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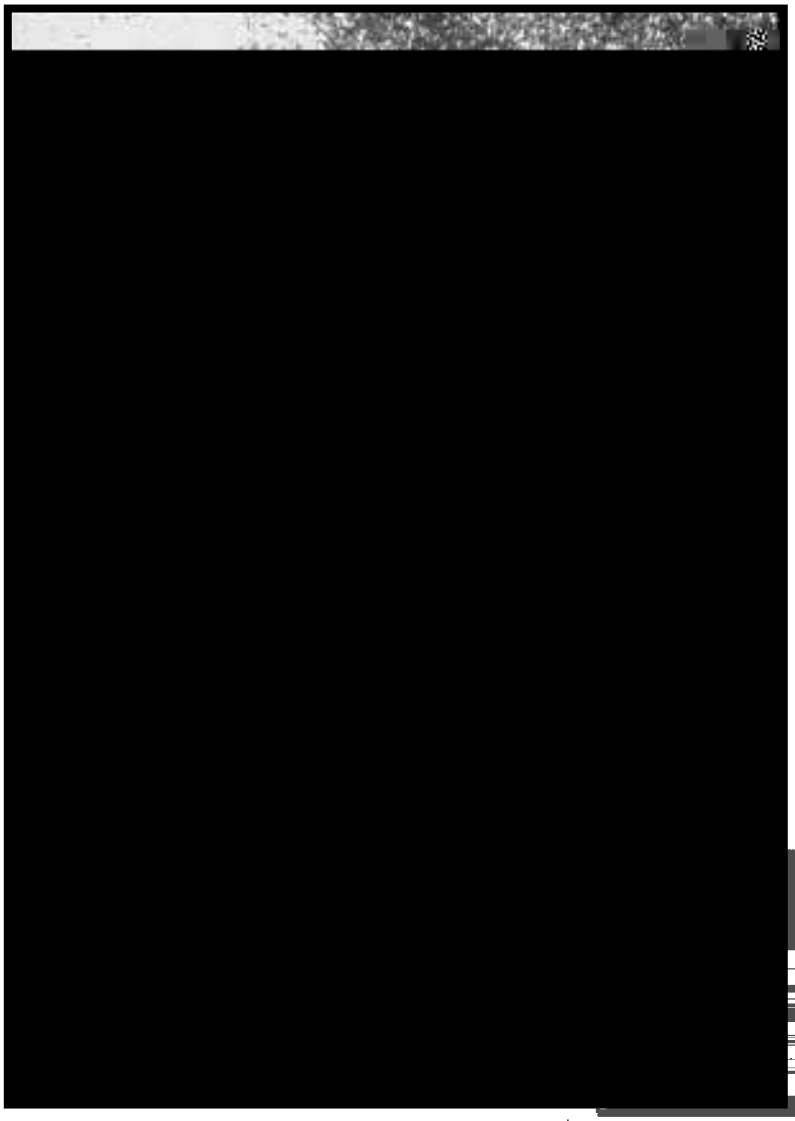
# A LANDOWNER'S GUIDE TO WOODLAND WILDLIFE MANAGEMENT



*with emphasis on the ruffed grouse*

*By Stephen DeStefano, Scott R. Craven, Robert L. Ruff, Darrel F. Covell and John F. Kubisiak*

*Cover photo of the Leopold shack, Leopold Memorial Reserve, Baraboo, Wisconsin by Darrel Covell*

*University of Wisconsin–Madison, University of Wisconsin–Extension, Wisconsin Department of Natural Resources and the Ruffed Grouse Society of North America*

PREFACE iii

INTRODUCTION v

Focus on the ruffed grouse vi

The Wisconsin private woodland owner: a profile vii

1 A FOREST ECOSYSTEM PRIMER 1-6

Wildlife needs 1

Wildlife managemenu

# *Introduction*

Forests are one of Wisconsin's most important natural resources. They provide economic, recreational and aesthetic benefits and make up nearly 15 million acres (43%) of the state's total land area.

Many woodlands are publicly owned, especially in northern Wisconsin. Others are controlled by corporations or industry. But at least 370,000 private citizens own woodlands in Wisconsin. Their holdings make up about 60% of the state's forested habitat.

*Stephen DeStefano*

Forests provide a refuge for many kinds of wildlife. In the past, most wildlife management programs have been directed toward public lands. But because most land in Wisconsin is privately owned, landowners are now encouraged to develop and maintain wildlife habitat on their land. University of Wisconsin-Extension, the Wisconsin Department of Natural Resources (DNR), and many private groups all share a common interest in promoting wise resource management on Wisconsin's private lands. This guide is a product of that interest.

Wisconsin's forests range from small isolated woodlots surrounded by agricultural lands in the southeast, to large stretches of conifers and hardwoods in the north. Many wildlife species depend on some form of woody vegetation. A few, such as black bears and timber wolves, need many square miles of forested habitat; others, such as squirrels, can live in small woodlots. Some species prefer deciduous forests, others coniferous. Some birds require uniform expanses of mature trees for nesting, while ruffed grouse and woodcock prefer a mix of young and middle-aged woods. Forests of every size, type and age provide habitat for some kind of wildlife.

Most wildlife management is actually habitat management. A management strategy may be simple, such as erecting a bluebird nest box, but more often it involves manipulating vegetation. Maintaining a forest in a mature state is good management for some wildlife, whereas removing timber enhances habitat for others. Your decisions about woodland management should be influenced by many factors, including your land's potential, your goals, and the conservation of Wisconsin's resources. This guide will help you explore management alternatives.

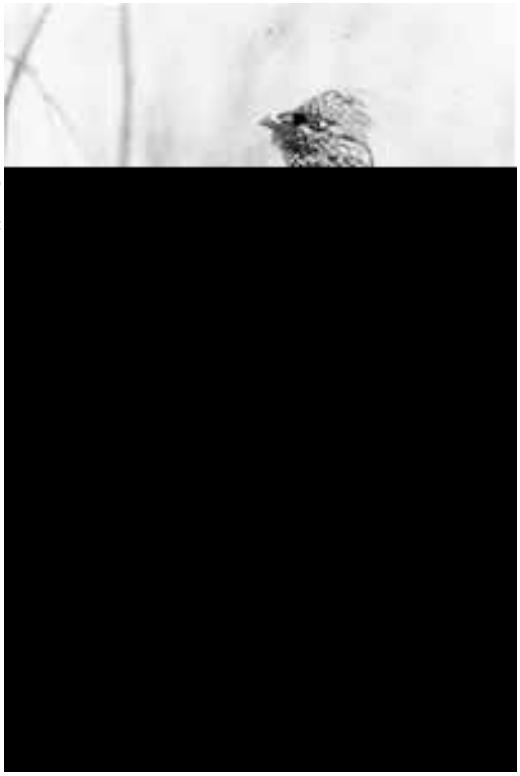
Remember to temper your expectations. Wildlife management is often more art than science. Variations in location, topography, weather, natural events and wildlife populations make it difficult to predict the exact results of any management effort. Nevertheless, this guide offers some proven techniques for benefiting wildlife on your property.

## *Focus on the ruffed grouse*

The ruffed grouse (or partridge) is featured in this publication for several reasons. As the most popular game bird in Wisconsin, grouse offer a challenge to hunters and are also attracting increasing attention from photographers and others who simply enjoy wildlife. Although ruffed grouse are common throughout much of Wisconsin, DNR researchers expect populations to decline if aspen and oak acreage continue to decrease. Here is an obvious opportunity for the woodland owner to maintain habitat for this popular species.

A great deal of research has been done on the biology, habitat requirements, and population ecology of the ruffed grouse. That research provides a sound basis for the habitat management practices described here.

Ruffed grouse management need not be exclusive. Good grouse habitat also benefits woodcock, rabbits, deer, and many songbirds, as well as wildlife predators. The basic principles outlined in this guide can be used to benefit all Wisconsin's wildlife species. Your primary management goals—preservation, timber, wildlife, or recreational—along with your land's native vegetation, will ultimately determine the wildlife species found on your property.



*Tom Martinson, Little Marias, MN (UW–Extension ruffed grouse slide set)*

# *The Wisconsin private non-industrial woodland owner: a profile*[1]

• Private woodland owners in Wisconsin account for an estimated 9,082,000 woodland acres (218,000 private non-industrial woodland, or PNIF, ownership units). At least 370,400 people (12% of the state's population 20 years of age or older) have an ownership interest in this land.

• The average size of woodland holdings is 42 acres, with property ranging from 1 to 9,000 acres.

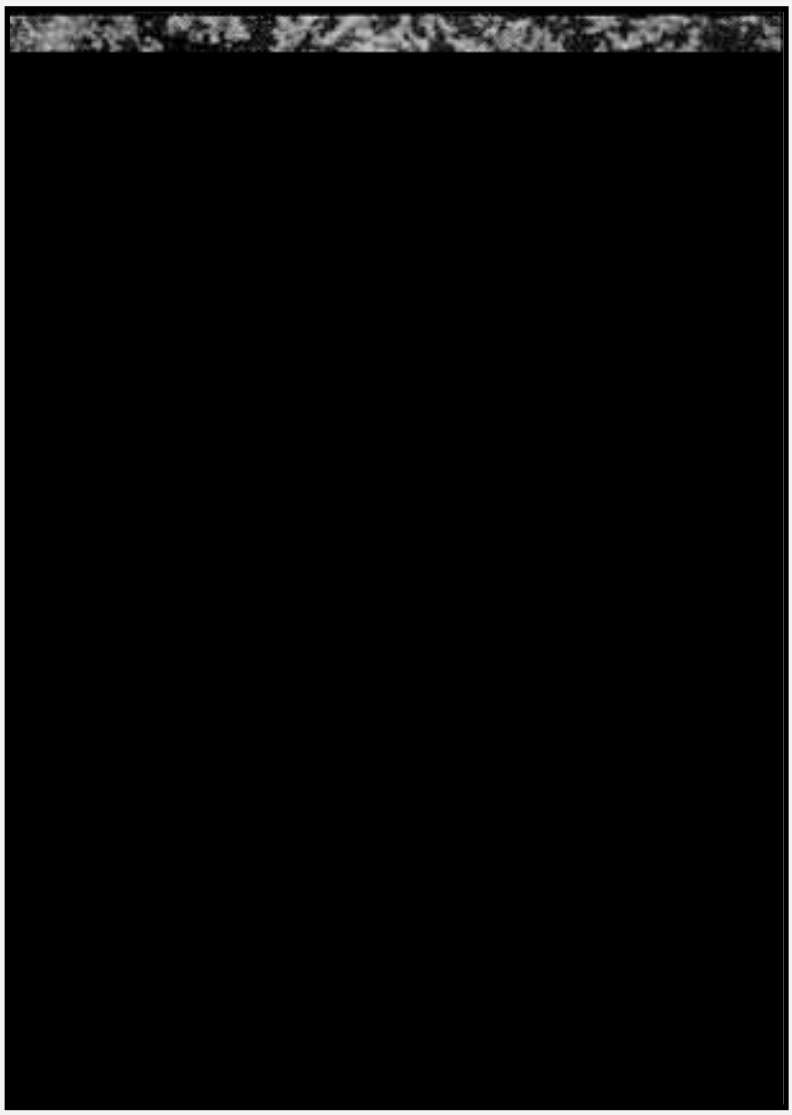
• Eleven percent of the woodland owners control 50% of the PNIF acres.

• Nearly one-third of Wisconsin woodland owners acquired their woodland within the past ten years.

• Forty-two percent of woodland ownerships are part of an active farm. About one-third farm as their primary occupation.

• The education and income of woodland owners are similar to Wisconsin's population as a whole.

• Woodland owners cite a wide variety of reasons for owning their woodlands. Most list "scenic enjoyment" (69%) and "wildlife habitat" (74%) as most important. The smallest proportions of owners give "motorized recreation" (7%) or "investment," the potential to sell for a profit (18%), as important reasons for owning their own woodlands. "Timber production" (30%) ranks seventh among the ten most important reasons for owning woodlands—fourth, if considered on an acreage basis. Most owners report multiple reasons for owning their own woodlands.



*A. Jeff Martin*

• Department of Natural Resources (DNR) county foresters, Soil Conservation Service (SCS) personnel and UW-Extension county agents are the most popular sources for professional advice about woodland management.

• Only one of every three woodland owners (37%) obtained outside management advice in the past decade. For those who solicited such advice, the main purpose was for timber production, harvesting or management information. Although large proportions of owners rate wildlife habitat and scenic enjoyment as important reasons for owning woodlands, very few have obtained management advice on these subjects over the past decade.

[1]Highlights from Roberts, J.C., W. G. Tlusty and H.C. Jordahl, Jr., 1986. The Wisconsin private non-industrial woodland owner: a profile. Wisconsin Coop. Ext. Serv. Occas. Paper Series No. 19. 128 pp.

• Relatively small proportions (3% to 10%) of woodland owners have participated in the forest management assistance programs that are available. The proportions of woodland owners who say they are aware of the programs' existence ranges from 21% to 41%.

• The highest ranked recreational activities—"viewing nature," "hiking," "hunting" and "berrypicking"—are enjoyed each year by over half of all woodland owners.

• Woodland owners report that a wide variety of public incentives could induce them to undertake or continue a woodland management program. Property tax reduction and free or low cost trees (incentives now available but not widely used) are considered essential by most woodland owners. While not deemed essential by a majority, they also felt that state and federal tax credits, low cost educational programs, tax reductions, and assistance in marketing timber and preparing management plans would also be important.

• About half (51%) of woodland owners say they are not interested in developing and carrying out a management plan for timber, scenic beauty or wildlife habitat. About one in four (26%) are interested in developing such a plan. Sixty percent of those interested would require a tax reduction as an incentive; 40% would not.

• Approximately 8.6 million acres (95%) of privately owned woodlands are open to public access, but permission is required on two-thirds of these lands.

• Twenty-five percent of owners who close their land indicate they have problems with trespass. Hunting is the most significant problem for this group of owners.

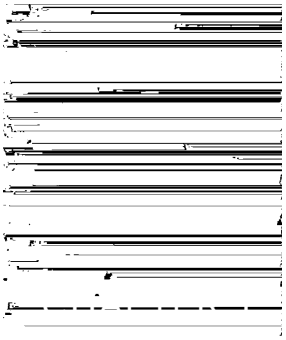
• The mean size of harvest area for timber sales was 23.3 acres. Twenty-seven percent of the sales ranged from 1 to 9 acres.

• Approximately two thirds (68%) of the owners have never harvested wood products to sell. This group controls 4.2 million acres or 46% of all private non-industrial woodland. More than 70% of all woodland owners agreed that the benefits of the Woodland Tax Law (WTL) or Forest Crop Law (FCL) programs should be made available to those who choose to emphasize wildlife habitat, scenic beauty and recreation in addition to wood production.

• Making the benefits of the Forest Crop Law or the Woodland Tax Law groups available to those who choose to emphasize other purposes in addition to wood production would not in itself encourage a large number of owners to enroll. The majority of owners (52%) didn't know if such a change would cause them to enroll in FCL; 41% didn't know if such a change would cause them to enroll in WTL.

