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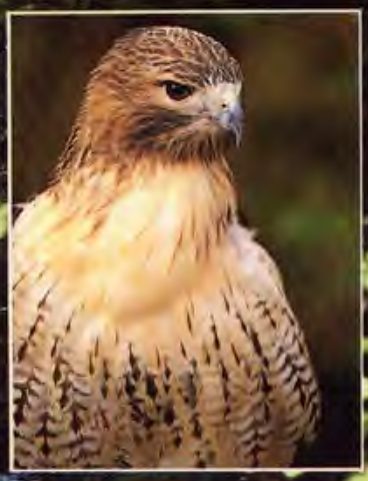
CENTRAL HARDWOOD REGION

Managing Forest & Wildlife Resources:

An Integrated Approach



Central Hardwood Region

Managing Forest & Wildlife Resources: An Integrated Approach

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Purdue University Cooperative Extension Service
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Editing: Barbara Cooper

Purdue University Cooperative Extension Service
West Lafayette, IN

U.S. Fish and Wildlife Service
Office of Extension and Publications

Published 1990

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Purdue University, and local governments; H.A. Wadsworth, Director of Cooperative Extension Service, Purdue University.

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Managing Forest & Wildlife Resources:

An Integrated Approach

Wildlife mangement and forest management are not mutually exclusive. Just the opposite is true. Many basic sound land management practices benefit both forests and wildlife.

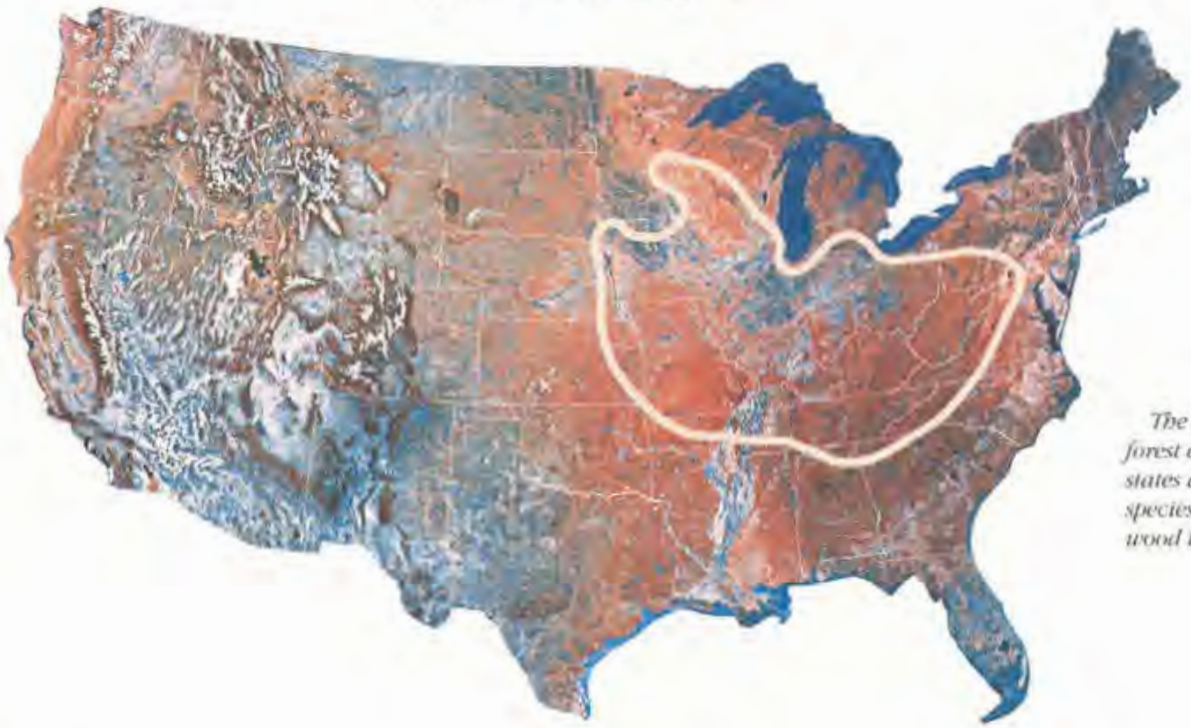
Managing Forest & Wildlife Resources: An Integrated Approach

Proper timber management can enrich wildlife populations.

