

# 8 Species Management



Following are thoughts on managing some popular wildlife species favored by North Carolina landowners. These are species most commonly managed by our state's citizens, but management for these species should not be viewed as a negative for other wildlife. For example, quail management benefits numerous declining songbirds and even lesser-known species of butterflies and beneficial insects.

We are fortunate today that information about the life history and habitat requirements of many species is available online, in publications, and from wildlife researchers and managers. By doing some research and seeking professional assistance, you should be able to tailor your land-management efforts to benefit the species or group of wildlife that interests you. However, just remember that as in managing the species below, you will be limited by the capability of your land and the landscape in which your property is located.

## Northern Bobwhite Quail

### Food

Quail use more than 1,000 species of plant foods. They feed on the seed of ragweed, lespedezas, beggars' lice, trumpet creeper, acorns, pine seeds, and many more species. Fruits are especially important during summer, but are used at other times when available. Fruits used include blackberries, blueberries, honeysuckle, sassafras, and dogwood. During late winter and early spring, greens and succulent plant materials are especially important. Insects are essential foods for nesting hens and fast-growing young. Important insect foods include grasshoppers, crickets, beetles, ants, and true bugs.

### Cover

Ideal quail habitat is composed of extensive areas of broomsedge and other native grasses, ragweed, goldenrod, farm crops, open woodlands and other low-growing weeds and wildflowers. These plants should be interspersed with escape cover consisting of clumps of woody cover, such as plum thickets, briar tangles, shrub, severed tree tops, and hedgerows.

### Reproduction

Females lay multiple clutches of eggs. During one summer, researchers documented that a radio-marked North Carolina hen (on Fort Bragg Military Reservation) laid three nests of eggs; two of which were incubated by males.



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Quail are ground nesters with a nesting season that starts in May and extends until October. Quail lay 12 to 15 eggs in the first nest of summer with a 23-day incubation period. Young leave the nest within 24 hours of hatching, are brooded by an adult, but feed on their own.

### Home Range and Survival

Home range size varies from 40 to 200 acres. Home ranges are smaller in better quality habitat. 25 to 30 percent of quail disperse from winter ranges to breeding habitat. Average dispersal distance is a little over a mile. Seventy to 80 percent of birds live less than one year.

Though populations have steadily declined over much of the species range in recent years, quail still occur where grassland, farmland, and brushland provide a favorable mix of habitat types. Populations respond most favorably to management in landscapes with a high percentage of early-successional habitats.

Examples where you would expect quail management to be most effective include areas where the majority of the land is in cropland, grasslands, young forest regeneration, or open-canopy forests with a groundcover of grasses and forbs. In landscapes where row-crop farming is a predominant land use, quail will respond positively when relatively small amounts of habitat are provided. However, small areas devoted to habitat improvements in landscapes dominated by forest often do not make noticeable differences in populations.

Habitat management for quail works—but only when it is done at the appropriate scale and is directed toward increasing the amount of useable habitat available to birds. Energy expended in developing islands of habitat in landscapes that are otherwise unusable by quail are rarely productive. Quail habitat consists of native grasses, which provide nesting sites and cover; forb-dominated areas, which provide brood habitat and produce seed foods; and dense woody escape cover. All three habitat types must be in close proximity.

The major land uses in an area will determine what habitat-management techniques are most suitable. Developing borders of volunteer vegetation and woody escape cover on field edges and ditch banks are effective techniques on landscapes where row crop agriculture predominates. Planting native grasses, developing woody cover on fencerows and edges, and burning are techniques that work well on grasslands. Thinning to a basal area of 40 square feet per acre and burning on a one- to two-year rotation in blocks from 10 to 50 acres in size are techniques to provide high-quality habitat in forests.



### *Managing Cover for Quail*

Without disturbance, quail habitat doesn't last long. Brushy field edges or young forest plantations grow into sapling stands that shade and smother groundcover and leave quail exposed to predators. Weedy fields develop a thatch at ground level, and food plants don't persist without frequent disturbance. Open woodlands quickly turn into tree-choked areas with litter-covered ground. Because of our fertile soils and abundant rainfall, repeated treatments at one- to five-year intervals are required to maintain habitat in a suitable stage of plant growth.

Techniques for developing and managing cover for quail include burning, disking fallow areas, planting annual and perennial crops, and cutting or killing trees and brush that have grown too tall. The goal for each of these techniques is to encourage a plant community that provides secure screening cover and a variety of low-growing grasses and forbs.

One additional practice worth discussing is the creation of woody escape cover. This habitat type is often limiting and should be considered whether managing woodlands, croplands, or grasslands. Consider an area to be suitable escape cover if you can't walk through it. Creating and maintaining this escape cover is an ongoing process. Ideally, clumps of woody escape cover ranging in size from one-tenth acre to one acre should be located no more than 100 yards apart. Escape cover can consist of impenetrable areas of blackberry or plum thickets, cane and green-brier-dominated drains, or loosely piled woody treetops and brush. Edge feathering is one way to provide escape

cover and is suitable for use on field edges, rights of way edges, hedgerows, and fence lines that have become open at ground level because of competition from trees. (See “Edge Feathering and Woody Cover Establishment,” page 64).

