Attracting Deer to Forested Areas

Tennessee Department of Agriculture, Division of Forestry

Tennessee has an abundance of deer. But since deer have a range of 300 to 2,400 acres, they will usually be subject to hunting on adjacent lands. You can nevertheless attract deer to your property by providing what they seek: nutritious food, minerals, and shelter. Groves of evergreens (cedars or pines) as small as five acres supply usable shelter. Minerals can be placed in a depression and worked into the ground. The mix should contain 25% to 50% salt and have a calcium to phosphorous ratio of 2:1. It is illegal to mix food with salt and then hunt over it.

Food during critical seasons is usually the factor that limits deer populations and so it is what they seek most. There are three ways to provide food: cut trees, plant food plots, and fertilize.

Forest openings an acre or more in size have up to 10 times as much wildlife food as the forest interior. Making openings as small as 1/8 acre (about six mature trees) can provide forage and possibly some income from timber. However, to be optimal, openings should be an acre in size. Ideally, openings should comprise 1-5% of the total forest area. These areas will reforest naturally, and so new openings will need to be made every few years. Dense sapling stands that grow up in these openings will provide prime fawn rearing habitat.

Plants in forest openings highly preferred by deer include Japanese honeysuckle, blackberry, greenbriar, strawberry bush, persimmon, ash, and oaks. The protein content and yield of these plants can be raised by fertilization, which should help attract deer. Using a timed-release fertilizer high in nitrogen, such as 36-3-7, will save time, effort and cost, and will minimize loss of nitrogen through leaching and volatilization. As a rough guideline, apply about 500 pounds per acre in the early spring. Or, apply about 250 pounds per acre of a conventional high nitrogen fertilizer (such as 24-6-6) in March, May and September. Fertilize mast-bearing trees in the same way. Timed-released tablets are available; insert them at the edge of the tree's root zone at a rate of four for every one inch of diameter. These will release nitrogen for up to two years.

Liming should not be neglected when fertilizing native vegetation. This will sometimes be difficult due to inaccessibility, but areas treated need not be large. Manually liming 1/8-acre plots will cost around $50 each if contracted out; a few plots of this size can be readily limed by most landowners. (See "Liming Wildlife Food Plots").

Late summer and late winter are times when food is least available and of lowest quality. Supplemental summer crops (and planting dates) include

- Soybeans (April-June)
- Cowpeas (April-June)
- American jointvetch (March-June)
- Rape (April-July)
- Lablab (April-June)
- Corn (March-May)
- Millet (April-July)
- Grain sorghum (May-July)

When mixing planted foods, be sure one will not crowd another out. For instance, cowpeas can be planted with corn, but only small grains should be planted with clovers. Winter food plots should contain a mix of grains and clovers. Use a low-nitrogen fertilizer such as 7-27-27 when fertilizing legume/grain mixes. Consult with your county Extension agent for recommendations on varieties and seeding rates.

Prescribed fire will increase spring forage amount and quality. You will need a permit from the Division of Forestry. Inexperienced persons should not attempt a prescribed fire. The Division of Forestry can advise you, and can sometimes assist. (See "Prescribed Burning").

Mowing and disking are low-cost options. Disking in December will promote growth of partridge pea and ragweed, which are utilized by quail and heavily browsed by deer. April disking will favor grasses. June disking benefits deer, and it promotes insects needed by turkey and quail. (Version 12-03)

Building Brush Piles for Wildlife

Tennessee Department of Agriculture, Division of Forestry

Nearly all animals need cover, so they can escape from predators, rest in safety, nest and raise their young, and find shelter from extreme weather. Brush piles will benefit two game animals, rabbit and quail, but will also provide a home for other ground nesting birds, amphibians and reptiles. Brush piles bring the fastest response of any forest wildlife management tool.

Locate brush piles near food and near the edges of forest openings. Do not pile brush closer than 10 feet from trees with potential commercial value, since bark beetles and borers feeding on the dead brush can attack nearby trees.

To maximize the benefits of brush piles, place larger materials on the bottom and leave tunnels for access. Three types of bases work particularly well: large pole-size logs, piles of rocks, and stumps.