• About two thirds (68%) of woodland owners plan to keep all their woodlands for the next 10 years. "Low available volume," "ruin scenery," and "desire to leave their woodlands as a legacy" were the reasons most frequently given for not harvesting and selling wood products.

• Owners of larger woodland acreages are more likely to harvest and and rn addcrd e1r w liife wnot0gnise their llablea and anhes(in land3r•ly g wood)TjT*(products.)Tj12de



# *CH oftferent age clas w.*

Before you begin your management program, it is absolutely essential that you understand fundamental forest and wildlife ecology.

## *Wildlife needs*

All animals need food, water, cover and living space to survive and reproduce. Wild animals vary in the kinds of food they eat. The black bear is a *generalist* that feeds on berries, roots, nuts, leaves, fish, small mammals and carcasses of deer and other carrion. An adult woodcock is a *specialist* because 90% of its diet is composed of earthworms. The ruffed grouse is both a generalist and a specialist at different times of the year. In summer, grouse eat leaves, seeds and berries in addition to insects and other invertebrates. Throughout the fall, twigs, buds, nuts and fruits make up the grouse diet. During winter, grouse specialize on buds, particularly from aspen trees. They depend on this high-protein food until spring.

All animals need water, which is usually readily available in Wisconsin. Wildlife can get moisture from standing water, dew-laden plants, and juicy foods such as berries. Ruffed grouse apparently do not need standing water; they get most of their water from food and dew.

Cover is also crucial. Your management can improve its quality. Cover serves many purposes for wildlife: It offers protection from bad weather, provides a refuge from predators and affords a secure nesting site.

Cover and food often go hand in hand—especially for ruffed grouse. A mixture of different age classes of aspen and other trees provides breeding, nesting and escape cover, while also supplying food in the form of buds, twigs, catkins and leaves.

There are many factors to consider when managing land for a particular form of wildlife. A species' *home range* is one such factor. The home range of a gray squirrel may be only a few acres, whereas a white-tailed deer or wild turkey might range over hundreds of acres.

As part of their home range, many animals, particularly birds, have *territories* they defend from others of the same species and sex. For ruffed grouse, the territory reserves a breeding area. In spring, adult males (commonly known as drummers) defend 6 to 10 acres of suitable cover for breeding. To a large extent, the size of your property (relative to a species' space requirements) determines both the presence and abundance of wildlife on your land.

Habitat is simply the place, with all its environmental influences, in which a species lives. A suitable habitat fulfills the four wildlife needs for food, water, cover and living space, and permits individuals to survive, reproduce and maintain the population.

For species which can adapt to different habitats, suitable dwelling places often vary widely in different geographic areas. For example, within limits, deer in Wisconsin thrive equally well in southern farm lands, large central Wisconsin marshes, and northern forests. This indicates that an area's capacity to fulfill wildlife needs, and not the land's appearance, determines its habitat value.

## *Wildlife management principles*

Managing wildlife means applying your knowledge of ecology to animal populations and their habitats. You can make an impact on wildlife when you observe ecological principles or consult resource professionals about managing your land.

*Aldo Leopold* emphasized the view that wildlife is a product of the land and the habitat it provides. He also believed that habitat management is the art of producing a sustained yield of wildlife. As a landowner, you can create the necessary habitat and master this art.

Thoughtful wildlife management, based on ecological principles, often uses the techniques of forestry to attain its goals. Chief among these is silviculture, which involves manipulating forest establishment, composition and growth. Healthy wildlife populations are one of the many benefits of good forest management.

Your property may have enough water, cover and space to support ten animals. But if there is only enough food for six, you will only have six. This is the limiting factor principle: The scarcest basic requirement limits the population. Of course, inadequate food, water, cover and living space are not the only things that limit animal populations. Disease, parasites, predators (including hunters), and adverse weather can also reduce populations. Yet these so-called mortality factors usually

have less impact in good habitat that meets the basic needs of wildlife.

Wildlife management, like most management, attempts to achieve an objective—such as increasing grouse or other wildlife populations. In the example above, increasing food quantity or quality will allow your land to support ten or more animals, but eventually another shortage will limit further population growth. In theory, wildlife management attempts to remove these limiting factors until wildlife population goals are reached.

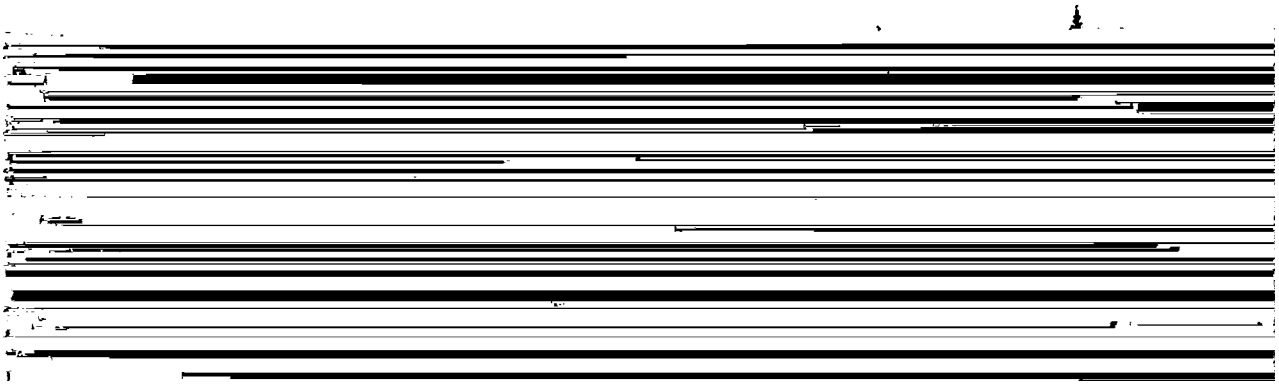
When you improve poor grouse cover, you increase your land's *carrying capacity*—and this should result in more grouse. If you continue to remove limiting factors to improve the carrying capacity of your land, will wildlife populations increase forever? No. Each

openings in the heavily forested tracts of northern Wisconsin, the areas often exhibit increased wildlife use. On the other hand, much of the forested habitat in southern Wisconsin is already broken up into islands of woodland surrounded by large open areas. Some wildlife species can't use such small parcels of habitat. This phenomenon, known as *habitat fragmentation*, is now viewed as a problem by wildlife managers. If you own a large wooded tract in southern Wisconsin, you should consider preserving this unique community.

As a rule, evaluate the available edge in terms of the wildlife needs discussed here. If the edge barely meets a species' habitat requirements, try to increase its size. Increasing the amount of edge can sometimes be counterproductive because it reduces the area of forested habitat.

If you do decide to manage your land for ruffed grouse, there is another factor to consider—the ten-year population cycle. Ruffed grouse populations rise and fall naturally, with peaks and troughs occurring about every ten years throughout much of their range (fig. 2). Other northern forest species, such as snowshoe hares, also exhibit this so-called "ten-year cycle." The reasons for the cycle are complex and involve interactions between the quality and quantity of critical winter foods, predators, severe winter weather, disease and parasites. Still, studictions

If a farmer plows the “back forty” in the spring and then for some reason abandons it, annual weeds quickly establish themselves on the bare soil. The weedy field doesn’t look much like a forest, but succession has begun. Perennial plants invade the field, and because they can outcompete annuals for nutrients and space, they will eventually dominate. Shrubs and tree seedlings that grow well in direct



some disturbance (fire, windstorm, disease or logging) changes it. Because these events happen so often during the hundreds of years it takes for a forest to mature, a true climax forest rarely evolves.

Forest succession is an important concept in wildlife management because it predicts the wildlife species you can expect to find in any given stage of forest development (fig.3). Some animals are adapted to live and breed in old fields, some in young forests, and others in mature woods.

There is usually some overlap in the habitat of each species. For example, cottontail rabbits inhabit fields, shrubby areas or young woodlots with dense understories. Some species have very general habitat requirements while others are more specialized. But few species, if any, thrive throughout all of the forest's successional stages.

How does this relate to grouse management? Ruffed grouse are usually associated with the early stages of forest succession. To maximize grouse populations, forests that have grown beyond the early successional stage must be cut, burned or disturbed in some way—then allowed to grow back. Thus, succession necessitates a basic management decision. Do you want to manage your land for ruffed grouse, woodcock and other early successional stage wildlife? Do you want to emphasize older stages that provide habitat for species of mature forests, such as pileated woodpeckers? Or do you want to try (if your property is large enough) for a mixture of both?

## *Managing the forest as an ecosystem*

A forest is a biological community dominated by trees and other woody vegetation. An ecosystem includes all the environmental elements, both living and non-living, that contribute to a community. A forest ecosystem encompasses the animals, trees, understory growth, leaf litter, soil, rainfall, groundwater and all the other components that make up a forest. Wildlife is a part of the ecosystem in which it lives, and each species is influenced by all facets of the ecosystem.

Managing natural resources wisely is often interpreted as using resources to benefit the site, the landowner, or the public—depending upon which interests are being considered. There is nothing really wrong with this philosophy. Nevertheless, many owners overlook a woodland's many potential values by narrowly defining use and restricting their management schemes. Thus, woodlots are often managed only for timber production, watershed, wildlife or recreation. But every forest is a watershed because some rain falls on it . Every forest has some wildlife, aesthetic, conservation and recreational value. The impact of these values varies among woodlands and among woodland owners.

As the manager of your woodland, you decide which uses to favor. One option is to produce timber on land that is managed for wildlife; in fact, timber and wildlife management often complement each other. Some tradeoffs between various land uses will always be necessary. Sawtimber management may require you to compromise ruffed grouse habitat. Likewise, managing for grouse, woodcock and deer may adversely affect species that require large tracts of mature forest. If your property is large, you may have more flexibility for managing diverse habitats. But you will need to establish priorities and realize that you cannot support everything in the same woodlot. Vegetation, soil, water and wildlife are all interrelated; conserving them is the concern of forest ecosystem management.

At this point, you may be wondering about the potential conflict between managing an ecosystem and managing for a single species. After all, isn't this guide primarily about managing young forests specifically for ruffed grouse? Yes, but you must exercise caution with single species management. All the applied management disciplines—forestry, agriculture, soils, as well as wildlife, fisheries, and range management—have been criticized for manipulating natural systems without regard for their complex interrelationships. But a healthy ecosystem provides all of the different forest types necessary to support its native flora and fauna.

In this time of wildfire control and huge acreages of middle-aged forests, both ruffed grouse and old-growth songbird enthusiasts have reason for concern. As the manager of your own land, sensitivity to your woodland as an ecosystem will allow you to accomplish your goals, while still protecting the many values that make forests such a unique part of our world.

# *The natural zones of Wisconsin*

On the basis of vegetation alone, northern Wisconsin with its mesic forest types requiring moderately moist soils, differs from southern Wisconsin with its combined elements of prairie and eastern deciduous forest types. The Tension Zone (fig. 4a) divides these two regions. The Tension Zone's exact location represents the densest concentration of individual plant range limits (see Curtis, 1959).

Beyond this simple two-fold division, Wisconsin can be further separated into five natural zones or ecotypes (fig. 4b): *Northern Forest* (including the Lake Superior lowland), *Eastern Deciduous Forest* on the shore of Lake Michigan, *Western Upland* (including mostly the Driftless Area), *Central Sand Counties*, and *Oak Savanna/Prairie* (now mostly farmland) of southeastern Wisconsin. These zones differ in local geology, topography, soils or vegetation. Although most management techniques apply to the first four zones, be aware that special problems or unique situations occur in each.

FIGURE 4a. THE TENSION ZONE

The Tension Zone (shaded area) represents the densest concentration of individual plant range limits. For example, balsam fir is not typically found south of the Tension Zone, but partridge pea, a southern legume, is not found north of it.

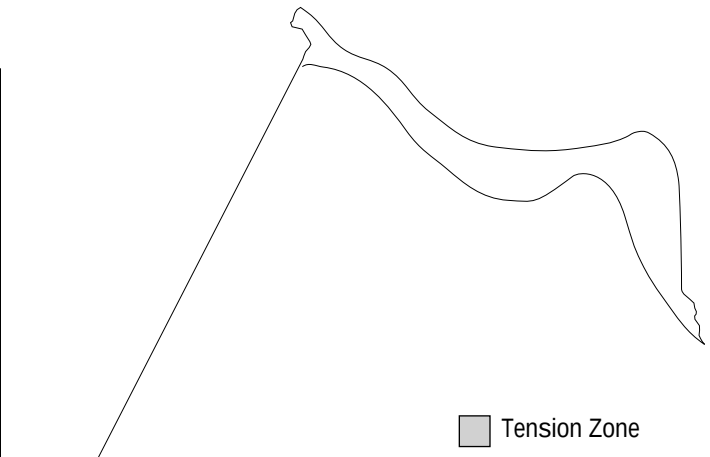
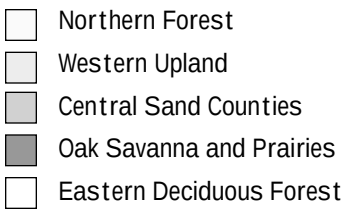



FIGURE 4b. WISCONSIN'S FIVE NATURAL ZONES.

A subdivision of Wisconsin into five natural zones: Northern Forest, Eastern Deciduous Forest, Western Upland, Central Sand Counties and Oak Savanna/Prairies.



*Wisconsin DNR*

*Northern hardwoods.*

Since this guide focuses on woodlands, we will not discuss the Oak Savanna/Prairie zone. Initiating a habitat management program in southeastern Wisconsin depends on woodlot size, type and management potential. But you can still manage for pheasants, quail, rabbits, squirrels, songbirds or other wildlife typical of agricultural land.

## *The Northern Forest*

The Northern Forest is a conifer-hardwood forest in the heavily glaciated northern third of the state. This land is owned by private citizens, industry, Native Americans, counties, and state and federal governments. All of the 1.5 million acres of National Forest in Wisconsin lie within this zone. Agricultural land is widely scattered and devoted to dairy farming and cash crops. Upland forests include pure or mixed stands of northern hardwoods, aspen (popple), fir and birch. The major forest product is pulpwood, followed by fuel wood and sawlogs.

Some of the best ruffed grouse habitat is located in northern Wisconsin where aspen is one of the major forest species. In many areas nearly two-thirds of the upland forest consists of aspen—offering opportunities to consider grouse habitat when developing pulp and timber management plans.

In the last 60 years, aspen acreage has decreased by about 1% per year, due to natural succession in the face of fire control and weak aspen markets. If you are interested in managing for ruffed grouse, aspen should be maintained where feasible. This may be difficult on sites where competition with balsam fir or northern hardwoods exists. Although small clumps of balsam fir provide excellent winter cover, fir can dominate some areas and reduce habitat quality. Likewise, northern hardwoods will eventually succeed aspen if stands are not clearcut periodically. Unfortunately, larger-sized cuts of over 40 acres are more common in the Northern Forest, which reduces potential grouse response. Keeping clearcuts to 5 or10 acres will increase age-class diversity and maximize grouse and deer populations.