Wildlife and the forests in which they live are linked closely together. The abundance of most wildlife populations and associated forested lands have paralleled each other throughout history. This link between plant and animal communities illustrates the balance of nature. Understanding this balance helps us realize why forest management is important. Any action that affects the abundance of one population may alter the balance of another. For example, an increase in den trees provides more homes for cavity-nesting species and may result in an increase in squirrels, raccoons, and woodpeckers. However, an increase in deer, rodent, or insect populations might have an adverse impact on surrounding plant communities. Overcrowded deer, an exploding rodent population, or too many insects may eat all available fruits, twigs, leaves, or shrubs available to them, which in turn, affects the composition of the forest and other wildlife species. Good forest management means considering the needs of both plant and animal communities. This booklet explains the balance between wildlife populations and their forested habitats and discusses the importance of responsible forest management.

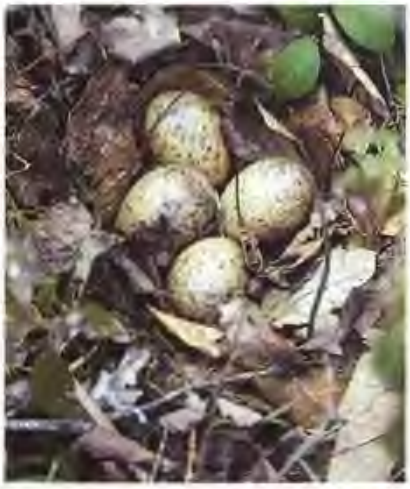
In Absence of Management

The tall trees of a maturing forest create a dense canopy that shades out sunlight from the forest underneath (understory). As shade increases, understory tree species requiring more sunlight die, while shade-tolerant trees take over the stand. A forest maturing without any disturbances tends toward a climax condition. In a climax forest in the central hardwood region, the dominant tree species on moist, fertile sites are beech and maple. This forest is characterized by an open understory containing few fruit-producing shrubs or dense shrubby areas to provide needed cover for many wildlife species. The climax forest is less diverse, and so is the number of different wildlife species it can support. Of the estimated 260 terrestrial vertebrate wildlife species occuring in the central hardwood forest, none are currently known to require old growth (100 + years) forest stands. Forest stands over 40 years old benefit about 30 percent of these species. Nearly 70 percent require successional stages of a forest less than 40 years old to meet at least part of their habitat requirement.



The central hardwood forest extends across 12 states and contains over 70 species of impressive hardwood trees.

Forests help maintain the quality of our environment. Trees, especially young vigorous growth, improve air quality by absorbing carbon dioxide and releasing oxygen into the atmosphere. Timbered areas along streams, wetlands, and in areas susceptible to erosion improve the purity and quality of our water.



All wildlife species need food, shelter, and water, and all of these resources must be located within the animals' home range. Home range is the area where animals confine their activities. For example, a woodcock's home range is about 40 acres, and the deer's may be 2 square miles. The set of interactions between an animal and the environment which supplies the three basic needs of a species is called its niche. Each bird or mammal species has a specific niche within the forest. Although some overlap occurs, these niches are unique and allow many wildlife species to occupy the same forest without strong competition for vital resources. The more niches that can be created within a forest, the greater the number of wildlife species it can support.

Nature creates a diversity of niches on an irregular basis, some by means we do not consider socially acceptable, such as fire. In the past, natural events such as lightning storms, tornadoes, or high winds, created a diversity of habitats in central hardwood forests but on a very large scale. The natural occurrence of fire or wind disturbance is erratic, and large distances may occur between disturbances.

Over time, native plant species began to invade these disturbed sites. The first plants to colonize a site are those requiring full sunlight (shade-intolerant species). As they mature and create shade, shade-tolerant species begin to grow on the site. On abandoned farmland, the plant composition changes from old field species to young forest through a process called natural succession.

Today's smaller land holdings and social and economic needs no longer permit us to allow habitat diversity and forest regeneration when and where nature chooses. Proper forest management can provide a home for numerous species of wildlife and allow us to use timber and firewood that would have been lost through natural events.

Land clearing, agriculture, industrialization, and urban development have placed an increased importance on the remaining forest. Since the early 1900s, our forests have continued to mature, thus causing a decrease in early successional forest habitat.

The American Woodcock

A Management Example

Because of its wide distribution and specific habitat requirements, the American woodcock is being considered by the U.S. Forest Service as an indicator species for other animals requiring early successional habitat types. This migratory gamebird is predominant throughout the eastern United States. Although unnoticed by most people, the "timberdoodle" as it's often called, breeds in forested areas in most states east of the Great Plains. The woodcock feeds entirely on earthworms and insect larvae. The bird requires a young forest containing a thick cover of young tree stems to provide protection from predators, and a large portion of the area must have bare soil for ease of probing for worms. These habitat characteristics are usually found in young forest growth (7 to 30 years old).