Lay four poles measuring six inches in diameter and six feet long parallel and a foot apart. Then lay four more on top perpendicular to the base logs. If rocks are used, make three stacks about two feet high, about six feet apart, forming a triangle. Place large limbs to form the sides of the triangle and pile other limbs across them. Or, select a tall stump and lay large limbs on it. Pile more limbs on these foundations to a height of six to eight feet.

A long-lasting alternative is to make a “living” brush pile by cutting partway through saplings so that they fall in a crisscross pattern over each other. Pile branches over these, but leave enough of the tops exposed so that the trees remain alive. Or, bend down or break low-growing limbs of a smallish tree and pile brush over them.

(Excerpted from Wildlife Management for Tennessee Landowners, Tennessee Wildlife Resources Agency)

version 8-04

Control of Weeds in Wildlife Food Plots

Tennessee Department of Agriculture, Division of Forestry

Weed competition in wildlife food plots may threaten your plantings. Some infestations may be light enough to tolerate, or to control satisfactorily by mowing, by planting tall grains that will compete with the weeds, or both. Mowing is an option with clovers, which respond well to cutting. Corn or sorghum planted after two plowings (in early- and mid-spring) might outgrow the competition.

Herbicides will usually be your best bet to control a serious infestation. The first step is to identify the weeds, then select the herbicides. There are dozens of brands on the market, but we will use as an example three that have wide use and brand-name recognition. 2,4-D, an ingredient of many herbicides, controls broadleaf weeds without affecting grasses like millet, corn or wheat. (Note: do not use 2,4-D around walnuts.) Grasses can be controlled by Poast and similar formulations without harming broadleafs. Roundup (glyphosate) kills both broadleafs and grasses.

It is very desirable to plan ahead so that timing will be right. Observe what grew on the plot last year. If grass was the main problem, plant a broadleaf forage crop and treat with a grass-specific herbicide like Poast. If broadleafs are the main problem, plant grasses and spray with a herbicide containing 2,4-D. If both are serious problems, spray with Roundup or similar broad-spectrum herbicide prior to planting. Time application of herbicides to kill weeds before they seed.

The ideal way to plant after spraying with Roundup is with a no-till seed drill, since plowing or harrowing will turn up more weed seeds. But if you don't have the right equipment, spray, plow, wait two weeks, plow again, and plant.

A backpack sprayer is practical only for small openings and roadsides. For larger openings, a sprayer equipped with a boom and fan nozzles is called for. Such a sprayer can be mounted on a pickup, tractor or ATV and will cost between $150 and $2,000. Herbicide application costs will run $15 to $50 per acre.

Fencerows and Headquarters Areas

Tennessee Department of Agriculture, Division of Forestry

Shrubby growth along fencerows provides escape cover and travel lanes for quail, rabbits, songbirds and other small wildlife. Habitat can be created by allowing areas along fences to grow up into briars and tree seedlings, and/or by planting species favored by wildlife.

Periodic mowing will renew fencerow habitat. Mowing on a rotational schedule will prevent brush from becoming too large to cut easily and will maintain well-distributed habitat in all stages of development. One fourth of the fence lines might be mowed annually.

The habitat value of a line of fairly mature trees along a fence can be greatly enhanced by expanding it with rows of shrubby food and cover species. Keeping the shrub row at least one bush-hog/disk width away from the actual fence will allow easy maintenance of the fence. The space between fence and brush can serve as a food plot. Total width should be at least 15 feet.

Cutting larger (6"+) trees can improve some fencerows. The stumps will send up numerous brushy sprouts, which make good cover. The treetops can be left in the game strip, where they too will provide cover. Mast producing trees such as oaks, ash or black cherry should be left uncut.

Good wildlife shrubs or trees include autumn olive, wild plum, gray and flowering dogwood, crab apple, hawthorns, sassafras, indigo bush, persimmon, blackberry, grape, sumacs, mulberries, elderberries, serviceberry, greenbriar, poison ivy, redcedar, oaks, hickories, beech, maples, cherry, pines, holly, blackgum, elm and ash. These are generally planted on a 6x8 foot spacing two to three rows wide. Lespedeza is a smaller shrub that provides excellent cover and late winter food for quail and other birds. Bicolor, Thunberg's, Korean or Amquail are good choices. Lespedeza can be grown from seed or seedlings. Plant seedlings every 18 inches in three or more rows on a three-foot spacing.