## *The Eastern Deciduous Forest*

Extensive groves of sugar maple, basswood and elm characterize the Eastern Deciduous Forest. Additionally, American beech reaches its western range limit in this region. The Green Bay and Lake Michigan glacial lobes came out of the northeast to completely cover this area of southeastern Wisconsin. Post-glacial revegetation was dominated by the Eastern Deciduous Forest advancing from south and east of Wisconsin.

This area is the most densely populated of the five natural zones described. It includes the cities of Appleton, Fond du Lac, Milwaukee, Oshkosh and Sheboygan. Much of the maple-dominated forest has been cleared for development and agriculture; however, a great deal of both publicly and privately owned wooded land still exists. Wetlands, including tamarack swamps, are also important in this part of the state.

Notice that the Tension Zone (fig. 4a) dips sharply to the south in the area of Lake Winnebago. This leaves the Door County Peninsula and Lake Michigan shoreline counties with plants and animals found in the Northern Forest as well as the southern forest community. The Eastern Deciduous Forest is marked by glacial features such as drumlins and kettles, including the well-known “Kettle Moraine” areas. Ruffed grouse management is not a common practice, but deer and waterfowl management are important. Wild turkeys are also expanding in range and numbers.

## *The Central Sand Counties*

The Central Sand Counties, with their fine sands and silt loams, are dominated by aspen, jack pine and northern pin (scrub) oak. Immortalized in Aldo Leopold’s *A Sand County Almanac* (1949), this area contains a mosaic of cover types. Agricultural development

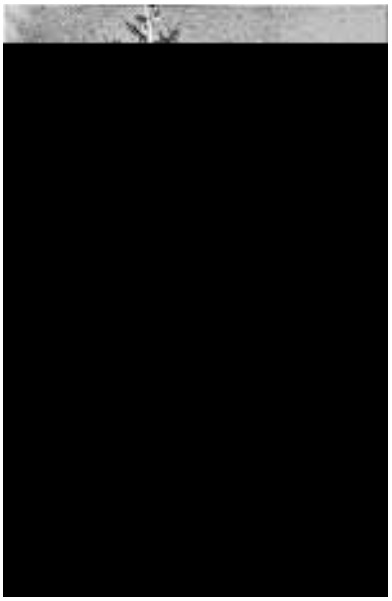
Because of these trends and economic factors, foresters may encourage you to convert to northern hardwoods or pine after harvesting mature oak-hickory woodlands. This will probably diminish grouse, deer, squirrel and turkey populations. Nevertheless,

# *Designing a habitat management plan*

You should consider several things before beginning a habitat management program for your woodlands. One of the first and most important is your time, because a successful wildlife management program requires several years' commitment. This does not mean that you have to work every day for many years to improve habitat, but it does mean that you must be willing to follow through with your management efforts.

It can take a long time to alter the vegetation and detect a wildlife response to the changes. Don't be discouraged—your efforts will be steadily rewarded in small ways. Each time you hear a ruffed grouse drumming from a new corner of your land, or when songbirds use snags (dead trees) you have preserved or a nestbox your children built, you will reap benefits from your labors.

Abundant wildlife can cause problems. At high populations, some species become pests that compete with other land uses. A good grouse management program will also attract deer to your woodlot. Deer can, and do, cause considerable damage in Wisconsin. Your woodland could provide sanctuary for a deer herd that raids a neighbor's orchard or cornfields. Deer may make it nearly impossible to establish some of your own plantings, such as Christmas trees or fruiting shrubs. You may need to protect gardens and berry patches from certain species.



*Wisconsin DNR*

Quality wildlife habitat can also attract potential users of wildlife—especially hunters—who may create safety and trespass problems. But before you close off the wildlife resource by posting your land, remember that wildlife belongs to everybody. The DNR's "Project Respect" offers one option to help you deal with trespass, while providing for regulated public access. Also, Wisconsin's recreational use statute, revised in 1984, limits the injury liability of private landowners (see Appendix E for an explanation of the statute).

The basics are behind us. Let's get going with a management plan for your land.

Step 1

## *Set management objectives*

Once you have decided to manage your woods for wildlife, plan your approach. Establish your goals and decide what you want from your woodland. Are you primarily interested in grouse, woodcock and deer, or would you also like to have thrushes, warblers and woodpeckers breeding on your property? Do you hunt squirrels and rabbits as well as grouse? Do you plan to sell some pulpwood to help defray your management costs? Do you harvest fuel wood for your own use or income? Do you enjoy gathering wild berries and nuts? There are many things to think about!

You are not restricted to one goal. You can have several primary objectives (such as managing for ruffed grouse and pulpwood sales), plus secondary objectives. Secondary objectives could include encouraging rabbits by building brushpiles, providing squirrels with nest boxes, and saving snags for cavity-nesters such as woodpeckers. Jot down your ideas and objectives and keep track of references and literature that will aid your management efforts. You may want to keep a journal, including field notes and nature observations. This will be a helpful and

interesting record of your progress and experiences.

Now is a good time to do a little research on forestry techniques and the habitat needs of wildlife species you wish to encourage. Some good publications can be found in REFERENCES FOR FURTHER READING (see Appendix D). Background knowledge on what it will take to achieve your goals will help you evaluate your land and communicate with professionals.

Step 2

## *Inventory and evaluate your land*

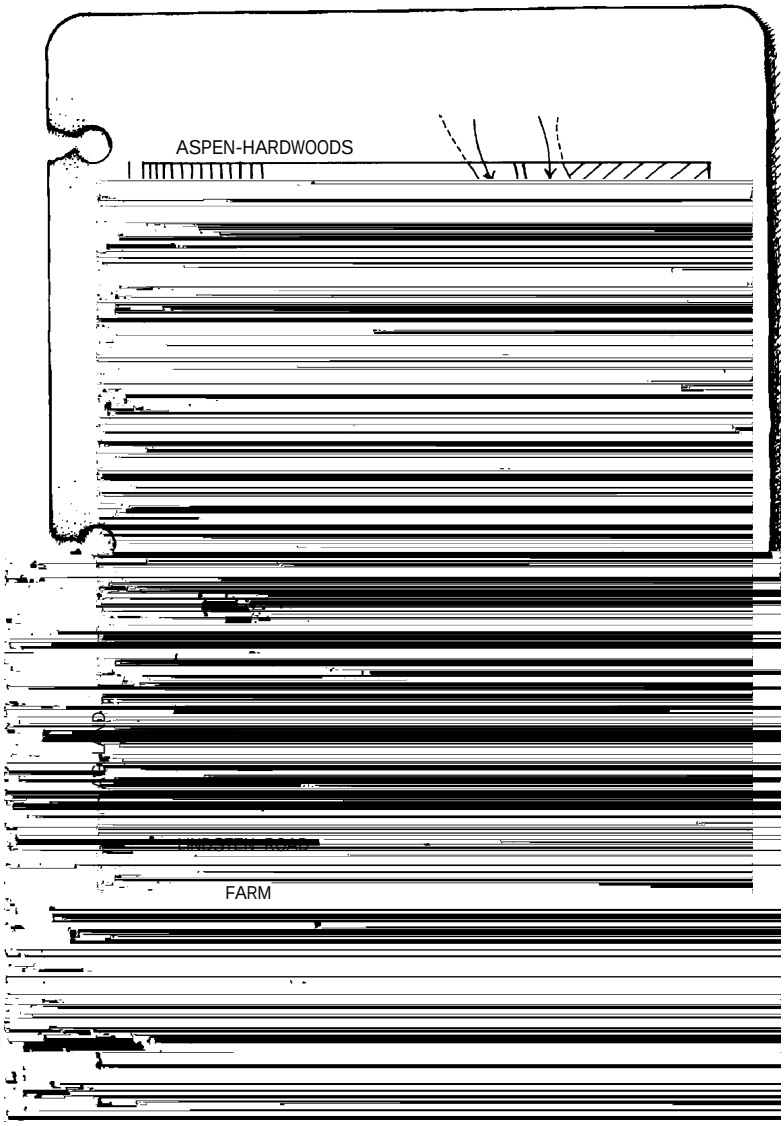
With some objectives in mind, you can begin to inventory the wildlife, vegetation and physical features of your land. Take your journal along and write down any information that pertains to your objectives. In what successional stages are your woodlands? What tree, shrub, and herbaceous species are present? What is the acreage of various stands of conifers, oaks, aspens and mixed hardwoods? If your land is hilly, record the slope and exposure (northwest, southeast, etc.) of each stand. Take special note of any snags, large acorn-producing oaks (wolf trees) and berry patches. A pair of binoculars and some of the field guides listed in the references will help you make an accurate inventory. You may find a new hobby, a new species for your county, or even a new champion tree!

While examining your own land, observe your neighbor's property, too. Are mature forests, young shrubby woodlands, or old fields nearby? Locate and estimate the acreage of adjacent croplands. Evaluate neighboring land for habitat components you cannot provide, and for their effect on wildlife movement.

Contiguous habitat strips provide travel lanes, while a wide field may be a barrier. You may even want to talk to your neighbors about forming a cooperative habitat management plan. It takes additional planning, but the larger acreage involved may be worth it, especially for such contemporary interests as "trophy deer management."

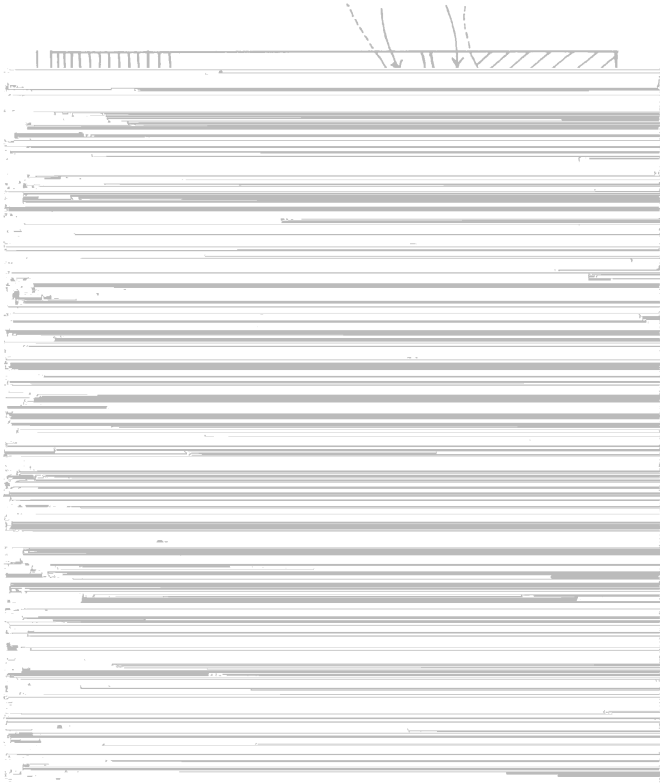
Collect enough information to delineate the size, type and successional stage of different habitats. For example, to manage for ruffed grouse, record the number and ages of any aspen plus the location and acreage of berry-producing shrubs, alder thickets, small openings in the forest, grape tangles and young conifers. A lack of some of these cover types tells you where to begin your management.

FIGURE 5. PROPERTY COVER MAP.



Once you've had a good look at what you (and your neighbors) own, begin sketching a map of your property. Aerial photographs, available at the local Agricultural Stabilization and Conservation Service (ASCS) office, and topographical maps from the U.S. Geological Survey (USGS) are very useful. Start with obvious landmarks (buildings, driveways, fencelines, roads, trails, streams and ponds) and use them as reference points. Next, sketch in property boundaries and the location and approximate size of major timber stands (any similar, identifiable groups of trees).

For example, you may have 15 acres of 10- to 12-year-old aspen, 22 acres of 25+ year-old aspen, 23 acres of mature northern



discuss concerns previously recorded in your journal. If you cannot arrange a professional visit to your property, set up an office consultation. Your journal and cover map should provide enough information to plan your management program.

After the professional assesses the wildlife potential of your property, settle on your final objectives and sketch out a habitat management plan based on your cover map (fig. 6). If logging is needed, a forester can provide information on timber marketing practices, sawlog and pulpwood prices, locations of the nearest mills and names of reliable timber operators and harvest companies.

FIGURE 7. SAMPLE WORK SCHEDULE FOR HABITAT MANAGEMENT

Schedule for Habitat Management

I. Aspen Management
1. Construct log road and landings
2. Clearcut 1/2 of 45-year-old aspen in 1995
3. Clearcut 8 acres of 20-year aspen in 1995
4. Sell for pulpwood
5. Cut second half of 45-year aspen in 2000
6. Cut 3 more patches of 20-year aspen in 2000
7. Make final 2 aspen cuts in 2005

II. Alder Management
1. Make initial strip cuts in 1996
2. Follow-up with additional strip cuts in 1998

III. Hardwood Management
1. Begin T.S.I. in 1995 - cut enough for 10 cords (4 for home use, 6 to sell)

IV. Miscellaneous
1. Seed logging trail and landings with white clover
2. Plant conifer patches between 1993-1998
3. Build brush piles; in north 1994; in south 1996
4. Construct 6 bluebird boxes and place around house by 1995

Step 4

## *Finalize your management plan*

Your habitat management plan is nearly complete. You should have the following: an inventory of wildlife and plant species; a description of timber stands including location, size and composition; additional field notes; references, addresses and phone numbers of the local wildlife manager and timber harvesting contractor; a complete cover map and a map showing areas to be managed.

The final step is to draw up a work schedule. Include the primary type of work to be done (for example, clearcut 5 acres of 35-year-old aspen), secondary jobs (use the slash to build two brush piles), the job location and an approximate timetable for completion. Be realistic. Don't expect to clearcut five acres or plant 1,500 conifers by yourself on a Saturday afternoon. A work schedule will help keep you on course and provide a record of accomplishments (fig.7). Consider enlisting the help of volunteer groups (scouts, 4-H, senior citizens, or conservation clubs) in your area. Take the opportunity to share the joys and responsibilities of land stewardship.

# *Managing young forests for grouse and other wildlife*

*Stephen DeStefano*

As mentioned earlier, you should familiarize yourself with the life history and habitat requirements of ruffed grouse, or any species of interest, before starting your management program.

Some publications that can provide more information are: *The Ruffed Grouse* (Gullion), *Ecology of the Ruffed Grouse* (DeStefano et. al., 1984), *Ruffed Grouse* (Madson, 1969), and *Ruffed Grouse* (Atwater and Schnell, 1989). Many publications on wildlife-related topics are included in *A Bibliography of Cooperative Extension Service Literature on Wildlife, Fish and Forest Resources* (Ruff et al. 1993). Details on these and other helpful publications are found under REFERENCES FOR FURTHER READING.