In the absence of forest management, the woodcock may find a home only in areas where fire or wind have created an opening in the forest canopy and allowed vigorous new tree growth to respond to the increased light. These new openings will serve the woodcock's needs for only

15 to 40 years. Once the young trees reach this age, they no longer provide the structure woodcock require. A regular supply of new forest openings must replace those stands growing toward maturity. Like many other wildlife species, the American woodcock depends on sound forest management in today's central hardwood forest.

Younger forest stands, old fields, wildlife openings, and log landings provide an opening for the spectacular mating flights performed at dawn and dusk. In sparsely vegetated spots (around 60 percent herbaceous cover) within these openings, the male woodcock performs for his prospective mates by strutting and calling with the nasal "peent" sound.

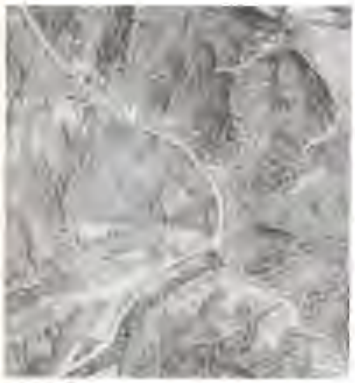
Slightly older forests (15 to 40 years old) often contain a spotty cover of grass, goldenrod, sedges, asters, yarrow, jewelweed, cinquefoil, sensitive ferns, and violets on the ground. This environment is ideal for woodcock nesting and brood habitat.The young chicks avoid bare ground and areas of extremely dense ground cover. Woodcock chicks (and the young of many forest birds) require feeding areas that permit them to move freely with their short legs. These areas provide adequate overhead cover from avian predators, adequate visibility at ground level to spot mammalian predators, and an adequate protein-rich supply of insects, earthworms, and seeds. Woodcock hens and their broods spend most of their summer in a small area (20 to 40 acres), so all of their habitat requirements, represented by a forest with a stand of trees of different ages, must be located within this small space. Proper forest management including timber harvesting, thinning, and timber stand improvement adds diversity to the forest by providing early successional habitat in areas where mature trees have been removed. A wildlife biologist and a forester working together can improve the productivity and quality of timber in a forest. In addition, they can tailor habitat needs and placement to suit wildlife species.

History of Wildlife and Forest Management

Wildlife

The central hardwood region is home to more than 60 species of mammals, 40 species of reptiles, 130 species of birds, and 30 species of amphibians. Throughout history, human influence and the resulting changes in the forest composition have changed wildlife populations. Before European settlement, substantial openings in the predominantly unbroken forest canopy were made only by strong winds or fire. These natural events strongly benefited certain species requiring these open areas: woodcock, deer, turkey, grouse, and many species of songbirds. As people began to open up forests through land clearing, wildlife populations responded. However, excessive land clearing and uncontrolled hunting for food and market led to the disappearance of many wildlife species from much of their historic range: deer, ruffed grouse, wild turkeys, wolves, mountain lions, black bears, passenger pigeons, Carolina parakeets, ivory-billed woodpeckers, common ravens, and bald eagles. In the early 1900s regulations were enforced to control wildlife exploitation. At the same time, abandoned farm ground was returning to young forest vegetation.

Nationwide, forests provide us with 1.8 million jobs and $25 billion in annual wages.



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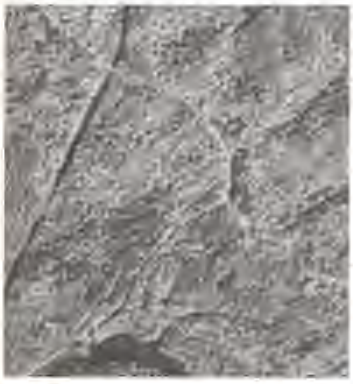


1979

Today, forest lands in the southern half of the central hardwood region are more extensive and less fragmented than at the turn of the century.