Ideally, any point in an area managed for quail should be within covey flush distance (100 yards) of cover. Fencerow habitat areas might need protection from grazing until vegetation is well established.

"Headquarter areas" are clumps of dense shrubby vegetation with good overhead cover and shady open ground below. They are used for loafing and dusting by coveys of quail. They are best utilized if they are located where three or four habitat types come together (field, weeds, brush, forest etc.) The number of these areas can determine how many coveys a particular farm will support. Wild plum, dogwoods, crabapples and hawthorns are highly desirable for headquarter areas. Evergreens (redcedar, holly, Virginia pine, white pine, etc.) provide important winter cover, plus excellent dove nesting areas. Clumps should be 1/4 to 1/2 acre in size and be connected to (or near) other good cover.

(Adapted from the Kentucky Division of Forestry.) 1-00

Gray Squirrel

Tennessee Department of Agriculture, Division of Forestry

Gray squirrels need hardwoods, especially nut producers (hickory, beech, white oak group, and red/black oak group, in that order, and walnut where it occurs.) Berries, soft fruits, buds, seeds, and fungi are supporting foods. Red maple is particularly important in early spring and mulberry in May and June. Foods by season include:

August-October:
Nuts and acorns
Sugar maple, pine and yellow poplar and seeds
Hornbeam seeds
Dogwood, blackgum, hawthorn and cherry fruits
Fungi
Insects

November-January:
Nuts (including acorns)
Blackgum fruit
Yellow poplar seed

February-April:
Red and black oak acorns
Fungi
Buds & flowers
Red maple seeds

May-July:
Buds, flowers
Berries
Fungi
Insects
Yellow poplar seeds

Nuts (hard "mast") are the mainstay of squirrels' diet in the critical fall, winter and early spring months. Half of the forest should be oak, beech and hickory. Acorn production usually starts about age 20-25 and peaks between age 40 and 80. Generally, red oaks produce the highest yields, followed by white and chestnut oaks, then black oak. Acorn crops are not consistent from year to year; good crops usually occur only every 2-5 years. White oak bear seed annually, red oaks every other year. White oak acorns are more edible, while red oak acorns are more durable. A mix of oak species is best. Sawtooth (or Chinese) oak seedlings can be planted to provide heavy yields every year, beginning at an early age.

Shelter is important. Squirrel pup survival is much better in waterproof dens than in leaf nests. Good den trees must usually be at least 40 years old. Maple, beech and black cherry are especially good. Retain at least 1 or 2 potential den trees per acre (3 is ideal) during all stages of forest growth. Select only trees that should be able to live for at least 25 more years.

How to harvest timber to favor squirrels:

1. Thin existing stands to increase mast production and stimulate growth of foods beneath the canopy. Squirrels prefer a well-developed forest mid-story.
2. Protect grapevines (if not damaging crop trees.)
3. Use timber harvest methods that allow good oak regeneration, leave evenly distributed mast-bearing trees and den trees, promote good hard mast crops and supporting foods. Alternatives:
   - harvest small blocks of trees (1/4 to 1 acre)
   - create a two-age forest (harvest roughly 1/2 of the trees when the stand is between age 40 and 80 and plan on harvesting the rest in 20 to 40 years). This ensures continuous mast production and good midstory growth.
   - use a "wildlife shelterwood", i.e., leave several large mast-bearing trees per acre
   - avoid diameter limit cutting. If diameter limit harvesting is used, leave hard mast-bearing trees and are potential den trees.
4. Leave den trees, especially if clearcutting.
5. Regenerate oak (this can be difficult on good sites – see a forester to improve success.)
6. Schedule timber harvests to ensure a steady supply of oaks of prime mast producing age.

Hunting Leases

Tennessee Department of Agriculture, Division of Forestry

Landowners can generate income and get some help in policing and protecting their land from trespass and vandalism by leasing it for hunting.

Hunting leases average $2 per acre for tracts over 150 acres and $4 per acre for less than 150 acres. Prime waterfowl areas can bring $7 to $8 per acre or more. However, markets are highly localized, and the price a lease will bring depends on many factors, including

- location
- amount of land
- amount, quality and species of game
- services provided (15% of leases include accommodations other than camping)
- nature of the agreement (time period covered, land management, special provisions such as reserving the family's right to hunt.)