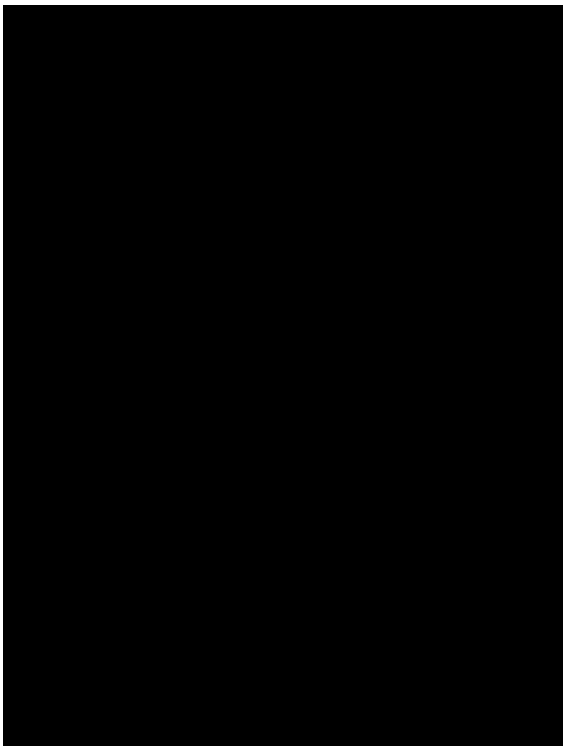
## *Evaluate your land's potential*

If your property lacks wooded cover, you may want to check the references in this guide for farm wildlife management tips on waterfowl, ring-necked pheasants, gray partridge, cottontails, fox squirrels, bobwhite quail or grassland songbirds. Remember to target those species whose ranges overlap your property.

Property consisting mainly of open fields may be better suited for re-establishing native prairie, while low pastures might be restored as wetlands. Restoration can be a particularly satisfying way of regaining some of Wisconsin's lost natural communities, and will attract wildlife unique to these habitats.

## *Aspen management*

Two aspen (popple) species grow in North America: trembling (also called quaking) aspen and bigtooth aspen (fig. 10). As its name implies, bigtooth aspen has large teeth on its leaf margin, while trembling aspen has smaller teeth and flattened leaf stems that allow the leaves to tremble in a breeze. Trembling aspen is the most widespread tree in North America. Bigtooth, which prefers drier sites, is limited to eastern North America. Trembling aspen provides somewhat higher quality food and cover for ruffed grouse, but management strategies for both species are similar. The two types will be treated together in these guidelines. Also in REFERENCES FOR FURTHER READING see the DNR's bulletin *Aspen Management on Your Land*.



*Scott R. Craven*

Aspen provides the major source of pulpwood in the Great Lakes states, while well-formed mature trees are sold as sawlogs or veneer bolts. Fast-growing and short-lived, aspen survive from 70 to 100 years on the best sites. As pioneer species, they grow best in open sunlight and poorly where shaded by other trees. They are unable to reproduce under an

FIGURE 9. ESTIMATING STEM DENSITY.

overhead canopy, except along forest edges or steep hillsides where sufficient sunlight reaches the ground.

As a forest ages, aspen eventually die out due to competition from shade-tolerant species. Nevertheless, the aspen in your woodlot can be maintained indefinitely—if you regenerate by clearcutting to allow the sun to reach the ground. Removing mature aspen produces a vigorous growth of young shoots, or suckers, that sprout from the older root stocks to start a new forest. Suckers commonly sprout in uniform stands, often at densities of up to 70,000 stems per acre! These stands provide the dense vertical cover required by grouse; first as brood cover, later, after about five years of natural thinning, for drummers. Surprisingly few aspen are needed to provide adequate regeneration following clearcutting.

Admittedly, there is some irony in cutting a forest to preserve it. What many consider to be the exploitative cutting of mature forests in mountainous regions of the country has given clearcutting a bad name. Huge clearcuts in such areas often result in severe erosion, and the slow regeneration of these forests create at least the impression of ecological devastation. Yet almost all aspen originates with some form of forest disturbance—either from natural causes such as fire and windstorm, or logging. If you remember that cutting an aspen leaves behind a vigorous root system, it is easy to draw a parallel with the gardener, who must periodically cut back rose bushes to keep them blooming. This strategy would not work for all trees or bushes, but for aspen and roses it works well. Small, well-planned aspen clearcuts on Wisconsin's relatively flat terrain are quite safe, and they quickly resprout without planting. Growth is surprisingly rapid, so there is no long-term denuded landscape to look at (fig. 11). Cutting your aspen at maturity provides the multiple benefits of excellent grouse habitat, aspen maintenance, and income from your land.

Removing all trees and saplings (including other species) over 1-inch DBH should regenerate a dense stand of aspen on most sites. This allows suckers to develop without overhead shading to hinder their growth. Remember, you can always make exceptions for a favorite white pine or oak (see the section on reserve trees).

Specify the 1-inch DBH limit in the logging contract, or make arrangements for treatment after the sale. Otherwise most operators will not take the time to cut submerchantable trees, such as small red maples or conifers, leaving you the back-breaking job of removing these aspen competitors. Don't worry about the slash left behind after cutting aspen or conifer stands. Aspen and conifer slash breaks down within a few years and will not hamper grouse movement as other hardwood slash does. If you have a lot of small hardwoods left lying on the site, you can burn them or invite your friends to cut them up for firewood.

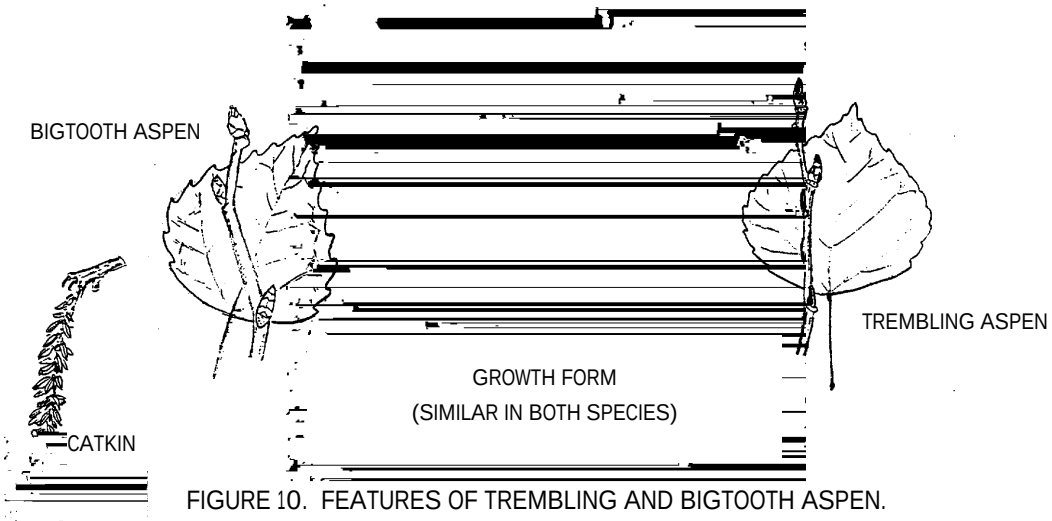



FIGURE 10. FEATURES OF TREMBLING AND BIGTOOTH ASPEN.

On poor or wet sites, common in the Central Sand counties, you may have trouble obtaining good regeneration. Preparing the site after clearcutting will improve aspen and shrub densities. Scarifying the site (disturbing the soil) through full-tree logging or logging when the ground is not frozen will improve suckering. Both methods increase surface disturbance, the former from the rake-like action of dragging a full tree out of the woods; the latter from the logging equipment that chews up the unfrozen ground.

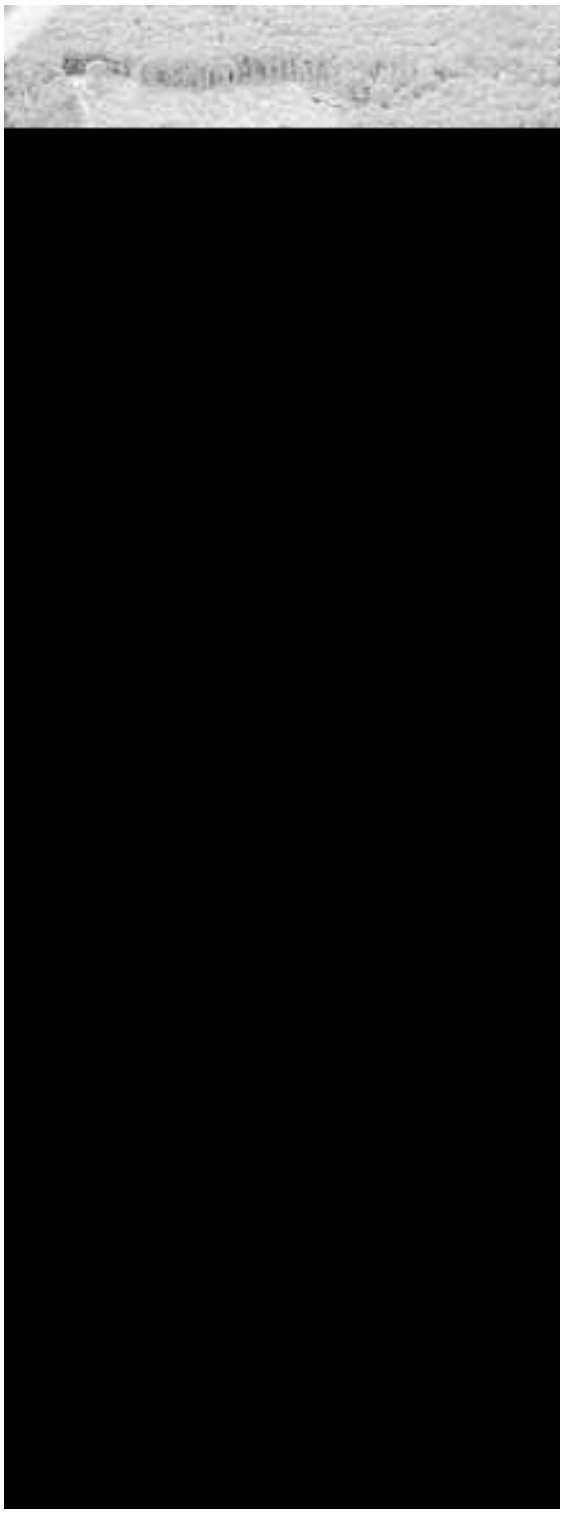
Burn the logging slash where it lies, rather than in piles. This allows the sun to warm the soil and will also stimulate suckering. Seek professional help before attempting to burn slash since the potential for danger exists in any venture involving burning. To encourage the best regeneration, harvest timber only from August to April. During this time, food reserves needed to stimulate sprouting are stored in the roots, protected from loss due to logging.

Now you know how to regenerate aspen. Next, you must provide the three age-classes of aspen needed by grouse within 6 to 10 acres—the approximate size of a drumming male's territory. Remember the Law of Interspersion! The more copies you can create of this basic unit—a drumming territory providing most of the year-round needs of ruffed grouse—the greater your potential grouse population. The easiest way to do this is to cut your aspen in small blocks on a rotation basis, producing a mix of age classes throughout your property.

Follow these four steps when setting up an aspen rotation:

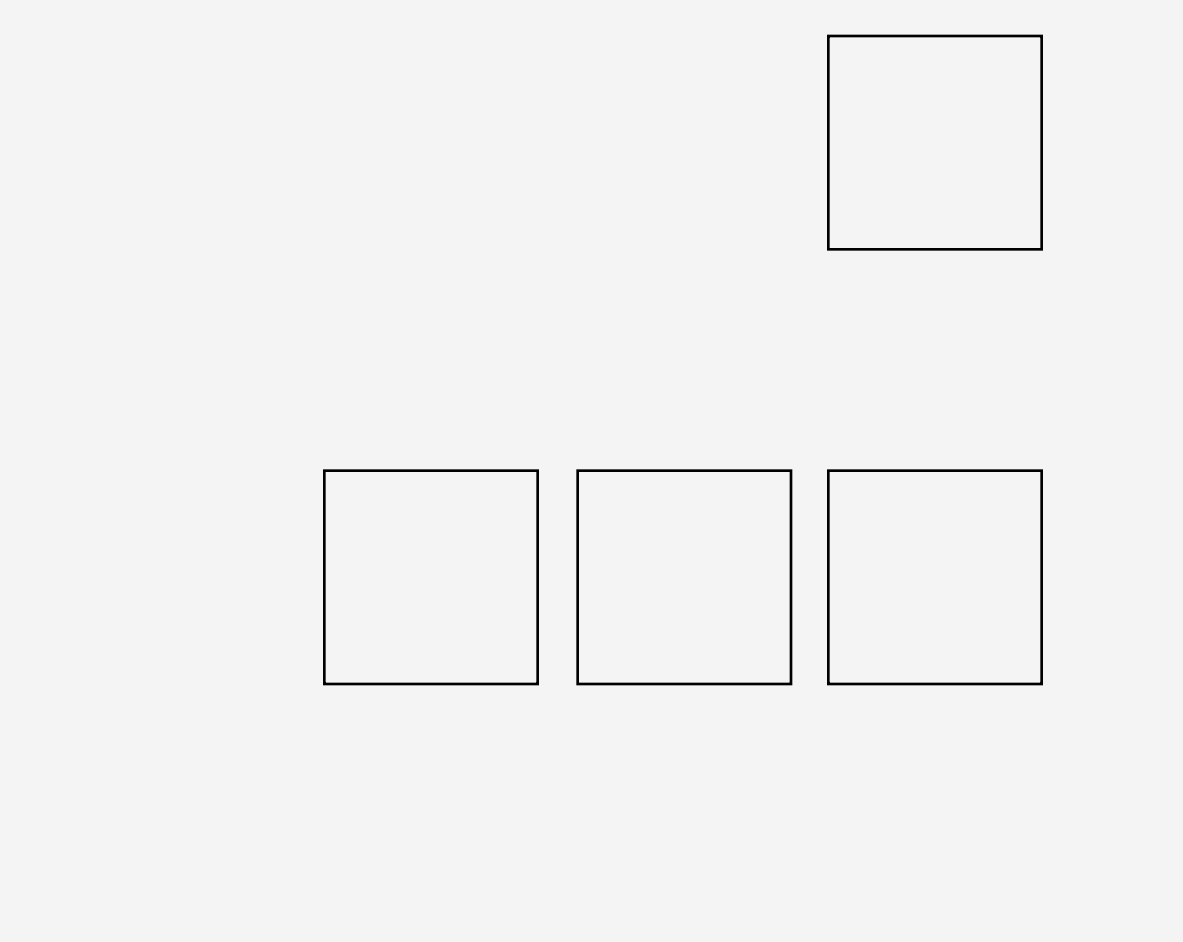
1. *Determine the rotation age.* Foresters recommend a rotation age of 40 years on poor sites (site index less than 50), 50 years on medium sites (site index 50-60), and 55 to 60 years on the best sites (site index over 60). Your forester can determine the rotation age for your aspen; this period then becomes the time frame in which you should plan your grouse habitat rotations.

