MANAGING FORESTS FOR WILDLIFE

(PART TWO OF A TWO-PART SERIES)

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Wild animals are integral parts of a forest ecosystem and any forest management activity affects their habitats. Habitat (which consists of cover, food, water and living space components) and the arrangement of habitat components are the keys to successful wildlife management. The aim of habitat management is to arrange cover, food and water within an animal's normal living space. Timber management practices can be used to manipulate forest and other vegetation into an arrangement that provides suitable habitat for a desired species if those practices are applied with attention to the animal's life requirements. Whether wildlife is the primary objective of forest management or secondary to timber production, the same management practices are utilized, but will vary in degree of application. Prescribed burning, thinning forest stands, various harvesting practices and forest regeneration can be tools to improve wildlife habitats. Their effectiveness depends on their application according to principles of wildlife biology.

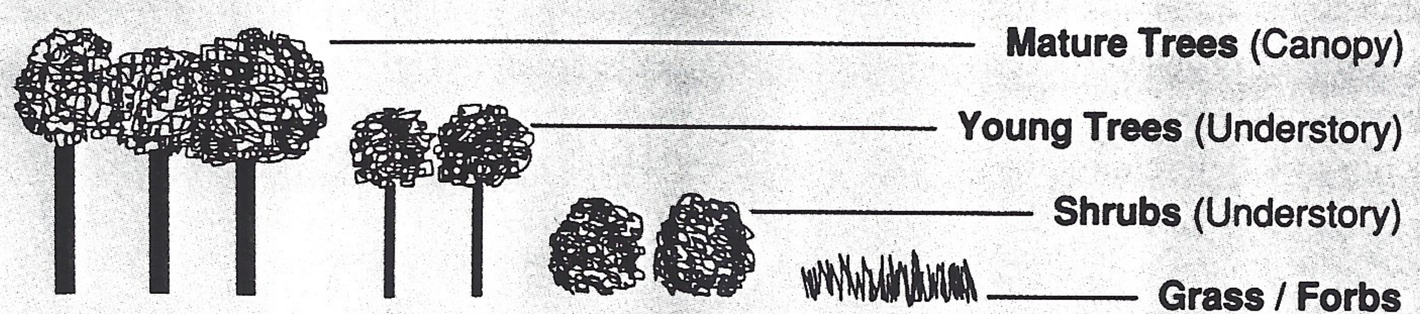
Although each species of wildlife has unique habitat requirements, two principles can be applied in many wildlife management situations. They are the concept of diversity and the law of interspersion. As a general rule, habitat diversity translates into wildlife diversity and abundance. To varying degrees, all wildlife species need a diverse assortment of plants and vegetation types to flourish. Similar to this principle is the law of interspersion, which says that wherever two required habitat types for an animal meet, the edge between the two will be more favorable for wildlife than either type alone. According to the "edge effect" concept, wildlife density is directly proportional to the amount of edge for all species that require more than one vegetation type. It should be noted that interspersion includes both horizontal and vertical dimensions since wild animals live and obtain their requirements in three dimensional space (see Figures 1 and 2). The basic rules of habitat diversity (that provides necessary habitat components) and interspersion (the arrangement of habitat components) are fundamental considerations in the application of wildlife habitat management practices. Management of forests or timberlands for wildlife should follow the same rules.

Forest Improvement Practices

Various treatments can be applied to existing forest stands to improve their ability to support wildlife. Intermediate aged forests often lack the structural diversity attractive to many kinds of wildlife. For example, breeding bird densities in regenerating pine-hardwood forests may be as high as those in mature stands. But, densities may be low at mid-succession because of limited sub-canopy growth. Habitat improvement consists of measures to diversify these stands.

Figure 1. Vertical Density

Vertical density, or layering, is the arrangement of cover types adjacent to one another.



A great tool of wildlife management is prescribed fire. Forest communities follow a pattern of succession to a climax stage in the absence of disturbances such as fire, wind, etc. However, disturbances are normal events in nature that interrupt succession to create varying stages of plant growth from early pioneer species to climax vegetation. Such variety is vital to many wild animals, providing food and cover components necessary for their continued existence. Fire disturbance has played a major role in the ecology of many wildlife species and forest communities. In fact, the longleaf pine forests of the South were climax forests because of the prevalence of fire.