Often, land is leased for enough money to pay the taxes.

Small, odd, isolated fields may very likely produce a greater financial return from hunting than from agriculture.

Landowners with small acreage can join with neighbors to offer a larger block of land.

The primary species hunted under leases are deer, rabbit, turkey, raccoon, quail, duck, geese and grouse. Habitat can be improved to increase populations and hunting success.

It is desirable to have some idea of the numbers of the game animals present. This can be done in a general way by referring potential leasees to the Tennessee Wildlife Resources Agency (TWRA) county wildlife technical reports, and to the local wildlife officer who will know which areas of the county carry the most game.

Some forestry/wildlife management consultants will perform population surveys for individual ownerships. However, these are very time consuming and are subject to many variables.

Hunters who lease land know they have a place to go. They feel greater ease and safety, and they feel they have a higher chance of success. The quality of the hunting experience is as important to many hunters as hunting success. Surroundings, exclusive use of the land, availability of game, and services provided all contribute to a quality hunting experience.

7.5% of hunters currently lease private land, a similar number (18,000) who are not leasing are "very interested," and another 14% are "somewhat interested." Most share a lease with up to 6 or 7 people. As more "no trespassing" signs go up on private land, leasing is becoming a more attractive option for hunters.

Leasing has two drawbacks. The most serious is liability. "Hold harmless" agreements are generally ineffective. Landowners should take out liability insurance if they want to protect against the unlikely event of a lawsuit from a hunter. Ten percent of leasing landowners carry liability insurance. A second and easily resolved question is family hunting rights. If the leasing family intends to continue hunting on the land, this should be specified in the agreement.

Advertising can be done by word of mouth, in newspapers, on bulletin boards, and through the Tennessee Private Lands Hunting Register. See your county Extension office to sign up.

Version 1-00

Liming Wildlife Food Plots

Tennessee Department of Agriculture, Division of Forestry

Liming is often as important as fertilizing. Lime "liberates" nutrients stored in the soil. As lime makes soils less acidic, it also enhances the growth of soil microorganisms. This is especially important for the bacteria used to inoculate legumes. Legumes do best in non-acid soils, ideally at pH levels (a measure of acidity) of 6.0 to 7.0. By comparison, many forest soils in Tennessee have pH values of 5.5, which is moderately acidic.

Lime comes in a range of forms, from powder to grit to pellets. The finer the grind, the more immediate the effect the lime will have on soil acidity, but the more rapidly the effect will dissipate.

Till in the lime before planting the crop, ideally several months in advance so that the soil pH has time to adjust. If more than 2 tons per acre are called for, it is best to spread the lime in 2 applications 6 months apart. In planning the time to lime, schedule a time when farmers are not liming their fields. Commercial applicators are more likely to take small jobs during the off-season.

Take soil samples to your Extension office to determine how much lime to apply. In Tennessee two tons per acre is usually needed, but some forest sites may require up to three or four tons per acre. For accessible sites, powdered lime plus commercial application cost will run $20+ per ton per acre. Manual application of bags of pelletized lime on plots inaccessible to spreader trucks will run about $80-100 per ton per acre for the lime alone.

Version 12-03

Managing for Quail in Wooded Settings

Tennessee Department of Agriculture, Division of Forestry

Bobwhite quail are not usually abundant in most forest-dominated landscapes in Tennessee, but are often present nonetheless and can benefit from proper management of forests and openings. Quail utilize open pine and hardwood forests interspersed with grass, weeds, scrubby growth and small fields. They feed on seeds, insects, and succulent browse and like to nest in clump grasses or brush close to the edge of clearings. Activities that create nesting and brood habitat are the practices most beneficial to quail in forested areas.

To provide habitat favorable to quail, harvest timber in small blocks or narrow strips, use prescribed fire, maintain plots in a weedy condition, plant favored foods, and provide plenty of cover. Thinning and prescribed burning of pine stands will greatly improve conditions for quail as well as increase the growth of the remaining pines. Managing either hardwoods or pines to sawtimber stage at wider spacings that allow the sunlight to stimulate more abundant growth of native grasses and forbs will provide the most optimal management for quail in woodland settings over larger areas.