2. *Select a cutting pattern.* You can use various cutting patterns to attain a mixture of age classes. Researchers have experimented with a number of checkerboard designs, using



*Tom Bahti*

FIGURE 11. An aspen clearcut quickly returns to its original mature forested state.



clearcuts of various sizes (fig. 12). This

3. *Determine your block size.* How big should you make your clearcuts? If you are using natural stands, you already know, although you can lump or split them. Small cuts are best: 5 to 10 acres is ideal, but loggers may demand 10 to 20 acres. You might convince a logger to cut in 5-acre blocks, however, if your total sale acreage is sufficient. For example, a commercial logger may agree to log your property if he or she can take 20 acres of aspen. Instead of clearing a contiguous 20-acre patch, two 10-acre blocks or four 5-acre blocks could be cut. Loggers may agree to this arrangement if they don't have to move their equipment too far between work areas. Providing good access will make a logger more willing to cut small blocks. *Managing Northern Forests for Wildlife* (Gullion, 1984) has special patterns for use on large properties where clearcuts over 20 acres may be necessary.

4. *Calculate your cutting cycle—the interval between one cut and the next.* Divide your average block size into the total aspen acreage; then divide this into the average rotation age of your aspen. This will tell you how often you must cut to complete a rotation in the available time frame. For example, 5-acre blocks divided into 40 acres of aspen with a rotation age of 50 equals 8 clearcuts to make in 50 years, or a cutting cycle of 6.25 years. On larger properties, multiple blocks will have to be cut during each cycle to complete a rotation on time. The cutting cycle is flexible. You can adjust it to take advantage of good pulp markets or to accommodate a logger's schedule.

Laying out an aspen rotation is not as complicated as it seems. Foresters do it routinely, and they can set up a rotation that will reflect your specific goals and timber situation. For example, cutting prescriptions often require adjustments, depending on the age and condition of the stand. If your stand is 10 to 15 years older than rotation age, deterioration (blowdowns, disease or dying trees) may force you to take immediate action.

understory to successfully compete with other tree species once the oak overstory is cut. Since many of our oak stands originated when

red oak acorn crop showing the effects of the frost. Likewise, hickories or other mast producers can help compensate for a total oak mast failure due to insects or other causes.

Whenever a mast species is eliminated from a woodlot, whether by cutting without regard for regeneration, or by disease (for example, the nationwide chestnut blight), the wildlife food supply becomes less dependable. By maintaining a variety of species, you imitate nature's way of supporting life by providing diverse food resources.

Oak wilt can be a concern in southwestern and central Wisconsin, but this disease progresses slowly and its effects are usually localized. Red oak is more susceptible to wilt than white oak. Preventing wounds to the bark, and logging or pruning only from October through March reduces the chance of insects spreading the oak wilt fungus to your woodlot. Once trees in your woodlot have been infected, you must cut the root connections between infected and healthy trees to prevent the disease from spreading. Be sure to disinfect your tools with alcohol after working on an infected tree.

## *Wisconsin Oak management guidelines**

This short outline will help you make management decisions about your oak. Starting at level 1, select one of the choices (1a or 1b) and you will be led to a management recommendation or directed to another choice. Continue choosing the statement that best describes your oak stand until you reach a management recommendation. A forester can help you determine which alternative best describes your oak stand.

| IF... | THEN... |
|---|---|
| la. Oak site index is 75 or greater | ☛ Go to 2a or 2b. |
| lb. Oak site index is less than 75 | ☛ Go to 4a or 4b. |
| 2a. Stand is mature | Harvest oak and convert to northern hardwoods, or dedicate to old-growth management. |
| 2b. Stand is immature | ☛ Go to 3a, 3b or 3c. |
| 3a. Stand basal area is 2/3 or more in oak | Manage for oak or mixed oak and northern hardwoods. |
| 3b. Stand basal area is between 1/3 and 2/3 in oak | Manage for best quality, fastest growing trees, regardless of species. |
| 3c. Stand basal area is 1/3 or less in oak | Manage for northern hardwoods. |
| 4a. Oak site index is 65-74 | Manage for oak or mixed oak and northern hardwoods. ☛ Go to 6a or 6b. |
| 4b. Oak site index is less than 65 | ☛ Go to 5a or 5b. |
| 5a. Oak site index is 55-64 | Manage for oak or mixed oak and pine. ☛ Go to 6a or 6b. |
| 5b. Oak site index is less than 55 | Manage for pulp or convert to pine or leave as non-economic stand for recreation, fuelwood and wildlife. |
| 6a. Stand is mature | ☛ Go to 7a or 7b. |
| 6b. Stand is immature | Thin or wait. |
| 7a. Oak advanced reproduction is adequate (at least 400 stems/acre, 4.5 ft. or taller) | Harvest. |
| 7b. Oak advanced reproduction is inadequate | Establish oak advanced reproduction. |

* Adapted from Sander, I.L. 1977. Manager's Handbook for Oaks in the North Central States. USDA For. Serv. Gen. Tech. Rep. NC - 37, North Cent. For. Exp. Sta., St. Paul. 35 pp.

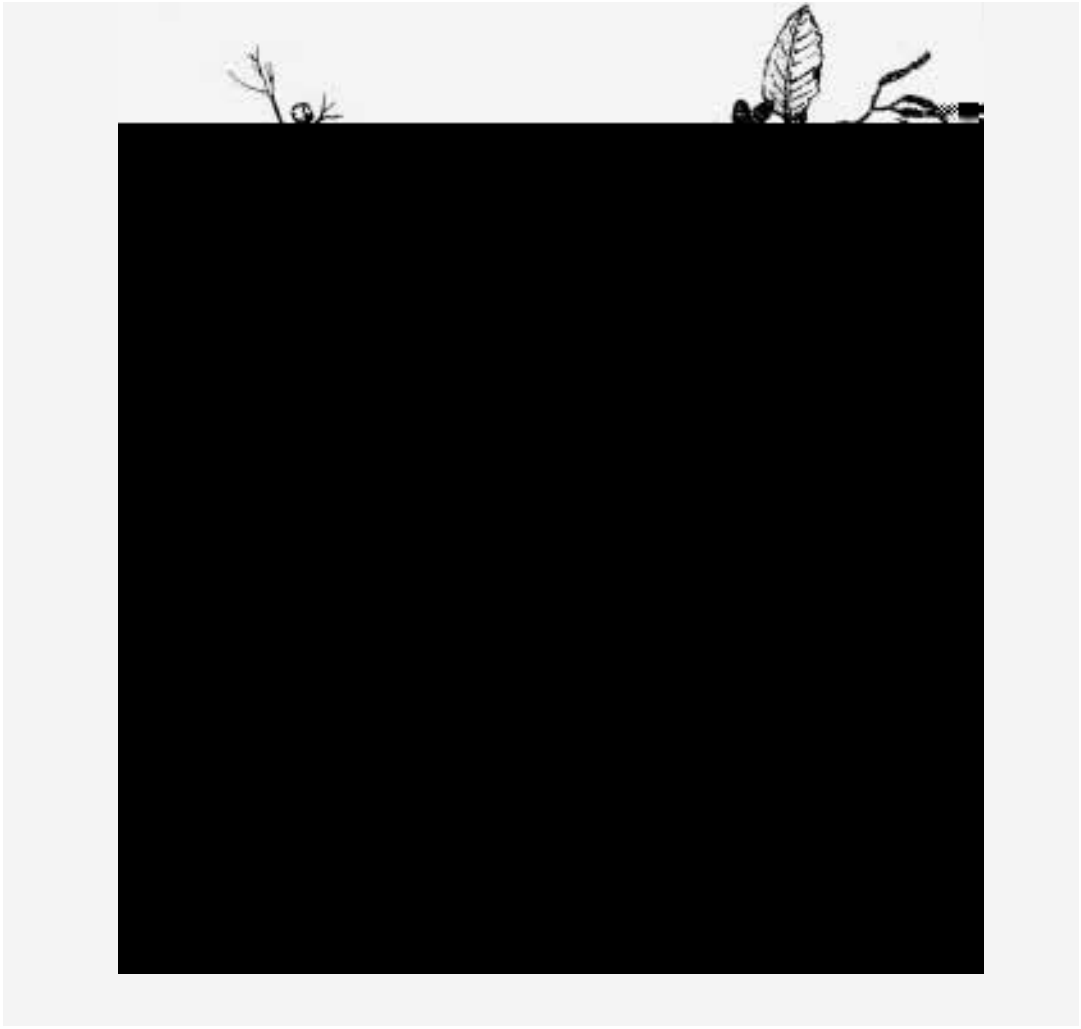
## *Conifer management*

The quickest way to start an argument among ruffed grouse biologists is to whisper the word conifers. There seems to be universal disagreement about how much grouse use conifers, whether they need conifers, and the effect they have on grouse mortality.

With this as an introduction, here is a suggestion: Use them or not as you and your consultant see fit. Conifers (pines, balsam fir, spruce and cedar) will diversify your woodlot and provide cover for ruffed grouse, deer, rabbits and songbirds throughout the year. Dense patches or clumps of conifers insulate grouse during the cold months. They are pleasing to the eye, especially in winter when they offer some relief from a uniform white and gray landscape.

The quality of coniferous cover varies by species and age. Tall pines and other conifers that have high crowns and lack lower

Still, from a wildlife standpoint, converting large areas to pine plantations should be avoided, especially if the pines replace high quality aspen or oak habitat. If you are contemplating a new conifer plantation, be sure to consider the costs for planting, herbicides, pruning and thinning—relative to natural stands of aspen, oak or jack pine—when making your decision.



few years.  This pattern of staggered

Dogwood, alder, hazel, winterberry, prickly-ash, raspberry and blackberry respond with vigorous growth following treatment (fig. 14). TSI or selectively harvesting marketable trees to increase sunlight penetration will improve shrub growth in mature stands.

## *Food and cover plantings*

Upland habitat can often be enhanced by planting berry-producing shrubs and trees. The additional food and winter cover will increase the carrying capacity of your land. Native shrubs and trees such as hawthorns, dogwoods, viburnums, mountain ash or chokecherry are good choices for Wisconsin. For wildlife plant sources, consult Chapter 6 and Appendix C. Gullion's *Shrub and Tree Planting for Ruffed Grouse* gives valuable planting information.

Shrub planting, because it is expensive and labor-intensive, should generally be limited to areas where food and cover are inadequate. In most of northern Wisconsin, it is more important to preserve herbaceous openings than to plant additional woody vegetation.

Leaving food patches of agricultural grains is not necessary for grouse, but will benefit songbirds, deer, squirrels, quail and turkeys—and draw them to an area where you can easily observe them. Plant food patches near good wildlife escape or resting cover, such as a dense woods or cattail marsh. Corn is the best all-around grain for winter food plots, because it will dependably hold its

woodlots loaded with large wolf trees. Because they have so many limbs, wolf trees often have little timber value except as firewood.

Landowners commonly see these large trees as money in the bank, with the mistaken idea that they are sitting on a valuable timber resource. Foresters, however, see poor-quality trees and an understocked woods. Without management to correct past abuses, it may be generations before natural processes restore the timber-producing capabilities of such land. Taking a forester's advice for TSI in these woodlots will open up the canopy to improve sawtimber stocking and growth rates, and also increase shrub densities for grouse and deer for many years. By leaving one or two wolf trees per acre, you can strike a nice balance between wildlife and timber production. Such use of reserve trees fits in well with Aldo Leopold's ideas on land stewardship—resorting neither to maximum economic production nor total preservation, but giving primary consideration to the overall values of your land.

## *Preservation*

Wisconsin possesses some unique habitats that should be preserved because they are fragile or essential to certain species. For example, in the southwestern part of the state, "sandblows" provide excellent reptile habitat. Other sites that warrant preservation include the patches of wild lupine inhabited by endangered Karner blue butterflies, or the dense stands of mature forest in southern Wisconsin, where rare Worm-eating Warblers dwell.

There is a place for preservation, even in land actively managed for timber production. A large white pine, used for roosting by wild turkeys or valued simply for its beauty, is a good example. Fruit-producing vines and shrubs may also be protected. Although most will vigorously resprout if their root systems are not torn out during logging, it may take quite awhile before they grow large enough to dependably supply food. Preserving thick grapevines or large-crowned hawthorns will tide wildlife over until your woodlot responds to the increased sunlight with a flush of new shrub growth.

Snag trees that provide nesting cavities and insect food are also an asset to your woodlot. In Wisconsin at least 65 bird and mammal species use snags for nest or den sites. Some excavate their own cavities in the snags; others use natural cavities or take over the abandoned homes of others. Try to leave at least five snags of various sizes per acre. The nice thing about snags is that they need not be left at the expense of timber production. Unsaleable trees growing too close to valuable timber can simply be girdled and left standing, providing valuable snags while reducing competition for nutrients and sunlight.

## *Diversifying your woodlot*

You can improve overall wildlife habitat by encouraging a mix of tree species in woodlots that are mostly one type. A few good mast-producing oak trees, or small clumps of oaks, scattered throughout a large aspen clearcut will provide food for squirrels, deer and other wildlife. Another option, which minimizes shading, is to leave a single small stand of oaks (one acre or less) within each clearcut. Likewise, small aspen clones within or at the edge of a large oak stand may be expanded to improve winter food supplies for grouse. Jack pine is another good species to mix in, particularly on poor soils in central Wisconsin. The mixed aspen-oak-jack pine stands common to this area may be the most productive amAeack p habtclose7Dnuiscough/r esihawthorns wiT*(bnc

meandering edges between the cut area and adjacent woods, and leave some trees and shrubs standing along the cut-line (See fig. 13). Leaving uncut buffer strips, known as riparian corridors, along stream banks will provide travel lanes and mature lowland timber habitat for wildlife. These corridors also prevent erosion, reduce stream siltation, and keep water from becoming too warm. (See *The Benefits of Well-managed Stream Corridors* by Craven et. al., 1987.) This is often important for trout streams, but be sure to check with your local DNR fish manager.

On many cold northern streams, it is better to keep the actual stream bank clear of woody vegetation since shade blocks the growth of aquatic algae essential to stream productivity. Brushing back overhanging vegetation, or creating meadow openings will usually suffice. Leave the remaining woody vegetation to provide the benefits mentioned earlier.

Another consideration when dealing with forest management adjacent to streams is the presence of beavers. Beavers can be beneficial but they may also cause significant damage to roadways, culverts, trout streams and standing timber. There are many factors to consider when managing beaver. For an excellent summary of landowner rights, responsibilities and options in beaver management refer to the DNR's booklet *Beaver Damage Control*.

## *Do-nothing cover types*

Sometimes the best management is no management. Many areas provide some cover for ruffed grouse but are not worth the time, effort or expense required to improve them. Management input would be far greater than the benefits. Good examples are trees or shrubs growing under very wet, marsh-like conditions. Dense grass or sedge associated with alder, willow, bog birch and other wet-area shrubs often offer valuable winter cover, but efforts to improve these areas are usually unnecessary and expensive.

Aspen usually grows on fairly well-drained sites, but so-called "offsite aspen" grows on poorly drained, wet sites, often associated with sedges or grasses. These stands are best left as winter food trees. Offsite aspen produces low volumes of merchantable wood and regeneration is sparse and slow-growing. If the stand originated during a drought, aspen may even fail to resprout following harvest. Unlike upland aspen, some self-propagation occurs in these stands; as older aspen die, young saplings replace them.