Because it is otherwise controlled in today's landscape, fire for wildlife and forest management must be prescribed. Usually the fires that are prescribed for timber management are not good burns for wildlife. And, too often, the fires that are prescribed for wildlife habitat improvement prove to be detrimental to wildlife. This is true because the plans ignore the rules of diversity and interspersion. A good prescribed burn for wildlife creates a burned-unburned mosaic that stimulates new vegetation growth for the future while retaining adequate cover for the present. The "patchy" result of such a burn intersperses a variety of plant species and cover types meeting the needs of wildlife. Various firing techniques can be utilized depending on the situation, but backfires are recommended for most wildlife habitats because they tend to leave unburned patches.

The ideal approach to prescribed burning for wildlife habitat improvement is to divide a tract into burn units and burn a certain amount of them each year. Adjoining units would not be burned in the same year, creating differing stages of

plant growth. Within burn units key cover such as plum thickets, abandoned orchards or old homesites should be protected from fire. A two-year burning rotation is recommended for quail and rabbit habitats, and a three-year rotation for deer and turkey. Exclusion of fire from predominantly pine sites for five or more years greatly reduces habitat quality for many wildlife species. As useful as the prescribed burn is for wildlife, it has its limitations. Burning is not generally applicable in hardwood forests. Also, prescribed burning alone will do little to improve wildlife habitat quality in dense pine forest with a closed canopy.

A forest composed mostly of a single layer of trees, whether it is a mature hardwood forest or a pine plantation, offers limited wildlife habitats. Thinning can be extremely beneficial to wildlife in these forests because removal of some trees from the stand makes space available for other kinds of vegetation, and sunlight penetration through the open canopy allows new plants to grow. Thinning can be used to promote vertical diversity within a forest, influence composition, and improve vigor.

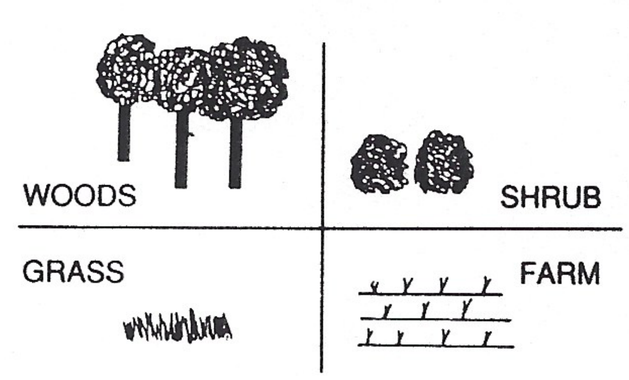
Artificially regenerated pine forests are of low value to wildlife during mid-succession because of canopy closure and reduction of understory. Thinning can dramatically improve habitat quality of these stands. Ideally, pine plantations should be initially thinned (and prescribed burned) at age five to seven. Stocking should be reduced to about 60 square feet of basal area per acre.

Careful thinning can enhance mast production in hardwood forests. In most forest stands, a few high quality oaks produce a disproportionate share of the mast. During fall when mast is present, good mast bearing oaks and other species can be marked and observed over a two or three year period. Non-producing and otherwise inferior trees can then be removed. Thinning around the mast bearing trees will allow them to crown out and produce a larger crop. Thinning will also allow understory soft mast trees and shrubs to bear more fruit.

Thinning activities should be dispersed through a forest and conducted at varying intensity. The result is a "patchy" pattern from open understory to dense shrubby growth. Removing trees at varying intensity along a forest edge is a useful technique to create a transition zone that minimizes contrast between cover types. Such a gradual edge is best for most wildlife. For example, removing 75 percent of tree cover from the first 50 feet of forest edge, 50 percent of trees from the next 50 feet, and 25 percent of trees from the next 50 feet creates a cover condition ranging from open land to weed and shrub to forest.