Food plots should be at least 1/8 to ¼ acre in size. Locate one for at most every 10 to 20 acres of forest. Old log landings are ideal.

Quail utilize both native seeds and planted foods with roughly equal preference; the benefit in planting forage is that these crops will provide a large amount of food in winter as forage from native species becomes scarce. Native "weed" plots mowed or disked after nesting season (that is, April to August) will provide both seeds and large amounts of insects that quail feed on.

Favorite planted foods include browntop or German millet, shrub lespedeza, bicolor and Korean or Kobe lespedeza, grain sorghum, cowpeas, soybeans, partridge peas and buckwheat. These can be planted on entire food plots or they can be rotated with fallowed weedy strips. Disk these plots in strips 15 to 30 feet wide, alternating disked and undisked strips every 3 years.

Lime and fertilize grain plots with 200-250 lb/ac 12-24-24, or 0-20-20 on lespedeza or partridge pea plots (see "Liming Wildlife Food Plots). Do not mow, disk or burn during nesting season (April – August).

Provide cover and food along fencerows and wood margins by planting and/or encouraging growth of fruit and seed bearing plants such as blackberry, grape, sumac, poison ivy, dogwood, blackgum, cherry, redcedar, and oak – especially oaks with small acorns, such as pin oak. (see "Fencerows and Headquarters Areas"). Cover can be immediately enhanced in open areas by creating brush piles. Make each about the size of a car.

Some bare ground near cover is desirable and will be utilized by hens and chicks immediately after hatching.

Plant and maintain openings and roadsides in native warm season grasses (see "Native Warm Season Grasses"). These provide excellent cover, mobility, and food, and bare ground between clumps that enhances quail chicks' movement and foraging. Tall fescue and other grasses that form a thick sod inhibit movement and do not provide good habitat for quail.

Burn plots either every 2 years or burn half one year and half the next. The freshly burned area provides brood rearing habitat, while last year's burn provides nesting habitat. It is also beneficial to burn fields and under pine stands every 3-5 years on a rotational basis. Fire clears away dead grass and encroaching brush, rejuvenates desirable food and cover, favors native warm season grasses, and creates the open conditions preferred by quail. Protect brush piles from fire. A permit is required from the Division of Forestry to burn outdoors between October 15 and May 15. It is highly advisable to get experienced advice and have plenty of help (see "Prescribed Fire").

Help with quail habitat can be obtained from the Tennessee Wildlife Resources Agency www.tnwildlife.org and from Quail Unlimited www.qu.org.

Version 12-03

Root Pruning Fencerow Habitat

Tennessee Department of Agriculture, Division of Forestry

Farmers have eliminated a large amount of fencerow/hedgerow habitat in an effort to maximize crop production. The general belief has been that shading by the trees and shrubs at the edges of a field hurts crop production. However, the reason for dwarfed crops at these edges is not so much shading as it is competition for water and soil nutrients between the roots of trees and crops. Tree roots can be pruned by deep plowing so they won't compete with crops. This allows both undiminished crop yield and valuable wildlife habitat to exist side-by-side.

Root pruning is done with a single shank ripper that will cut to a depth of approximately 24 inches or deeper, pulled by a tractor of at least 50 HP. Two or three passes are needed, sinking the plow deeper with each pass. Cut a furrow along the edge of the agricultural field, usually 15 feet or so from the center of the fencerow or a foot or so toward the field from the drip-line of the trees. Root pruning can be done in any season, whenever the ground can be worked. The interval between treatments will vary, depending upon the tree and shrub species present, soil types, and other growing conditions for the area. Generally speaking, root pruning should be done every four or five years in Tennessee.

WARNING -- Root pruning involves plowing deep enough to hit **underground utility cables or pipelines.** Be sure to check the area for such obstacles before starting root pruning operations.

(adapted from the Kentucky Division of Forestry.)

Version 1-00

Songbirds and Raptors

Tennessee Department of Agriculture, Division of Forestry

Open fields, brush, swamps, moist woods, dry woods, open woods, tall timber, dense tangled undergrowth, back yards, woodland margins – each is favored habitat for a number of bird species. You can attract many species by creating diverse habitat. Or you can tailor your forest for specific species.