Many of these farms were purchased by the state and federal governments and are now managed as public forest lands. Since many native wildlife species were no longer present to benefit from improved habitat conditions, wildlife managers restored many of these wildlife species to areas of suitable habitat, by capturing animals from existing wild populations and transporting them to new areas. Today, we enjoy the results of these efforts. White-tailed deer, wild turkeys, ruffed grouse, bald eagles, and beavers now exist in good numbers throughout much of their historic range. Unfortunately, the large predators (black bear, mountain lion, and wolf) have been lost from most of their historic range because of their large home-range requirements and potential conflicts with people and livestock production. People have assumed the role of these larger predators in the ecosystem through controlled hunting and trapping seasons.

Managers today are exercising great care to ensure that history does not repeat itself and that our wildlife and forest populations remain healthy. This effort requires scientific management of our existing forest lands to maintain wildlife habitats.

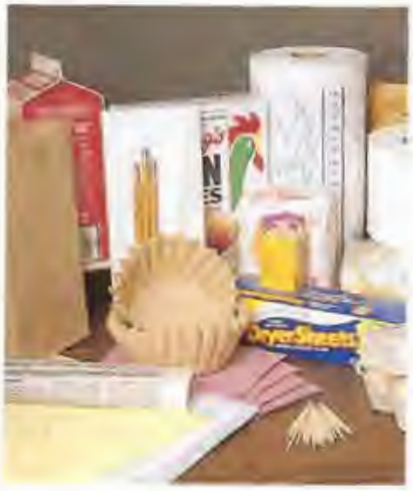
Forests

Indians and early settlers cleared the unbroken native central hardwood forest to create farmland. By the 1890s, land clearing in the northern, flatter half of the region was nearly completed. The remaining forested land, located primarily in the non-agricultural southern hilly areas, was cleared for logging and charcoal production in the early 1900s. The remaining forest land was subjected to widespread burning and grazing until the 1930s. During this period, land use patterns began to change as many small, nonproductive farms located on poor soil or highly erodible areas were abandoned and reforested mostly through natural plant regrowth.

Today, there are about 100 million acres of forest land in the central hardwood region. Despite continued development and urban sprawl, future net losses of forest land will be minimal. Portions of retired and highly erodible crop land are now being reforested. Since 1985, approximately 100,000 acres of cropland in this region, enrolled in the Conservation Reserve Program (CRP), have been planted with trees. Timber now covers 12 to 77 percent of the landscape in the central hardwood states, and most of these second growth stands are approaching middle-age (40 to 70 years old). About three-fourths of all forested land is controlled by small, private, non-industrial forest owners with varying objectives for their land. However, current harvest patterns are such that average size and quality of trees harvested for forest products are declining. Responsible forest management is essential to ensure an ample supply of high quality wood products for future generations.

Every Day is Earth Day to a Natural Resource Manager.

Today's forester, wildlife biologist, or recreation manager applies state-of-the-art technology in genetics, biotechnology, remote sensing, measurements, engineering, biology, and economics to the art of natural resource management.



The forest industry plays an important role in our economy and lifestyles. *Every year, each American uses enough wood products (newspapers, furniture, housing, fixtures, medicine, inks, and plastics) to equal one tree 100 feet tall and 18 inches in diameter.*

Management Benefits Both Forests and Wildlife

Our advanced technologies work well with the natural compatibility of forests and wildlife. Wildlife management and forest management are not mutually exclusive. Just the opposite is true. Many basic sound land management practices benefit both forests and wildlife. Some examples are protecting forests from fire and grazing by livestock. In fact, timber management techniques can accomplish many cost-free wildlife management objectives and provide an additional source of income to the landowner. Timber management practices are the most efficient and cost-effective tools available to the land manager. With them, land managers can manipulate a forest to influence visual and biological diversity, wildlife habitat, aesthetics, plant and animal species composition, water yields, economic returns, and tree growth.

Value of Managed Timber

Benefits to People

Managed timber lands provide a source of income to landowners through timber sales and provide jobs for a substantial work force. The central hardwood forest produces some of the highest quality, most valuable hardwoods in the world. This region is a major source of material for hardwood flooring, veneer, high-quality cabinets, furniture, wood partitions, and fixtures. Other tangible benefits such as fees for hunting rights or recreational access also result from a managed forest.

Benefits to Wildlife

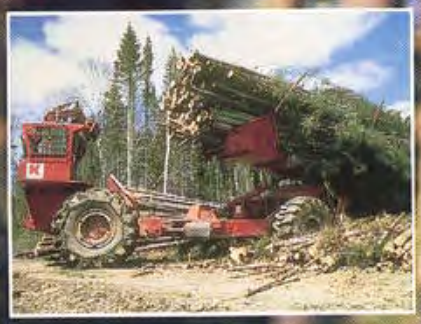
Proper timber management can enrich wildlife populations. Planned vegetative manipulation can increase habitat diversity within a forest, thus increasing the richness of the plants and animal species it can support.