Figure 2. Horizontal Diversity

Horizontal diversity (habitat interspersion) is the intermixing of different habitat types into a mosaic.



When thinning or harvesting a stand, retain six or more den trees (trees with cavities) and at least that many snags (dead and dying trees) per acre. They should be at least 5 inches in diameter—the larger the better. These trees are used by a variety of birds, mammals and reptiles. Silvicultural thinnings tend to remove these important trees, so special efforts should be made to retain them.

Timber Harvesting Practices

Timber harvesting, depending on the method, will create either even-aged or uneven-aged stands. Even-aged management utilizes clearcutting and shelterwood harvest. Uneven-aged management relies on single tree selection and group tree selection. Each method will favor some species of wildlife and adversely impact others.

With even-aged management, the mosaic created by cutovers interspersed through stands of older trees creates a diverse environment that provides habitats for an array of wildlife. Clearcutting and shelterwood cutting encourages vigorous growth of early succession herbaceous plants and new woody growth that provide abundant food, brood cover and escape cover for wildlife. They can result in new forests with a high component of soft and hard mast producing trees.

Even-aged forest management minimizes vertical diversity in a stand, but allows for development of maximum horizonal diversity. In even-aged management, diversity is enhanced by manipulating the size, shape and age differential of each stand. Most wild animals will not abandon an established home range to move into better habitat. If their habitat begins to decline, they will remain in the declining habitat until they eventually die out. Only a few individuals will move out to occupy new habitat. For this reason, when even-aged management is practiced on a large scale, local abundance of a given wildlife species will be a temporary occurrence. The population fluctuates with succession because the habitat changes. To maintain stable populations of early to mid-successional stage wildlife favored by even-aged forest management, harvesting should be done in relatively small units. If the goal is to favor late-successional wildlife in even-aged forest, cutting units can be large if managed on a long rotation.

Size, shape and distribution of clearcuts have major effects on wildlife because of the radical change in cover types. For this reason, clearcutting should be well planned when wildlife is a major factor. For many kinds of wildlife, 20-acre or smaller cutting units are large enough. Cutting boundaries should be irregular, with fingers and projections of forest, to increase edge effect for wildlife. Relatively long, narrow cuts, and cuts that follow natural contours also create more edge. Forested corridors of 100 yards or more wide should be left between cuts and linked to existing forest. Thinning can be performed in these corridors to commercially utilize part of the trees, and they can eventually be harvested completely. Forest corridors should be retained along perennial streams, with extensions up the stream drainages. They generally shouldn't be wide enough to see through. The drainage corridors serve to separate cutover uplands and form a natural tie into a continuous forest network.

Some wildlife species need large tracts of continuous forest. This can be achieved by various means, and generally requires long rotations of 60-100 years or more. Even-aged management for these species can involve use of large cutting units, from 80 acres to several hundred acres in size. Even-aged sustained yield harvesting with small cutting units can provide

the same result. Either way a large amount of continuous forest is present.

Uneven-aged forest management also favors wildlife needing a continuous forest environment. Edge species are not favored. Vertical diversity is enhanced and horizontal diversity declines. With single tree selection, shade intolerant trees (such as oaks that are important to wildlife) will sprout but are suppressed in the forest. Group selection harvesting can improve forest habitat diversity because it removes the tree canopy from small areas across the forest and allow pockets of new vegetation to grow. The herbaceous, shrub and sprout growth provide browse, nesting cover and escape cover in otherwise uniform forest. Group selection also encourages regeneration of shade intolerant trees such as oaks that are needed for mast production. Single or group tree selection readily facilitates retention of den, snag and mast trees.

Forest Regeneration Practices

Many animals need several stages of plant succession available to them to live, reproduce and flourish. That is why wildlife is abundant in areas that have a balance of older forest and regenerating forest. Several things can be done to enhance wildlife habitat when a forest is regenerated. During site preparation, efforts should be made to save living trees as well as snags because snags are temporary. Living trees continue to provide dens and mast. Soft mast trees such as dogwood, sassafras and black cherry should not be destroyed. Retain some groups or clumps of mature trees in clearcut areas. These islands should be about a quarter-acre in size and contain mast bearing trees such as oaks or beech.