The greatest numbers of species and individuals can generally be found near water and at forest edges. "Edge" is the transition from open land to forest. Edges should undulate and should be "feathered" (not abrupt or "hard".) Feathered edges, ideally 150' wide, taper in height and density, from 25% tree removal near the woods to 75% near the opening. A feathered edge allows a rich understory to grow, diversifies the habitat, and helps protect against predators and cowbirds than does an abrupt edge.

Brown-headed cowbirds are the greatest threat to songbirds in the U.S. Cowbirds live in agricultural areas and fly into the forest as far as a few miles to lay eggs in other birds' nests. Some songbird species kill cowbird chicks, but others raise them. For these songbirds, areas not easily accessible to cowbirds – including newly harvested forest - are prime habitat.

While some bird species thrive in a diverse setting, others need large uniform habitats. Groups or "suites" of species share a given habitat. The suite currently of most concern uses large blocks (5,000 acres or more is optimal) of tall trees. Species include cerulean warbler, wood thrush, worm-eating warbler, wood peewee, Kentucky warbler and the acadian fly catcher. Retaining large tracts of tall timber, or land adjacent to large tracts, will benefit this suite. Some timber harvesting (on a long "rotation" basis) can be compatible with this suite, and may even benefit it.

Clearcuts and young second-growth forests are also currently lacking for suites including prairie warbler and woodcock. Bottomland forests are another critically important bird habitat.

Any forest management, including no action, will benefit certain species and detract from others.

The best thing most landowners can do to conserve songbirds and raptors is to **leave all or most of the trees within 100 feet of perennial streams.**

Cover protects birds from predators and weather. Pines (especially white pine), cedars, brambles and tree cavities provide good cover, perches for resting, roosting and singing, and insects. When harvesting timber, especially when clear-felling large areas,

- Leave the largest diameter trees having active cavities, and 3-5 trees around them.
- Leave these clumps on lower slopes, upper slopes, and near edges of clearcuts. Clumps in the middle of large clearcuts should be connected to the surrounding forest by strips of trees (travel lanes.)
- Try to leave at least one or two clumps per acre
- If there are plenty of cavity trees to choose from, retain those that are long-lived (white oak, beech, sugar maple, yellow poplar), large in diameter and bear mast (food.)
- Leave 2 or more snags per acre. These should be at least 12" diameter and 10' tall. Unlike live cavity trees, snags don't inhibit seedling growth. *Snags can be created* by girdling live trees of low commercial value.

Raptors benefit from perches in or near weedy or cut-over areas where small mammals, birds and snakes are abundant.

In addition, ***don't harvest timber during nesting season*** *(April to July for almost all songbirds, and as early as February for hawks and owls) and* ***avoid using insecticides*** *(especially broad-spectrum insecticides) in the spring, since many songbirds eat insects.*

References:

- various field guides
- Land Manager's Guide to the Birds of the South by Paul Hammel, US Forest Service General Technical Report SE-22, published by the Nature Conservancy
- Breeding Bird Atlas (UT Press)
- Nature Conservancy (Bob Ford), Jackson TN 901-327-1752

Version 1-00

Wild Turkey

Tennessee Department of Agriculture, Division of Forestry

Turkey's habitat and food needs change seasonally. Turkey consume a wide variety of nuts, seeds, weeds, fruits and insects. Habitat should include:

- oak forest (acorns are a staple food for turkey). One third should be of acorn bearing age (25 years, peaking from 40 to 80 years)
- pine stands (roosting, pine nuts and insects). Maintain in an open condition
- grassy or weedy openings (nesting, brooding, bugging), and agricultural fields (10% of the total habitat in openings is sufficient). Native warm-season prairie grasses are especially desirable – they can easily attract one nest per acre.

Prescribed fire is very helpful in managing turkey habitat.

- ♦ Prescribed fire in older pine stands provides the open forest floor turkey like.
- ♦ Light controlled fire in oak forests also benefits turkey but can damage oaks.
- ♦ Native warm season prairie grasses require the use of prescribe fire.

See "Prescribed Fire" and "Native Warm Season Grasses"

Turkeys often nest in clearcuts and fallow fields in which some blackberry and other brush has grown up. Some biologists think that 20-30 acre clearcuts provide better protection of nests than fields or small openings.

Periodic timber harvests provide temporary nesting/bugging habitat and can also assure a future supply of acorns if oaks are regenerated. Ideally, harvest and regenerate 1% to 1.5% of the forested area per year.