## *Odd areas*

Your property may be providing valuable food and cover to wildlife in ways you never realized. Don't overlook such areas as lowland hardwoods along creek bottoms, sumac groves, wild grape and other shrub, vine and tree associations, hedgerows, ravines and any odd corners not under cultivation. Encourage the growth and wildness of these areas for wildlife habitats.

## *Openings*

Openings in shrub thickets are good additions to grouse habitat, and woodcock use them as feeding and singing grounds. Northern Forest openings constructed by the DNR are heavily used by deer. Such openings increase small mammal and songbird diversity and produce good berry crops. Vegetation responds poorly to openings made on very dry, sandy soils, however, and we don't recommend them.

Logging trails and trail junctions, or log landings (where logs are piled and loaded), may be maintained as excellent small openings. Seeded to white clover and timothy, or left to develop into natural mixes of wild strawberry and other local herbs and grasses, these openings will provide valuable early spring and late fall food for deer and grouse. Annual mowing or light cattle grazing will help keep larger clearings open. Use these methods after August 1 to avoid disturbing ground-nesting birds.

You can also use herbicides, but check with the local DNR wildlife manager or forester before you do. Herbicides can damage nearby trees by moving through root systems. If you or your friends and family enjoy a little physical labor on a cool weekend, cutting invading vegetation with a chainsaw or brushhook is a much better method. On small acreages, annual brushing should not become too burdensome. Use the opposite of the strategy recommended for aspen regeneration—brush during the growing season when nutrients are above ground to reduce resprouting.

## *Brush piles*

Properly constructed brush piles can provide cover for rabbits, woodchucks, song and game birds for many years. Large piles last 10 to 15 years and provide more protection than small ones, but just about any brush pile will be used by some form of wildlife. Ruffed grouse often use brush piles for cover during the coldest winter days. Once again there are tradeoffs; brush piles may also provide homes for grouse predators such as skunks and foxes.

To construct a long-lasting brush pile, place the heaviest logs on the bottom and lighter branches on top. Start with at least a 6-foot-square base of hardwood logs piled 4 feet high in log-cabin fashion. Fit branches into the base at different anf73u

# Managing mature forests and their wildlife

Many wildlife species share woodlands with ruffed grouse. As we have seen, woodcock, deer, rabbits and many songbirds directly benefit from ruffed grouse habitat management. By making minor changes in your management plan, you may be able to accommodate other forms of wildlife as well. This section describes how to incorporate procedures for other species into your management plan. Mature-forest wildlife habitat suffers when logging or natural disturbances disrupt forest succession. For more information, be sure to consult publications such as *Woodlands and Wildlife* (Hassinger et al., 1979), *Enhancement of Wildlife Habitat on Private Lands* (Decker and Kelley, 1982) or *Enhancing Wildlife Habitats: A Practical Guide for Forest Landowners* (Hobson et al., 1993).

## What is a mature forest?

In the section on succession, we discussed how forests proceed from young to mature species (aspen vs. maple), types of forests (aspen-birch vs. northern hardwoods), and forest communities (pioneer vs. climax). To a forest ecologist, terms such as young or mature describe a successional stage. Ecologists concern themselves with descriptive terms such as “new-growth,” “second-growth,” or “old-growth,” which refer to a forest’s origin and form. These terms often carry specific implications for species diversity, community stability, or some other characteristic.

In contrast, foresters use the terms “immature,” “mature” and “overmature” to

describe individual trees or homogenous stands as they relate to some commercial standard (for example, rotation age and diameter class). These terms describe a tree or stand's current condition relativbe a ums desired condition for harvest—regardless of the state of succession.

## *The value of mature forests*

In the remainder of this chapter, we will discuss mature forests comprised of large, full-grown, older trees—the wildlife manager's definition. Mature forests are among the most

A typical gray or fox squirrel den has an opening about 3 inches in diameter, a cavity diameter of 6 to 7 inches and a depth of 16 inches. Dens of flying and red squirrels are usually smaller. Den formation usually takes 8 to 30 years, depending on the tree species. Black oak, sugar maple, basswood, cottonwood, beech and elm over 24 inches DBH all produce excellent dens. Artificial nest boxes are easy to build and erect, and are useful in sapling and pole timber stands where a lack of den sites limits squirrel populations. See *Shelves, Houses and Feeders for Birds and Mammals* (Barquest, et.al. 1982) or *Enhancement of Wildlife Habitat on Private Lands* (Decker and Kelley, 1982) for construction and placement instructions.

### Woodpeckers, wood ducks and other cavity-users

In addition to squirrels, raccoons and other mammals, about 85 North American bird species feed, nest, or roost in dead or decaying trees (Appendix D and Table 1).

Non-game birds are integral members of the forest community and many are economically important. For example, researchers have found that woodpeckers help control epidemic insect populations. To manage for these species you must preserve snags and potential snags. When harvesting timber, use uneven-aged cutting; that is, cut some trees and leave others to grow beyond rotation age. These old trees will eventually degrade and

woodpecker, vireos and many species of warblers and raptors. Your overall habitat management plan should consider these species.

Birds that breed in undisturbed forests share several important characteristics. They are obligate inhabitants of forest interiors—that is, they need an undisturbed forest for breeding and will not reproduce anywhere else. Opening the forest interior exposes these species to predators and cowbird nest parasitism. While many of the species that reproduce on forest and field edges raise two or more broods per year, forest interior species raise only one.

If you have a stand of mature northern hardwoods, aspen-birch, oaks, or mixed conifers and hardwoods, try to preserve as much uncut forest and undergrowth as possible. Work with your neighbors to protect large blocks of mature, undisturbed woodlands.

If you do harvest:
• Extend the rotation period where economically feasible.
• Cut a single large tract, preferably along an existing edge or corner, rather than several small ones in the interior.
• Preserve snags on the cut edge.
• Build brush piles with the slash to harbor the insects on which songbirds feed.
• Plant conifers in the cut area or surrounding your woods for added diversity.

### Mammals

Forests and woodlots with well-developed understories provide habitat for many mammals. Small mammals, such as chipmunks and white-footed mice, may spend their whole lives within an acre of woodland. In contrast, many furbearing predators (mink, skunk, raccoon and fox) travel widely in search of food. Brushy stream borders, ravines, fencelines and hedgerows connecting woodlots, fields and wetlands provide these animals with travel corridors and hunting territory.

When logging or cutting firewood, leave any hollow sections lying on the ground. You can't sell them as sawtimber, and their value as firewood is small compared to that as dens or shelter for ground-dwelling mammals. Depending on their diameter, these logs may be used by anything from the smallest shrew to the largest black bear.

### Reptiles and amphibians

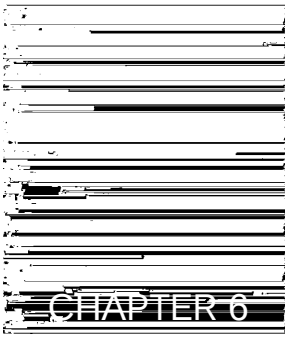
Forest-dwelling herps (reptiles and amphibians) live in forest wetlands, under leaf litter or loose bark, and in holes and crevices. Most woodland species depend on the moist, humid conditions found under the closed canopy of mature forests. Preserving or creating shallow ponds is one way to attract herps to your property.

Many woodland amphibians breed in temporary ponds. Shallow ponds are best, but make sure they are deep enough to retain water until mid-August to allow larvae to develop completely. Permanent ponds will attract wetland species, such as bullfrogs and leopard frogs, that live in or near water year-round. Having both temporary and permanent ponds on your property will reduce competition between the larvae of woodland and wetland species and increase herp diversity.

If you have no permanent ponds on your property, you can build one. You can create small ponds by digging out springs or potholes or by building a weir (small dike or dam) in woodland ravines. On sandy soils, you must line the basin of an artificial pond with clay or sheet plastic.

Although dugout ponds no longer qualify for cost-sharing, if your land is more than one-half mile from a permanent water supply, most county ASCS offices will approve assistance for a low-head dike in a natural drainage. Amphibians, deer, turkeys and waterfowl will all use the resulting pond, especially if it is built in or near wooded cover. However, if beaver are common in your area (as they are across much of the state), don't build an impoundment (manmade body of water) near any timber that you can't afford to lose. What they don't cut down, beavers might flood as they try to improve on your flowage engineering.

Leaving unmerchantable logs to rot away on the forest floor also benefits herps. They live in or under logs and feed on invertebrates supported by the decaying wood. Rotting logs also provide a moist seedbed for mosses, fungi, ferns and trees such as cedar and hemlock. Mortarless stone walls set off road or fence corners nicely, and will provide homes for many herps and small mammals. Any little hiding place located near water is particularly good.




# *Financial considerations*

Forest management can be expensive, especially if concessions for wildlife reduce your timber harvest. Consider the following when planning your woodland management program.

## *Marketing timber*

Professional advice is never more important than at harvest time. You may harvest timber only once in your lifetime on some stands, and correcting mistakes is often impossible.

The Agricultural Stabilization and Conservation Service (ASCS) administers the *Agricultural Conservation Program* (ACP) through offices in each county. ACP offers cost-sharing of up to 75% for approved conservation practices. Those of interest to Wisconsin woodlot owners include:

- timber stand improvement.
- site preparation for natural regeneration.
- forest tree plantation establishment.
- permanent wildlife habitat improvements (including impoundments, tree and shrub planting, and woodlot fencing to prevent overgrazing).

The Soil Conservation Service provides technical advice for those installing these practices.

The *Forestry Incentives Program* (FIP) also cost-shares with private nonindustrial forest owners for tree planting (including site preparation if necessary), and timber stand improvement. This program is generally for larger scale forest operations (10 to 1000 acres), and may only be available in counties with significant forest economies. The ASCS provides cost-share funding of up to 75%, and the DNR provides installation and technical advice. You can receive cost-shares of up to $10,000 annually, and can agree to fund long-term practices for 3 to 10 years.

Since the 1985 Food Security Act (Farm Bill), the *Conservation Reserve Program* (CRP) has offered annual rental payments for eligible lands taken out of production for ten years. To be eligible, land must have been in commodity crops (such as corn or alfalfa) at least two of the five years prior to signup, meet erodibility requirements, and be currently available for crop production. Tree and shrub planting for windbreaks or wildlife habitat is a qualified use of set-aside lands and will be cost-shared up to 50%. Permanent grass cover also qualifies and may complement your woodlands by providing nesting cover for pheasants, turkeys and songbirds. Provisions also allow for filter strips along streams and ponds and make it easier to qualify if you agree to plant trees. It is uncertain whether this program will continue, so check with your ASCS office for current information on the status of CRP.

In the past, a *Tree Planting Program*, part of the Farm Bill, has been offered to provide up to 3,000 free trees to farmers who have an

approved soil erosion plan or live in a county with an approved plan. The current administration is revising this, but there will likely be some sort of tree planting incentive in the years to come. Your county Land Conservation Department (usually located in the county courthouse, sometimes under the name Soil and Water Conservation Department) can provide you with current information about the programs available.

Another source of nursery stock is wildlife packets, consisting of 100 conifers and 200 wildlife shrubs, available free from the DNR for participating in the *Acres for Wildlife* program. Similarly, 500 trees or shrubs are offered as an incentive for participation in the *DNR Project Respect* program. A limited supply of such wildlife packets of nursery stock is also available for a small fee if you are not interested in these programs. For more information, contact your local DNR wildlife manager. You can also buy trees and shrubs from the DNR or private nurseries (see Appendix D).

The latest incentive for landowners is called the *Forest Stewardship Incentives Program* (SIP). Similar to other programs, SIP cost-shares (50-75%) with non-industrial private forest owners for the following objectives:

- developing a stewardship management plan.
- conserving water quality, soil and other related natural resources.
- controlling erosion and sedimentation from forest land.
- enhancing the timber, wildlife, fish, recreational, aesthetic and environmental benefits of properly managed woodlands.

Top priorities for the SIP include riparian/wetland protection and improvement and wildlife habitat enhancement. To see if your management practices qualify for funding, contact your county ASCS office.

## *Tax considerations*

Taxation of woodland enterprises can be very complicated. The long-term nature of woodland investment makes it crucial to consider taxes in all phases of your operation to assure favorable treatment. Some helpful sources are listed in the REFERENCES FOR FURTHER READING section, but be sure to consult a tax advisor before making any large investments in (or harvests from) your woodland.

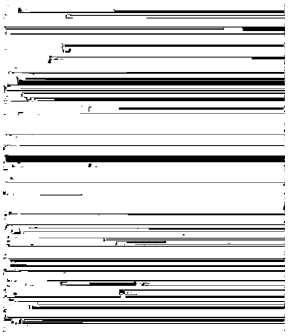
Sales taxes apply to most forestry-related purchases, although growing Christmas trees as a business is classified as farming and participants qualify for sales tax exemption. The DNR allows farmers to purchase state nursery stock tax-free by completing a Farmer's Exemption Certificate. More than nominal use of trucks, tractors, saws or other equipment purchased under the farming exemption for forestry requires payment of a use tax.

Several state programs may help you lower your woodland property taxes. The Managed Forest Land law reduces taxes for woodland property owners who follow an approved management plan. If you own at least 10 contiguous acres of wooded property (at least 80% of which must be capable of producing 20 cubic feet per acre per year of merchantable wood) within a single municipality (civil township) you may be eligible for the program. The contract period is 25 or 50 years. Eligible acreage is taxed at a fixed annual rate (85 cents per acre in 1993). In return, you agree to manage your land for wood fiber production under an approved plan. The plan may also recommend practices for wildlife, watershed, recreational or aesthetic benefits. The lands must be open to non-motorized public access, though landowners may choose to close up to 80 contiguous acres by paying an additional $1.15 in tax on each closed acre. The 85-cent and $1.15 rates will be adjusted in 1997 and every five years thereafter. At harvest, you will pay a 5% yield tax on the stumpage value of all timber products cut.

The Managed Forest Land Law replaces the previous Forest Croplands Law and Woodland Tax Law, though existing contracts under the

former laws will remain in effect until expiration. The Wisconsin Farmland Preservation Law is designed to protect farmland from urban development, through preservation plans or exclusive agricultural zoning. Along with traditional farming, most towns and counties allow forest and wildlife management on agricultural land. While not lowering property taxes directly, participation earns state income tax credits for eligible farmers enrolled in local preservation programs. You must make more than $6,000 in gross farm income to qualify. For more information, contact your county Land Conservation Department.

As noted in the Extension bulletin *Wisconsin Woodlands: Income Tax Considerations for*



# *Conclusion*

Management plans for grouse, or any wildlife, vary depending on location. For example, overgrazing in woodlots and lack of winter cover may be a concern in the Driftless Area; proximity to pulpwood markets is important in the Central Sands; and converting aspen to hardwoods or balsam fir is the major management concern in the North Woods. Planning and professional assistance will help you tailor your management plan to your property. Remember the sequence: objectives, inventory, professional assistance, goals and work schedule.