If pine stands are artificially regenerated, tree planting rates can be reduced to around 300 trees per acre. This will delay canopy closure. On appropriate sites, longleaf pine can be planted. An open canopy is more easily maintained with longleaf than with loblolly or slash pine because longleaf has a smaller crown. For the same reason, longleaf stocking can be higher than for loblolly or slash and still permit an open canopy. Mixed forest stands composed of pine and hardwoods beneficial to wildlife can be created by reducing pine planting rates to around 100 trees per acre and selectively controlling competition with herbicides.

Habitat diversity can be improved by artificially regenerating pine stands in regions of mostly hardwood forest. These stands provide escape cover and other benefits. They should be no larger than 20 acres and irregularly spaced. Similarly, hardwood stands can be retained or allowed to develop in areas managed for pine. Forested corridors between clearcut and regenerated pine stands and along streams are logical places to manage for hardwoods.

There are basically four options in forest management: exploitation, even-aged, uneven-aged management and preservation. Exploitation, the utilization of a resource for purely selfish purposes, is still too often the philosophy of land use, but is not a suitable management strategy. At the other extreme, preservation promotes old-growth or climax forest landscapes. We need such natural communities for their environmental stability, but these areas do not have the productivity to sustain us. Responsible management is the reasonable approach for much of the land. Forest management that preferably combines even-aged and uneven-aged management practices can be applied in a manner to create habitat diversity that supports wildlife and provides timber products.

From an ecological perspective, production is highest in early stages of plant succession and declines in later succession. So wildlife *numbers* can become prolific in areas of early forest succession because of profuse plant growth. On the other hand, wildlife *diversity* tends to increase with succession (with some declines at mid-succession and climax). Grassland will support some wildlife species, young forest more species and maturing forest will have a greater variety of wildlife. Obviously, the most wildlife and greatest diversity of wildlife will be found in landscapes composed of a mixture of successional stages and habitat types ranging from pioneer to climax communities. The spectrum of wildlife in the landscape will reflect that land's habitat diversity and interspersion.

References

Barnes, T.G., L.R. Kiesel and J.R. Martin, eds. **Private Lands Wildlife Management**. Lexington: Kentucky Cooperative Extension Service, 354 pp., 1992.

Dasmann, R.F. **Wildlife Biology**. New York: Wiley and Sons, 231 pp., 1964.

Hurst, G.A., J.J. Campo and M.B. Brooks. "Deer Forage in a Burned and Burned-Thinned Pine Plantation." Proc. Annu. Conf. S.E. Assoc. Fish and Wildlife Agencies, 34:476-481, 1980.

Odum, E.P. **Ecology**. New York: Holt, Rinehart and Winston, 152 pp., 1963.

Rosene, W. **The Bobwhite Qwail, Its Life and Management**. Sun Press, Hartwell, 418 pp., 1974.

Smith, D.R, ed. "Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds." Washington, D.C.: USDA-Forest Service, Gen. Tech. Rep. WO-l, 343 pp., 1975.

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Managing Vegetation with Goats

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vesting much easier and would allow for immediate replanting of the area. No work has been conducted in this area.

Researchers from Langston University in Oklahoma have utilized goats to control the erosion of the balds on the top of the Appalachian Mountains along the Appalachian Trail. In this area, which is utilized by thousands of hikers each year, the use of fire or chemicals has been eliminated by administrative decision. To prevent the balds from being overrun by unwanted vegetation, goats were used. The goats were fenced in small areas until they had reduced the unwanted vegetation and then were rotated to the next area. In this manner the United States Forest Service hopes to prevent natural succession from eliminating the grassy balds with their magnificent vistas as they occur along the Appalachian Trail. Goats can be used in environmentally sensitive areas because those people who are not willing to accept chemical or mechanical means of control are willing to accept biological control using goats.

Do goats have a place in forest management? The answer is a qualified YES! They are not going to solve all the problems, nor are they going to replace existing tools, but they are another alternative which should be considered in future management decisions.