Value of Managed Wildlife

Benefits to the Environment

Managing the forest for wildlife also benefits the trees. Birds consume large numbers of insects harmful to trees. Earthworms and rodents turn over the soil and recycle nutrients as they burrow and dig for food. The resulting loosened soil permits air and moisture to penetrate to the tree's feeder roots, allowing tree growth. Small mammals (shrews, mice, and voles) consume insects harmful to trees and assist in seed distribution.Tree seeds are dispersed by most small forest mammals (squirrels,mice, and chipmunks) as they store seeds in caches or bury

The quantity of potential wood products (growing stock) in our forests has increased steadily since the early 1900s. Current growth rates exceed the volume removed through harvest and mortality.



(plant) individual seeds in the soil, thus assisting in the natural regeneration process. Birds are also excellent seed distributors because consumed seed, deposited in the bird's droppings, may be carried miles from the original seed source. Wildlife is a necessary part of the forest environment. Encouraging healthy, diverse wildlife populations benefits the entire forest and can benefit recreation, timber production, and forest aesthetics.

Benefits to People

Recreation — hunting, fishing, hiking, camping, photography, nature study — and aesthetics are important forest management objectives that can be enhanced through wildlife management. A 1985 U.S. Fish and Wildlife Service survey indicated that 77 percent of the United States' adult population participated in some form of wildlife-related recreational activity.

A 1987 survey of Wisconsin residents indicated that favorite wildlife-related nonconsumptive activities were wildlife observation other than birds, birdwatching, and feeding wild birds. An activity which does not intend to remove a plant or animal from its environment is termed a "nonconsumptive" activity. The survey respondents said their motivation for participating in these activities was nature appreciation and a chance to be outdoors. Wisconsin residents (both hunters and nonconsumptive users) indicated a primary interest in the same type of wildlife. All user groups identified deer and songbirds as their favorite wildlife. The majority of these species require early successional habitats. These findings indicate that forest management can benefit the needs of both consumptive and nonconsumptive forest users. In addition, Wisconsin survey respondents cited "finding available time" as the major limitation on their participation in these activities. They most often participated in wildlife-related activities within one mile of their homes. This response indicates that sound, integrated forest wildlife management on public and private lands throughout the central hardwood region will create needed recreational opportunities to meet America's growing needs.

Management Strategies

Even-aged Management

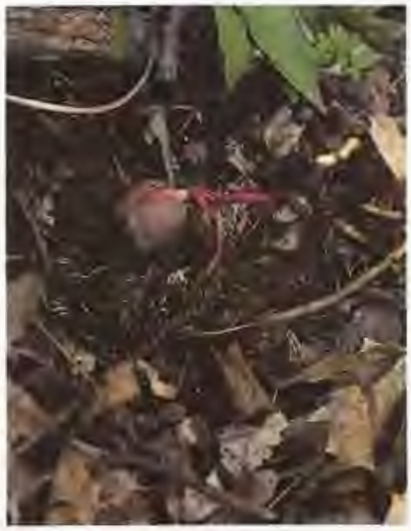
Timber management falls into two major categories: even-aged management and uneven-aged management. (See the Management Chart on page 12.) Over time, even-aged management produces a stand of timber where trees are all about the same age. Foresters often use this management strategy in the central

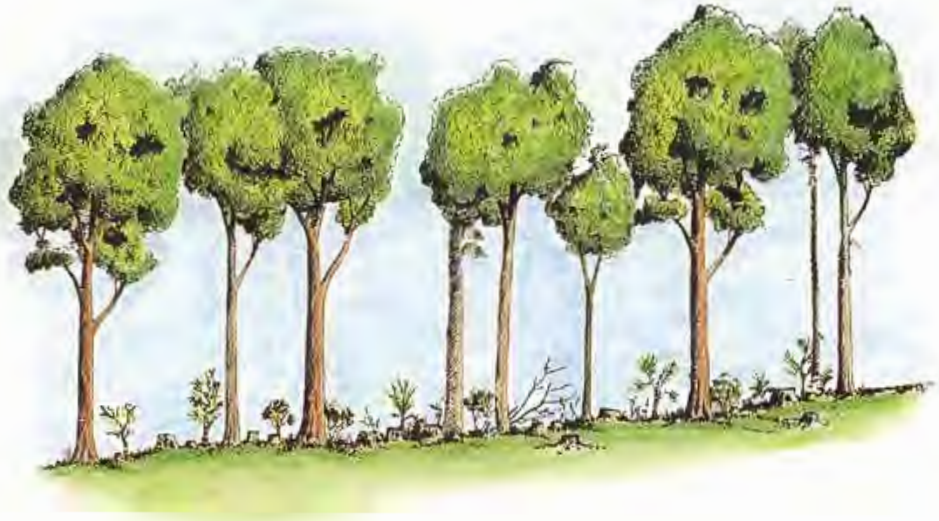
Are these activities important to you? Sound forest management can increase your recreational opportunities.