Resist the temptation to focus on only one aspect of woodland management for

# *References for further reading*

Prices, where given, are subject to change.
Appendix B on page 45 tells where these references are available.

## Woodland wildlife management


Craven, S.R. 1981. Wisconsin woodlands: wildlife management. Wisconsin Coop. Ext. Serv., G3097. 8 pp.

Craven, S.R., and R. Ellarson. 1986. Landscape plants that attract birds. Wisconsin Coop. Ext. Serv., G1609.

Craven, S.R., G. Jackson, W. Swenson and B. Webendorfer. 1987. The benefits of well-managed stream corridors. Wisconsin Coop. Ext. Serv., G3404.

Decker, D.J., and J.W. Kelley. 1982. Enhancement of wildlife habitat on private lands. Info. Bull. 181. NYS Coll. of Ag. and Life Sci., Cornell U., Ithaca. 40 pp. $4.95

Decker, D.J., J.W. Kelley, T.W. Seamans, and R.R. Roth. 1983. Wildlife and timber from private lands: a landowner's guide to planning. Info. Bull. 193. NYS Coll. of Ag. and Life Sci., Cornell U., Ithaca. 56 pp. $4.95

Gill, J.D., and W.M. Healy. 1974. Shrubs and vines for northeastern wildlife. USDA For. Serv. Gen. Tech. Rep. NE-9. Northeastern For. Exp. Sta., Upper Darby, Pa. 180 pp.

Gullion, G.W. 1983. Managing woodlots for fuel and wildlife. Ruffed Grouse Society, Coraopolis, Pa. 16 pp.

Gullion, G.W. 1984. Managing northern forests for wildlife. Ruffed Grouse Soc., Misc. J. Series Publ. 13442, Minn. Agric. Exp. Sta., Sd Rahern

Gullion, G.W. The ruffed grouse. Ruffed Grouse Society, Coraopolis, Pa. 4 pp.
Johnsgard, P.A. 1973. Grouse and quails of North America. Univ. of Nebr. Press, Lincoln. 553 pp.
Kubisiak, J.F. 1978. Brood characteristics and summer habitats of grouse in central Wisconsin. Wis. Dept. Nat. Resour. Tech. Bull. 108. 11 pp.
Kubisiak, J.F. 1985. Ruffed grouse habitat relationships in aspen and oak forests of central Wisconsin. Wis. Dept. Nat. Resour. Tech. Bull. 151. 22 pp.
Kubisiak, J.F. 1985. Ruffed grouse harvest levels and population characteristics in central Wisconsin. Wis. Dept. Nat. Resour. Research Rep. 136. 24 pp.
Kubisiak, J.F., J.C. Moulton, and K.R. McCaffery. 1980. Ruffed grouse density and habitat relationships in Wisconsin. Wis. Dept. Nat. Resour. Tech. Bull. 118. 15 pp.
Madson, J. 1969. Ruffed grouse. Winchester Press, Olin Mathieson Chemical Corp., East Alton, Ill. 103 pp.
Robinson, W.L., ed. 1984. Ruffed grouse management: state of the art in the early 1980's. North Cent. Sec. Wildl. Soc. 181 pp.
Rue, L.L. 1973. The world of the ruffed grouse. J.B. Lippincott Co., Phil. and New York. 160 pp.

## General wildlife

Anon. 1990. Beaver damage control. Wis. Dept. Nat. Resour. 30 pp.
Barquest, G., S. Craven, and R. Ellarson. 1982. Shelves, houses and feeders for birds and squirrels. Wisconsin Coop. Ext. Serv. G2091. 32 pp.
Craven, S.R., and G.J. Knudsen. 1982. Snakes of Wisconsin. Wisconsin Coop. Ext. Serv. G3139. 8 pp.
Craven, S.R., and R.L. Ruff. 1982. Bird feeding: tips for beginners and veterans. Wisconsin Coop. Ext. Serv. G3176. 12 pp.
Dumke, R.T. 1982. Habitat development for bobwhite quail on private lands in Wisconsin. Wis. Dept. Nat. Resour. Tech. Bull. 128. 49 pp.
Gregg, L. 1984. Population ecology of woodcock in Wisconsin. Wis. Dept. Nat. Resour. Tech. Bull. 144. 51 pp.

Robson, T.F., and G.R. Cunningham. 1979. Wisconsin woodlands: forestry terms. Wisconsin Coop. Ext. Serv. G3018. 10 pp.

Sander, I.L. 1977. Manager's handbook for oaks in the North Central States. USDA For. Serv. Gen. Tech. Rep. NC-37, North Cent. For. Exp. Sta., St. Paul. 35 pp.

Smith, W.B. 1986. Wisconsin's fourth forest inventory: area. USDA For. Serv. Resour. Bull NC-97, North Cent. For. Exp. Sta., St. Paul. 48 pp.

Steele, T., and G. Cunningham. 1983. Wisconsin woodlands: buying a safe chainsaw. Wisconsin Coop. Ext. Serv. G3206. 4 pp.

Tubbs, C.H. 1977. Manager's handbook for northern hardwoods in the North Central States. USDA For. Serv. Gen. Tech. Rep. NC-39, North Cent. For. Exp. Sta., St. Paul. 29 pp.

Wooden, A.L., C. Locey, and G. Cunningham. 1990. Lake states woodlands: aspen management. Wisconsin Coop. Ext. Serv. G3162. 6 pp.

Wisconsin woodlands: safe tree harvesting. Wisconsin Coop. Ext. Serv. G3205.

Wisconsin woodlands: protective clothing for chainsaw operators. Wisconsin Coop. Ext. Serv. G3177.

### Controlling wildlife damage

Craven, S.R. 1981. Controlling woodpecker damage. Wisconsin Coop. Ext. Serv. G3117. 2 pp.

Craven, S.R. 1983. Protecting gardens and landscape plantings from rabbits. Wisconsin Coop. Ext. Serv. G1654. 8 pp.

Craven, S.R., and S. Hygnstrom. 1986. Controlling deer damage in Wisconsin. Wisconsin Coop. Ext. Serv. G3083. 12 pp.

Craven, S.R., and F. Iwen. 1980. Bats: information for Wisconsin homeowners. Wisconsin Coop. Ext. Serv. G3096.

Hygnstrom, S., and S.R. Craven. 1986. Controlling: hawk and owl damage. Wisconsin Coop. Ext. Serv. 4 pp.

### Financial considerations

Barrows, R. 1984. Wisconsin's farmland preservation program. Wisconsin Coop. Ext. Serv. G2890. 4 pp.

Barrows, R., A.J. Klingelhoets, T. Krauskopf, and D. Yanggen. 1980. Mapping to preserve agricultural land. Wisconsin Coop. Ext. Serv. A3038. 20 pp.

Gerleman, T.G., and D. Last. 1985. Wisconsin's recreational use statute - limiting the liability of private landowners. Wisconsin Coop. Ext. Serv. G3326. 3 pp.

Last, D., and T.G. Gerleman. 1984. Wisconsin's trespass law — controlling the use of private land. Wisconsin Coop. Ext. Serv. G3296. 2 pp.

Martin, A.J., K. Potter-Witter, and J. Lapidakis. 1989. Lake states woodlands: marketing timber. Wisconsin Coop. Ext. Serv. G3297. 6 pp.

Lapidakis, J., A. Wooden, and G. Cunningham. 1981. Wisconsin woodlands: the Woodland Tax Law and the Forest Crop Law. Wisconsin Coop. Ext. Serv. G1549. 4 pp.

Stier, J.C., R.E. Denney, and J. Lapidakis. 1984. Wisconsin woodlands: income tax considerations for forestland owners. Wisconsin Coop. Ext. Serv. G3298. 3 pp.

Tlusty, W.G., and G.W. Rodgers. 1987. Wisconsin woodlands: the Managed Forest Law Program. Wisconsin Coop. Ext. Serv. G3413. 6 pp.

USDA For. Serv. 1982. A guide to federal income tax for timber owners. Agr. Handbook 596. U.S. Gov. Print. Off., Wash., D.C. $4.75.

Yanggen, D., and R. Barrows. 1980. Zoning to preserve agricultural land. Wisconsin Coop. Ext. Serv. A3038. 14 pp.

### Tax guides

Bowlby, V.L. 1989. The Christmas tree taxation manual (ninth ed.). $52.
*Available from:*
Bowlby Publishing Co., Inc.
310 N.W. Fifth St., Suite 103
Corvallis, OR 97330

Haney, H.L. Jr., and W.C. Siegel. 1988. Federal income tax guide for timber owners. Free.
*Available from:*
USDA Forest Service
Southern Forest Experiment Station
701 Loyola Ave.
New Orleans, LA 70113

Hoover, W.L. 1989. Timber tax management for tree farmers. $20.
*Available from:*
American Forest Council
1250 Connecticut Ave., N.W.
Suite 320
Washington, DC 20036

Hoover, W.L., W.C. Siegel, G.A. Myles and H.L. Haney, Jr. 1989. Forest owners' guide to timber investments, the federal income tax, and tax recordkeeping. USDA Agricultural Handbook No. 681. USGPO Stock #001-000-4540-7. $5.
*Available from:*
Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402-9325

### Record systems

Bowlby, V.L. 1986. Christmas tree taxation bookkeeping system. $35.
*Available from:*
Bowlby Publishing Co., Inc.
310 N.W. Fifth St., Suite 103
Corvallis, OR 97330

Haney, H.L., Jr. 1985. A guide to income tax records for tree farmers. Virginia Cooperative Extension Service Publication 420-090. Single copies free.
*Available from:*
Cooperative Extension Service
Virginia Tech. University
Blacksburg, VA 24061

Myles, G.A., T.A. Sedbrook and D. Casey. 1985. Woodlands account book. Single copies free.
*Available from:*
State Forester
Maryland Forest, Park and Wildlife Service
Tawes State Office Building
580 Taylor Ave.
Annapolis, MD 21401

Blumenstock, B. 1981. Yankee woodlot journal. Single copies free.
*Available from:*
Cooperative Extension Service
University of Maine
Orono, ME 04469

Stier, J.C. 1989. Financial record book for timber growers (second ed.). $5.
*Available from:*
Department of Forestry
University of Wisconsin
1630 Linden Dr.
Madison, WI 53706

Advance reproduction: Young trees at least 4.5 feet tall that can successfully compete for light and nutrients after the overstory is removed.

Block: Any group of trees that is managed as a unit; often synonymous with a stand.

Bolt: A short log or a squared timber cut from a log up to 8 feet in length and at least 8 inches in diameter at the small end.

Clearcut: A harvesting and regeneration technique that removes all the trees (regardless of size) on an area in one operation. Clearcutting is usually used with species like aspen that require full sunlight to reproduce and grow well. Produces an even-aged forest stand.

Climax forest: The final or self-perpetuating successional stage in a forest.

Conversion: Change from one forest type to another, either naturally through disturbance or succession, or artificially through harvesting and reforestation.

DBH: The tree Diameter at Breast Height (4.5 feet above the ground).

Forest Type: A group of tree species that, because of their environmental requirements and tolerances, commonly grow together. Tree examples of forest types are the sugar maple-basswood type, the oak-hickory type, and the aspen-paper birch type.

Herbaceous plants: Plants that die back annually to the ground level, as distinct from woody shrubs and trees.

Mast: The nuts, seeds and fruits produced by forest trees and shrubs.

Mature tree: A tree that has reached the desired size or age for its intended use. Size or age will vary considerably depending on the species and intended use.

Merchantable: Timber for which a market exists because it meets specifications for species, size, freedom from defect, etc.

Mesic: This describes a habitat site with intermediate soil moisture content, as opposed to xeric (dry) or hydric (wet).

Old-growth: A stand made up of trees that are older than the normal rotation age.

Overmature: A tree that has passed the desired size or age for its intended use and is beginning to decline in value.

Plantation: An artificially reforested area established by planting or direct seeding.

Pole-timber: A stand of trees with diameters ranging from 4 inches to approximately 8 to 12 inches.

Regeneration: The process of forest replacement or renewal. This may be done artificially by seeding or planting; or naturally by sprouting or natural seeding.

Reproduction: Young trees that will grow to become the older trees in the future forest.

Rotation Age: The number of years required to establish and grow trees to a specified size, product or condition of maturity.

Sapling: A small tree, usually between 2 and 4 inches DBH.

Sawlog: A log large enough to produce a sawn product—usually at least 10 to 12 inches in diameter at the small end.

Sawtimber: A stand of trees with diameters greater than 10-12 inches.

Seedling: A tree, usually less than 2 inches DBH, that has grown from a seed.

Seed-tree cut: Removing all trees from the harvest area at one time except for a few selected trees left to provide seed to establish a new forest stand.

Selection cut: Harvesting individual trees or small groups of trees at periodic intervals (usually 8 to 15 years) based on their physical condition or degree of maturity. Produces an uneven-aged stand.

Shearing: The non-commercial removal of unmerchantable trees, using a chain saw or a bulldozer with a sharpened (KG) blade. Also refers to shaping of Christmas trees.

Shelterwood cut: Removing trees from a harvest area in a series of two or more cuttings so new seedlings can establish and grow in the partial shade and protection of older trees. Produces an even-aged forest.

Site: 1. A tract of land with reasonably uniform soil and climatic factors. 2. An area evaluated as to its capacity to produce a particular forest or other vegetation based on the combination of biological, climatic and soil factors.

Site index: An expression of forest site quality based on the height of the dominant trees at a specified age (usually 50 years in the eastern U. S.).

Slash: The brush accumulated from a cutting operation.

Sprout: A tree growing from the base, stump or root of another tree.

Stand: Any identifiable group of trees —by age, species, height, site, origin, stocking, management, etc.

Thinning: Generally, a cutting in an immature forest stand to reduce the tree density and concentrate the growth potential on fewer, higher quality trees resulting in larger trees with faster growth.

TSI (Timber Stand Improvement): The thinning of timber stands by removing inferior trees to improve stand quality and/or species composition.

# *Sources of wildlife plants*

In addition to free nursery stock available to Project Respect and Acres for Wildlife participants, DNR nurseries in Hayward, Wisconsin Rapids and Boscobel also sell stock suitable for wildlife plantings. Most counties also deliver orders from state nurseries. You can obtain a Tree and Shrub application form and delivery details from your local DNR office beginning in October or November. These trees often sell out early, so submit your order for the spring as quickly as possible. If you miss out on these, many county Land Conservation Departments take orders for conservation trees beginning in late winter.

You can also obtain nursery stock from private nurseries that deal in native grasses, forbs, aquatics, and woody plants for prairie and wetland restoration or wildlife plantings. The following nurseries requested to be included on a DNR list of tree sources for the Conservation Reserve Program. (This list is based in part on an inquiry sent to all licensed nurseries in the state, but does not represent a complete list of native or wildlife plant nurseries in Wisconsin. For informational use only, it does not imply endorsement of specific products or services, nor criticism of nurseries not listed, by the authors, UW-Extension, or the Wisconsin DNR.)