Maintain permanent plots for food, nesting, bugging and brooding by disking, fertilizing with 400-500 lb/ac 6-12-12 (or 200-250 lbs/ac 12-24-24), planting seed-bearing vegetation, and burning 1/3 to 1/5 of the open areas each year on a rotational basis. Disk 15 to 30 foot wide strips, alternating disked and undisked strips every 3 years. Planted foods might include chufas, browntop millet, corn, wheat, crimson and other clovers, grain sorghum, buckwheat, lespedeza and sunflower. Roadsides and power utility line rights-of-way also serve as permanent plots if managed in this way (except for burning where it is inappropriate); mowing in February and August is another option for turkey, quail and deer. Do not mow or disk during nesting season (April - July).

Forested areas should interconnect to provide travel corridors. Leave 50-foot wide strips of hardwoods along all streams.

Version 7-01

Wildlife Habitat Management

Tennessee Department of Agriculture, Division of Forestry

Forest management can be tailored to benefit any species or groups of species. Timber harvest can serve as a valuable wildlife management tool, especially when the following principles and techniques are taken into account.

In general, maintaining a ***diverse habitat*** with a mix of forest, small openings and "edges" between them will benefit deer, rabbit, turkey, raccoon, quail, grouse and many non-game animals.

Create openings in the forest to provide more sunlight, which in turn produces accessible foods. Openings can include **timber harvests**, seeded **log landings and roads**, long, narrow **game strips** in unbroken forest, and permanent wildlife **food plots** (at least ¼ acre in size).

"Feather" forest edges (thin the forest near openings to encourage a brushy edge).

Leave buffers along streams: minimum 50' uncut buffers along each side of perennial streams, and twice that distance along trout streams and in areas managed for songbirds. **Swamps, bogs and other wetlands** demand special consideration.

Leave 1 to 3 den trees per acre and as many large **dead trees (snags)** as possible to benefit squirrels, raccoons and birds. Leave a few other trees in a clump around each den tree. **Snags** should be at least 12" diameter and 10' tall. Create snags where few are present by girdling commercially undesirable trees.

Build nest boxes for squirrel, bats, and certain birds if den trees are lacking. Patterns for constructing nest boxes are available from Tennessee Wildlife Resources Agency, 1-800-624-7406.

Thin crowded stands to increase tree growth, health and mast (food) production.

Establish stands of **native warm season grasses** for big game and game birds.

Use prescribed fire to maintain food plots and native warm season grass plantings, and to improve habitat in pine stands (older than 10-15 years).

Exclude livestock from the woods. They compete with wildlife for browse, compact the soil, and damage young trees.

Make piles of brush and limbs after timber cutting to provide cover for rabbit, quail and songbirds.

Plant evergreens to provide hiding cover and winter shelter for many wildlife species.

Allow **brush and trees** to grow along fences, and provide **"headquarters areas"-** dense brush thickets - to provide cover for rabbit, quail, etc.

Manage for oak and other hard-mast-producers by cutting other competing species around them. Conduct periodic timber harvests to regenerate oaks that are past their mast-producing prime in order to assure a future acorn supply. Sawtooth (Chinese) oak, available from the State Seedling Nursery, and blight-resistant chestnut, which can be ordered from several commercial nurseries in Tennessee, are heavy and consistent mast producers.

Plan ahead for the gypsy moth, an invasive pest that can devastate oak forests on dry sites. Strive for a diverse, healthy forest. Yellow poplar and sugar maple are avoided by the gypsy moth.

Protect endangered species on your land. These usually occur in small, unusual habitats near water and on rock outcrops. Information can be obtained from handbooks available through the Forestry Division.

Version 1-00

Cool Season Pastures

Tennessee Department of Agriculture, Division of Forestry

Many wildlife species benefit from good grass/legume plantings in cool season pastures because they provide high quality foraging areas as well as important bugging areas for quail, grouse and turkey chicks. If not cut too frequently these mixtures also provide high quality cover for a variety of small game animals.