hardwood region as a tool to regenerate valuable timber species such as oak. Oaks are a valuable timber tree, and they produce acorns, a nutritious and highly preferred food that is a dietary staple of many wildlife species. Oak trees do not grow in full shade. On fertile soils, oaks have a difficult time competing with other more aggressive tree species — maple, tulip poplar, and cherry. Scientists are seeing a shift in the species composition of our forests and project that in the absence of management, oak will be lost as a major component of our forests. The most successful management practice for regenerating oak is even-aged management. Foresters use two major practices in the even-aged management system: shelterwood and clearcut.

Shelterwood cutting takes place in two to three stages. Depending on the age and condition of the stand, one or two harvests are made 10 to 20 years apart. These harvests remove marketable trees and allow increased sunlight to reach the forest floor, so new seedlings may sprout and grow. Residual trees are left to "shelter" the young seedlings as they develop. Once enough trees start to grow in the stand, the remaining large trees are removed. This final harvest allows more light into the stand, and vigorous forest growth results. By insuring adequate regeneration is present before the final harvest, the resulting forest will be dominated by desirable tree species in only 15 to 20 years.

With clearcutting, all timber is removed in a single cut. This technique has generated a lot of criticism and controversy. However, clearcutting is a useful tool for

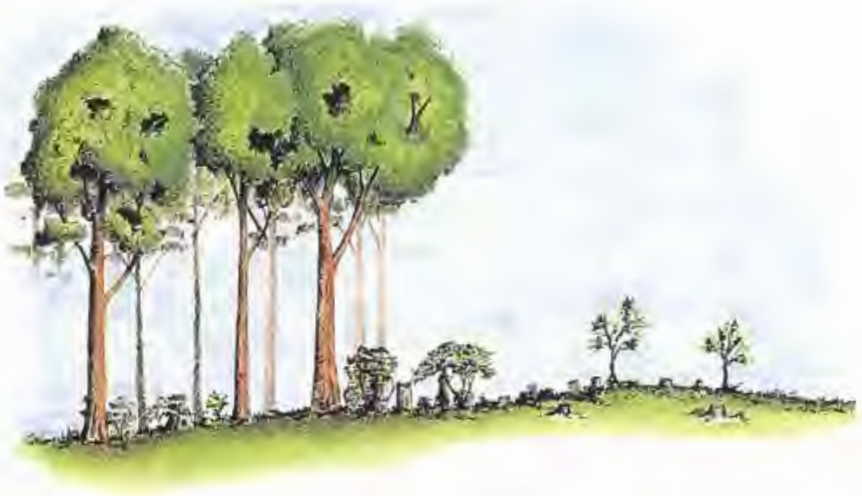




Shelterwood cut

regenerating vigorous new growth of shade-tolerant and intolerant species in mature and overly-mature stands, where tree growth rates have slowed and replacement is necessary. Clearcutting is usually the most economical management method for large parcels of land. This silvicultural treatment allows full sunlight to reach the forest floor throughout most of the day.