## *Iowa*

Cascade Forestry Service
Rt. 1 Cascade, IA 52033
(319) 852-3042

## *Minnesota*

Chippewa Farms
Rt. 1, Box 246 Brandon, MN 56315
(612) 524-2244

Itasca Greenhouse, Inc.
Box 273 Cohasset, MN 55721
(800) 538-8733

Spruce Pine Farms
Hwy. 52 Fountain, MN 55935
(507) 268-4466

## *Missouri*

Forrest Keeling Nursery
Elsberry, MO 63343 (314) 898-5571

Sand Creek Nursery
Rt. 2 Box 271, New Auburn, WI 54727

Detlor Tree Farm
Box 6, Plainfield, WI 54966
(715) 335-4444

Laura's Lane Nursery
Box 232, Plainfield, WI 54966
(715) 366-2477

Windfall
504 S. East St., Plainfield, WI 54966
(715) 335-6725

Suthers Moundview Nursery
30746 Hwy 151, Platteville, WI 53818
(608) 348-8991

Nepco Lake Nursery
Nekoosa Papers Inc.,
Port Edwards, WI 54469
(715) 887-5301

Insti Trees
7014 Fire Tower Rd. Box 137,
Rhinelander, WI 54501
(715) 282-5247

Krueger's Northwoods Nursery
3682 Limberlost Rd.,
Rhinelander, WI 54501
(715) 369-3959

Wis-Con-Trees
809 Keenan St., Rhinelander, WI
54501 (715) 362-3364

Northern Woodsman Products
W1177 Washington Rd.,
Rubicon, WI 53078 (414) 474-4098

St. Croix Valley Trees
458 Rice Lake Rd.,
Sommerset, WI 54025 (715) 247-5500

West Wisconsin Nursery & Christmas Trees
Rt. 4 Box 141, Sparta, WI 54656
(608) 272-3171

Evergreen Nursery Co., Inc.
5027 County TT,
Sturgeon Bay, WI 54235
(414) 743-4464

Pony Creek Nursery
Box 16, Tilleda, WI 54978
(715) 787-3889

Betthauser's Nursery
Rt. 3, Tomah, WI 54660
(608) 372-4317

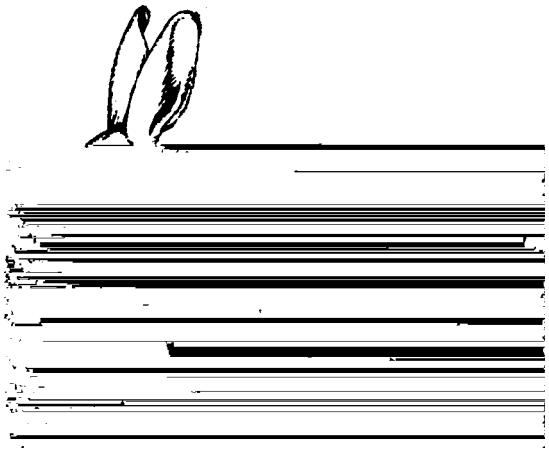
Lodholz North Star Acres
420 Hwy. A, Tomahawk, WI 54487
(715) 453-2976

Westfork Walnut Nursery
Rt. 3, Viroqua, WI 54665
(608) 637-2528

Birnamwood Nursery
603 Sturgeon Eddy,
Wausau, WI 54401
(715) 842-8719

Paradise Gardens Nursery
1848 Hwy 33 East,
West Bend, WI 53095 (414) 338-8316

Sigourney's Tree and Nursery
1080 Cooke Ave.,
Wisconsin Rapids, WI 54494
(715) 423-4465



The following is a list of sources for seeds, tubers and plants of native Wisconsin vegetation. It was compiled by landscape architect John Diekelmann and Drs. Evelyn Howell and John Harrington of the UW-Madison Department of Landscape Architecture. (This list is for informational use only and does not constitute endorsement by the compilers or the authors.)

## *Illinois*

Lafayette Home Nursery
c/o Jock Ingalls, Lafayette, IL 61449

Windrift Prairie Nursery
c/o Dorothy & Doug Wade, Rt. 2,
Oregon, IL 61061

## *Minnesota*

Orchid Gardens
Rt. 1, Grand Rapids, MN 55744

Prairie Restorations
c/o Ron Bowen, Rt. 3,
Princeton, MN 55371

## *Wisconsin*

Boehlke's Woodland Gardens
W140 N1089 Country Aire Rd.,
Germantown, WI 53022

Great Lakes Wild Flowers
Box 1923, Milwaukee, WI 53201

Prairie Ridge Nursery
c/o Joyce Powers, Rt. 2, Overland
Road, Mount Horeb, WI 53572

Prairie Seed Source
c/o Robert Ahrenhoerster, Box 83,
North Lake, WI 53064

Kester's Wild Game Food Nurseries
Box V, Omro, WI 54963

Strand Nursery Co.
Osceola, WI 54020

Wildlife Nurseries
Box 2724, Oshkosh, WI 54903

Little Valley Farm
Rt. 1, Box 287,
Richland Center, WI 53581

Prairie Nursery
c/o Neil Diboll
Box 116, Rt. 1, Westfield, WI 53964

# APPENDIX D

## *Cavity-using birds of Wisconsin**

### KEY

E = Excavator:
- 1 = Primary excavator; digs own cavity
- 2 = Secondary excavator; uses existing cavities

T = Type:
- L = Live tree
- D = Dead tree (snag)

DT = Diameter of tree in inches

FD = Floor dimensions of cavity in inches

DC = Depth of cavity in inches

ED = Entrance (hole) diameter in inches

EF = Entrance height above floor of cavity in inches

HG = Cavity height above ground in feet

| Species | E | T | DT | FD | DC | ED | EF | HG | Habitat |
|---|---|---|---|---|---|---|---|---|---|
| Wood Duck | 2 | L | 16 | 12x12 | 24 | 4.0 | 19 | 6-40 | |

*Adapted from Tubbs, C.H., R.M. DeGraaf, M. Yamasaki and W.M. Healy. 1987. Guide to wildlife tree management in New England northern hardwoods. Gen. Tech. Rep. NE-118. Broomall, PA:USDA, Forest Service, Northeastern Forest Experiment Station, 30 pp.

E = Excavator:
- 1 = Primary excavator; digs own cavity
- 2 = Secondary excavator; uses existing cavities

# *Wisconsin's Recreational Use Statute*

## *Limiting the injury liability of private landowners*

Thomas G. Gerleman and Donald Last

In 1984, the Wisconsin legislature revised the recreational use statute. The new law limits property owners' responsibility for people who use their land for recreation.

Except for some special situations described elsewhere, landowners do not have a legal obligation to:
1. keep their property safe for recreational activity;
2. inspect their property; or
3. give warning of an unsafe condition, use or activity on their property.

The law also eliminates liability of property owners for injuries to a person engaged in a recreational activity when the injuries are caused by another recreational user or a wild animal.

*EXAMPLE 1: Grant Door receives permission to hunt on Florence Clark's property. While hunting, Grant is accidentally shot by another hunter. Florence Clark is protected by the statute. She is not liable for Grant Door's injury.*

This publication provides a summary and interpretation of the key provisions of the new law. Persons wishing more information on this subject should consult an attorney or get a copy of the statute from a library or courthouse (Wis. Stats. 895.52).

### *What is a recreational activity?*

The state statute defines recreational activity as "any outdoor activity undertaken for the purpose of exercise, relaxation or pleasure, including practice or instruction in any such activity." The statute specifically lists 30 examples which fall within this general definition.

Wisconsin's new recreational use statute defines recreational activity as "any outdoor activity undertaken for the purpose of exercise, relaxation or pleasure, including practice or instruction in any such activity." The statute specifically lists the following examples of such activity:

> *hunting, bird-watching, ballooning, hiking, sleigh riding, snowmobiling, skating, sightseeing, animal training, outdoor games, bicycling, motorcycling, hang gliding, camping, sledding skiing, water sports, cutting/removing wood, outdoor sports, outdoor education, horseback riding, fishing trapping, tobogganing, picnicking, exploring caves, nature study, rock-climbing, climbing observation towers, harvesting the products of nature.*

### *Under what circumstances are landowners liable?*

The state's recreational use statute describes certain circumstances in which an owner may be liable for an injury to a person using his property. For example, the law does not limit or eliminate liability if a land owner sponsors a spectator sport since "organized team sport" is specifically excluded from the definition of recreational activity in the statute.

*EXAMPLE 2: Langlade Richland sponsors a softball tournament on land he owns. During the tournament, a foul ball hits and injures Rock St. Croix. Richland is not protected by the recreational use statute. St. Croix may initiate a lawsuit against Richland.*

A private property owner's liability likewise is not limited if that owner receives more than $2,000 annually from those using his property

In general, property owners are not liable for injury to a recreational user that is caused by the natural conditions of the land, by other recreational users, or by wild animals. Owners may be liable for injuries to recreational users of their land if they fail to warn about a hazard known to them, or if they have a malicious intent to injure the user. There are other situations in which landowners may be liable, such as when an injury occurs to an invited guest near the home or near a building used for selling or making something, or when the owner receives a substantial payment for the

This Contract is entered into by and between of (Seller),

and of (Purchaser).

The Seller hereby authorizes the Purchaser to enter upon the following described lands, (the Premises); for purposes of cutting and removing timber marked or otherwise designated by the Seller.

PAYMENTS

7a. LUMP SUM SALE:

(a) The Purchaser agrees to pay Seller an amount of $_____ to be paid under the following schedule:

(b) The Seller is not obligated to return the payment in part a, or any portion of it in the event the Purchaser fails to remove all timber or forest products authorized for removal.

b. SCALE PRODUCTS SALE: (As an alternative to a lump sum payment, the payment may be designated by price per cord or MBF per species with an estimate of forest products available.) Payment to the Seller shall be made based upon the following and as further described herein:

| SPECIES | PRODUCTS | ESTIMATED VOLUME | PRICE PER UNIT MBF FT | PRICE PER UNIT CORD | TOTAL ESTIMATED VALUE |
|---|---|---|---|---|---|
| | | | | | |

TOTAL

8. Log and tree volumes shall be determined by the Scribner Decimal C system.

9. Cord means a standard measure of piled wood 4’ x 4’ x 96” to 100”. Cord products of other dimensions shall be converted to standard cords.

UTILIZATION

10. Maximum stump height shall not exceed stump diameter, and for stumps of diameter less than 10 inches it shall not exceed 10 inches.

11. Timber or forest growth, whether mature or not, may not be damaged through careless operations or unnecessary equipment use.

12. The Purchaser agrees to complete all operations as described herein without waste or nuisance on the premises.

13. Additional equipment and operation requirements:

NOTICE OF INTENT TO CUT AND COMPLIANCE WITH LAWS

14. The _____ shall make and file a written declaration to the county clerk of his or her intention to cut forest products pursuant to section 26.03, Stats., and comply with all other notice requirements and laws and ordinances with respect to work under this Contract.

SLASH AND DEBRIS DISPOSAL

15. Slash falling in any lake or stream, in a right-of-way or on land of an adjoining landowner shall be immediately removed from the waters, right-of-way or adjoining land. Tops from felled trees may not be left hanging in standing trees. All trees shall be completely felled and not left leaning or hanging in other trees.

16. Other slash disposal requirements:

17. The Purchaser shall remove, to the satisfaction of the Seller, all solid waste, trash and debris generated by the Purchaser.

ROADS, CAMPS, SURVEY CORNERS

18. Location, construction, and use of logging roads, mill sites and camp sites is subject to advance approval by the Seller. All such areas or facillties used or constructed by the Purchaser must be operated, maintained and restored prior to termination of the Contract in a manner satisfactory to the Seller. Purchaser shall repair damage to existing roads .

19. Logging roads that intersect town, county, or state roads or highways must have the intersections approved by the proper authorities prior to construction and cleared of all unsightly debris at the time of construction.

20. The Purchaser agrees to pay for the cost of repair or replacement of property or any land survey monuments or accessories which are removed or destroyed or made inaccessible.

21. Other restoration requirements (i.e., seeding, gravel, rutting, culvert removal, etc.):

22. Erosion control requirements:

## LIABILITY

23. The Purchaser agrees to protect, indemnify and save harmless the Seller and the Seller's employees and agents from and against all causes of action, claims, demands, suits, liability or expense by reason of loss or damage to any properly or bodily injury to any person, including death, as a direct or indirect result of timbering operations under this contract or in connection with any action or omission of the Purchaser, who shall defend the Seller in any cause of action or claim. In addition, the Purchaser agrees to furnish the Seller with a certificate of insurance of current coverage under the Worker's Compensation Law, Chapter 102, Stats., and public liability insurance for the period of logging operations on the Seller's property in the amount of:
a. Personal injury: $300,000 single limit liability or $100,000 bodily injury per person and $300,000 per occurrence.
b. Property damage: $100,000.

## GENERAL

24. The Purchaser is an independent contractor for all purposes including Worker's Compensation and is not an employee or agent of the Seller. The Seller agrees that the undersigned Purchaser, except as otherwise specifically provided herein, shall have the sole control of the method, hours worked, time and manner of any timber cutting to be performed hereunder. The Seller reserves the right only to inspect the job site for the sole purpose of insuring that the cutting is progressing in compliance with the cutting practices established under this Contract. The Seller takes no responsibility for supervision or direction of the performance of any of the harvesting to be performed by the undersigned Purchaser or of its employees. The Seller further agrees that it will exercise no control over the selection and dismissal of the Purchaser's employees.

25. The Seller agrees to initially designate the timber to be sold and may make inspections for the purposes of ascertaining whether the timber has been cut and the Contract has been complied with. All work shall be performed in a workman-like manner. Work shall be performed in accordance with the requirements of the contract. The parties stipulate that in fulfillment of the terms of this timber sale Contract, the Seller warrants that the Seller has clear and unencumbered title to the stumpage subject to this Contract.

26. The purchaser agrees to take reasonable precautions to prevent the starting and spreading of fires. The Purchaser is responsible for damage and forest fire suppression costs, including that provided in ss. 26.14 and 26.21, Wis. Stats., caused by the Purchaser's operation under this contract.

27. This Contract or work under it may not be assigned or subcontracted in part or in whole without prior written approval from the Seller and may be changed or amended only in writing. The Purchaser agrees to notify the surety, if any, of any such change or amendment.

28. This Contract, together with specifications in the request for bids as well as reference to parts and attachments, shall constitute the entire agreement and any previous communications or agreements pertaining to this Contract are hereby superseded. Any amendments to this Contract shall be in writing signed by both parties.

Date _____ Seller _____

Date _____ Purchaser _____

Date _____ _____

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Dept. of Agriculture, University of Wisconsin–Extension, Cooperative Extension.


*This publication is available from your Wisconsin county Extension office or from Extension Publications, Rm. 245, 30 N. Murray St., Madison, WI 53715, (608)262-3346.*

G3578 A LANDOWNER'S GUIDE TO WOODLAND WILDLIFE MANAGEMENT
*with emphasis on the ruffed grouse*

I-02-94-2M-500-S