Perennial cool season grass/legume mixtures recommended include:

Mix # 1	orchard grass	10 lb./acre
	white clover	3 lb./acre
	red clover	4 lb./acre
	Korean lespedeza	5 lb./acre
Mix # 2	timothy	8 lb./acre
	white clover	3 lb./acre
	red clover	4 lb./acre
	Korean lespedeza	5 lb./acre
Mix # 3	orchard grass	6 lb./acre
	timothy	2 lb./acre
	white clover	3 lb./acre
	red clover	4 lb./acre
Mix # 4	redtop	2 lb./acre
	timothy	2 lb./acre
	Korean lespedeza	5 lb./acre
Mix # 5	alfalfa	15 lb./acre
	orchard grass	8 lb./acre

These mixtures are best planted in the spring (February 15- May 15). In each case we recommend adding a nurse crop for quick temporary cover and wildlife forage. Nurse crops such as spring oats or wheat (30 lb./acre), or annual ryegrass (5 lb./acre) would be appropriate.

For best performance fertilize and lime according to soil tests. Your county extension agent can instruct you how to take soil samples and submit them for testing. Or in lieu of a soil test, use 200 lb/ac of 12-24-24 with 2 tons lime. These perennial grass/legume mixtures will last for several years if maintained with periodic mowing. As the legume components die out, renovating the fields may be necessary to maintain high value to wildlife.

(Adapted from the Kentucky Division of Forestry) 10/99 TDA version 7-01

haying weather (late June to mid-July). Late haying also benefits nesting birds. NWSG are resistant to endophyte fungus, and they need little or no fertilizer for good performance.

Pre-Planting. *For no-till into existing turf:* cut hay or graze close in September, kill with 1-2 quarts Roundup per acre, controlled burn. Re-spray in spring with ½ to 1 quart Roundup if needed. The herbicide "Plateau", available only through Quail unlimited, is highly effective. Seed with no-till drill 1/4" deep. Insecticide treatment a week after planting will reduce disease transmission. Row crop fields can also be no-till seeded. *For conventional preparation:* control competing vegetation, especially grassy weeds, plow, disk and cultipack. Fertilization: do not add N, except for log landings, roads and other depleted sites, where 200-250 lbs./ac 12-24-24 or the equivalent is recommended. Bring P and K up to moderate if needed.

Seed selection: Germination rates can vary widely. Test germination by placing seed in wet paper towels in plastic bags, or buy seed based on Pure Live Seeds (PLS) specifications. Minimum lbs./ac PLS planting rates for grazing (drilled & broadcast, respectively): **switchgrass** 7, 9; **big bluestem** 8, 10; **Indiangrass** 7, 10; **eastern gamagrass** 8 (drill only). For wildlife, rates can be reduced to 5, 7, 7 and 7 lbs./ac respectively. Species can and should be mixed, as long as coverage is complete.

Planting: Conventional equipment can be used to plant switchgrass (alfalfa box) and eastern gamagrass (corn planter). Drill ¼" deep. Big and little bluestem and Indiangrass seeds are too fluffy for conventional drills. Ordering de-bearded or brushed seed may help but problems are still likely. Tennessee Wildlife Resources Agency can provide specialized drills. If for some reason one is not available, use a drop spreader or cyclone spreader to broadcast the seed, then drag to cover it. If using a cyclone spreader for bluestems and Indiangrass, install a special agitator. A carrier of cracked corn or fertilizer will help. A granular soil legume inoculant is a good carrier for switchgrass. Cultipack after seeding. Don't worry about covering all the seed. Plant in May or June.

Management: Mow initial weeds back to 6" stubble when they reach 15-18". Keep them mowed back to 10-12" during July. Quit mowing in late July to allow root system to develop. Don't mow NWSG seedlings themselves. Flash grazing for 1-2 days is an option. Do not graze full time until NWSG are over 15" tall. Do not graze lower than 8". Burn to control weed grasses and brush and improve wildlife habitat value. Burn in late winter, taking proper precautions. Maintain a 12' firebreak around field, (either disked ground or a strip of cool-weather pasture). Get a permit from the Forestry Division. Burn ¼ to 1/3 of the stand each year, and burn entire pastures to encourage uniform grazing. Brooding habitat is good the first year after burning; years 2 and 3 are good for nesting. Plant legumes with NWSG to benefit birds.

For more information contact UT Extension Service, Tennessee Wildlife Resources Agency, Quail Unlimited (423-470-0009) or the NRCS

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