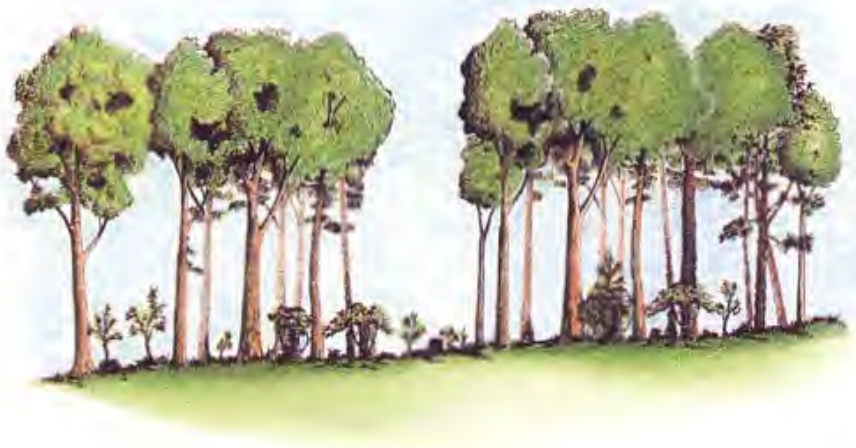
Clearcut openings are highly variable in size and shape and depend on surrounding tree heights and steepness of slopes. To allow full sunlight to reach 50 percent of an area on level ground with surrounding trees 100 feet tall, a clearcut would have to be about 10 acres. However, on a south slope it may be possible to have a clearcut as small as 2 acres. Full sun is necessary for regenerating and growing important, moderately shade-tolerant species such as ash, cherry, oak, tulip poplar, and walnut. Immediately after clearcutting, rapid sprouting and regrowth of trees occurs. This new forest, is not harvested until trees reach commercial size in 60 to 80 years. Properly placed narrow or irregularly shaped clearcuts can create needed openings in heavily forested areas to provide food, browse, and cover for many wildlife species. On large properties, periodic clearcutting is required to manage a forest with many different ages of trees. Careful planning and placement of these cuts creates diverse habitats, fostering a variety of wildlife and tree species. Under certain conditions, clearcutting is the best method to harvest existing timber while regenerating a new stand and creating essential wildlife habitat. Clearcut openings can also be patches or strips. This technique is not only useful for regenerating shade-intolerant hardwood species but also for creating early successional habitat for woodcock, grouse, deer, and songbirds.



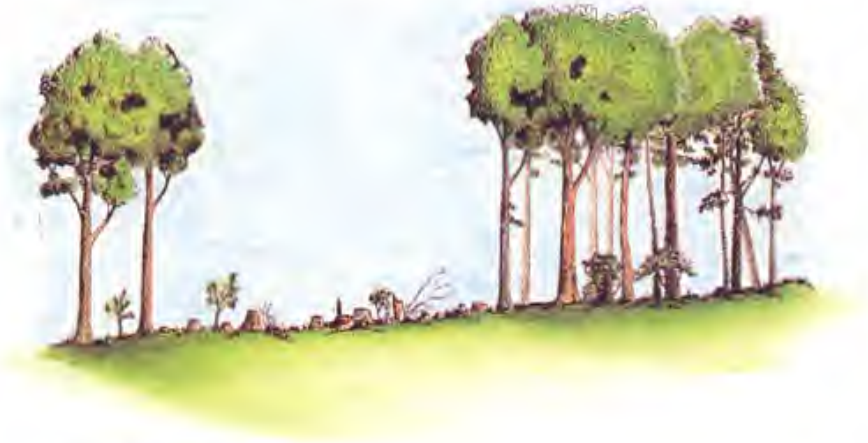
Clearcut

Uneven-aged Management

The second primary timber management strategy is uneven-aged management. As the name suggests, this management strategy results in a forest composed of trees of several different age classes. Using this strategy, timber can be removed for harvest. The remaining opening creates valuable wildlife habitat and stimulates new forest growth. This strategy is more practical on smaller acreages because the majority of the parcel remains forested all the time. This strategy maintains a diversity of age classes, tree species, habitat types for wildlife, as well as economic returns and recreational enjoyment over a sustained period.



Single tree selection



Group selection

Two primary cutting methods commonly used to achieve uneven-aged management are single tree selection and group selection. Under single tree selection management, individual trees are selected for cutting. Selections are based on criteria that will achieve intended management objectives. Criteria fulfilling wildlife habitat needs may mean including a number of den trees, fruit-producing trees, or openings per acre. To provide quality timber products, managers select individual trees that will be allowed to grow to larger sizes or specify tree diameters of species to be harvested. This method maintains continuous forest cover and eventually results in a forest composed of shade-tolerant species like maple and beech. Single tree management allows frequent, smaller volume harvests. This system closely simulates trees dying naturally in the absence of management and favors shade-tolerant tree species.

Group selection management encourages periodic harvests of small tree groups, (a half acre or more) spaced 15 to 20 years apart. This system creates small openings throughout the forest that favor regeneration of tree species requiring full sunlight to grow: ash, cherry, oak, tulip poplar, and walnut. To maintain the character of a stand, the diameter of a circular opening should not exceed two times the height of the dominant trees. These periodic harvests eventually create a diverse forest with well-distributed, small, even-aged tree groups of varying ages. Managers often combine group tree selection with single tree selection within the same forest.

Both even-aged and uneven-aged management strategies have the common objectives of producing market goods, ensuring regeneration of desired tree species, and maintaining the desired tree diameter and age distribution. Because of the many site conditions, management objectives, and stand types, no single system is best for managing hardwood stands. The proper method must be selected and used as a tool to improve a forest for wildlife habitat, recreational opportunities, or timber production. Proper planning can benefit timber, wildlife, recreation, and income even on small parcels of land.

Summary

Multiple-use management yields the most benefits from our forested lands. Management strategies scientifically encourage natural responses, resulting in plant communities desired by both wildlife and people. The most valued timber species — oak, walnut, cherry, maple, and ash — all provide fruit required by most forest wildlife species. Encouraging healthy trees of these species increases the food source available to wildlife and provides a supply of valuable timber products. When these trees are harvested for our needs, openings are created in the forest. The resulting vigorous forest growth satisfies the food and cover requirements of most forest wildlife species. In time, these harvested areas grow back into valuable timber species and, at the same time, provide wildlife food. Proper timber management does not interrupt nature's processes but works with them.

Trees, like wildlife, are truly a renewable resource. Like all living things, they have limited life spans. Once they have reached maturity, both fruit production and timber quality decline. However, overly-mature trees do provide dens, nests, and insects for food for some wildlife species. Encouraging mature timber along streams, roads, and in remote areas increases stream and water quality, aesthetics, and provides valuable wildlife habitat and cover. By harvesting the mature trees from the rest of the forest at the proper time, the timber products can be used, and vegetative species and young forest growth that provide more benefits to wildlife will occupy this growing space.

Management Chart

Management method	*Timber benefits*	*Wildlife benefits*
Even-aged management	- Favors shade-tolerant species (oak, tulip poplar, cherry, ash, etc.)	- The mosaic created by regeneration cuts surrounded by stands of older trees creates a diverse environment which fulfills the habitat requirements of a wide array of wildlife species
Shelterwood	- Becomes necessary when adequate advanced regeneration (≥1000 stems per acre of the desirable species greater than 4.5 feet tall) is not available in the stand - Provides economic return in two to three stages - Provides firewood and specialty products - Uses wood lost to natural competition	- Encourages vigorous growth of understory vegetation necessary for food production, brood cover, and escape cover - Results in new forest of desirable fruit and seed mast-producing trees (oaks, cherry, ash, walnut, and tulip poplar)
Clearcut	- Used when advanced regeneration is present - Provides economic return all at once - Allows efficient and cost-effective harvest (especially when managing large land parcels)	- Encourages vigorous growth of understory vegetation necessary for food production, brood cover, and escape cover - Results in new forest of desirable mast-producing trees (oaks, cherry, ash, walnut, and tulip poplar)
Uneven-aged management	- Favors shade-tolerant species (beech, maple, basswood) - Provides a regular economic return from timber sales	- On small land parcels, a mix of shade-tolerant and intolerant mast-producing trees (oak, walnut, cherry, maple, beech, hickory, tulip poplar, and ash) and shrubs (dogwood, greenbriar, blackberry, sassafras, vibrunum, and spicebush) can be provided within the same stand
Single tree selection	- Provides effective regeneration of shade-tolerant species (beech, maple, basswood) -Maintains continuous forest canopy at all times -Increses control of forest species, size, and distribution - Uses wood lost to natural competition - Provides firewood and specialty products	-Provides habitat for species desiring continuous forested environment -Provides specific den trees, snags, and fruit-producing trees - Harvested tops provide cover
Group selection	- Regenerates small patches of shade-intolerant species within a stand composed primarily of shade-tolerant trees - Increases control of forest species composition	- Provides needed browse, nesting cover, food, and escape cover in heavily forested areas - Provides habitat for a wide range of wildlife species - Harvested tops provide cover

Because of the many site conditions, management objectives, and stand types, no single system is best for managing hardwood stands. The proper method must be selected and used as a tool to improve a forest for wildlife habitat, recreational opportunities, or timber production. Proper planning can benefit timber, wildlife, recreation, and income even on small parcels of land.

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P.O. Box 482, Lexington, TN 38351

Petchenik, J.B., 1988.
Wisconsin's Wildlife Constituency Study
University of Wisconsin Extension, Madison 53706

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