Quail eat greens and insects during the spring, and insects and soft mast are used heavily during the summer. During the fall and winter, quail are primarily seed eaters. The winter quail diet varies across the state. In grain-producing areas, soybeans are the most important winter quail food, and many hunters plan their hunts based on locations of soybean fields. In other areas, quail rely heavily on tree or weed seeds but also use grain crop residues, when available.

It is essential that food be available close to escape cover. Quail should be able to walk through good cover to their feeding grounds and have several areas of woody escape cover within close proximity. See *Growing and Managing Successful Food Plots for Wildlife in the Mid-South* (University of Tennessee Extension) for planting instructions for quail food plots.

Good nesting cover is most often located in native grass stands that are not mowed, burned, or grazed during the previous winter. Nesting cover in blocks several acres in size or in borders 30 feet wide or wider is preferred over narrow strips of nesting cover that are easily hunted by predators. Quail roost on the ground in vegetation that is not too dense but still provides concealment from above. The roost is usually in open, “clumpy” vegetation away from thick or tangled escape cover. Fields of ragweed, broomsedge, or Indiangrass are good roosting areas.

Disking is used to change the composition of plants within the quail range. The removal of strips of sod-forming grasses, such as Bermuda and fescue, will make room for the seed-producing plants that are important to quail. Disking can be applied to old fields where the vegetation has grown into a stagnated condition that provides less diversity of plants. However, if fescue or Bermuda are the major grass component, disking may only enhance the exotic grasses. In this situation, herbicide must be used to kill the sod-forming grass prior to initiating a disking regimen.

Fallow crop fields that have produced tall weeds for a couple of years can be made more accessible for quail broods by disking from November to April. The short, fast-growing vegetation that is generated after disking will produce insects that also are important for quail chicks. Disking strips in alternate years will add to the field’s diversity and prolong its usefulness for quail and other wildlife that use this habitat component. Results from disking vary depending upon the agricultural history of the area. In areas with a long history of row crop farming and herbicide use, quail foods such as partridge pea, annual lespedezas, beggar’s lice, and ragweed may not volunteer. In these situations, a one-time seeding may be required.

The most economical, useful tool for anyone wanting to increase wild quail is prescribed burning in open-canopy woodlands, old fields, native grass plantings, ditch banks, and field borders. The removal of litter makes quail food easier to find. Important plant seeds scarified by the heat will germinate much better on the burned-over range, while young sprouts and flowering and fruiting plants support insects in spring and summer. Furthermore, burning releases the nutrients tied up in vegetation and stimulates the building of nitrogen in the soil.

Timing of burns and burn block size are important considerations. Burns during March and April are most appropriate because cover returns quickly and nesting activities have not been initiated. However, under some circumstances, burns during the growing season are justified to control hardwood sprouts. Burn blocks of from five to 50 acres can be scattered across a property to provide food and cover in close proximity.

See Appendix C for information on monitoring quail.



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## Common Quail Habitat Management Mistakes

- *Incorrectly identifying woody cover*—Woody escape cover must be dense at ground level but not necessarily tall. Once the cover near the ground opens up to the point that cover from knee-height down is shaded out and accessible to predators, it is no longer of value to quail.
- *Carrying too many trees*—Forests managed for quail must be thin enough that they support a continuous cover of low-growing grasses and forbs. On most Coastal Plain soils, thinning to *basal areas* below 50 will be required to provide adequate groundcover to support quail.

### Points to Ponder

**MANAGEMENT**—Target management to convert non-habitat (closed-canopy woodlands, mowed areas, overgrazed pastureland, and large row crop fields) into useable habitat.

**BIGGER IS BETTER**—Highest quail densities are reached where open habitats that support native grass and forb-plant communities dominate a large percentage of the landscape. Quail increases have been consistently documented where field borders were established in open row crop farming landscapes. However, habitat created in forest or introduced grass-dominated landscapes often does not become occupied by quail. To sustain a high-density quail population in otherwise unsuitable landscapes, such as forest or introduced grass, habitat must be well dispersed across 5,000 to 10,000 acres of land.

**IT'S ALL ABOUT GROUND COVER**—Diverse, low-growing plant communities provide cover, food and nest sites.

**MINIMIZE POPULATION SINKS**—Plant communities that have opened up at ground level to allow access to predators should be set back to an earlier stage of plant growth. Examples include overgrown hedgerows, clumps of hardwoods, and closed-canopy forest.

**NEW GROUND EFFECT**—Habitat improvements that occur on a large scale elicit population responses. Best population responses are obtained when habitat disturbances such as timber harvest, land clearing creating windrows, or installing field borders occur in a short period of time across a large area.

**PREDATORS AND QUAIL**—“Well distributed bits of bushy refuges not more than 100 yards apart over both open woodlands and fields are by far the best protection one can provide for the quail; then the cooper’s hawks go hungry in a land of plenty, for the quail can easily elude them.” (Stoddard, 1961)

## Eastern Cottontail Rabbit

### Food

Rabbits browse a variety of plant leaves, buds, and stems during the growing season. During winter, they feed on bark, dried stems, and plants such as clovers, small grain, or weeds and grasses that remain green.

### Cover

Highest densities occur in extensive areas dominated by briar tangles, shrubby areas, and young forest stands.

Native grasses and low-growing weeds and wildflowers that provide dense protective cover, both overhead cover and horizontal cover, often support high rabbit populations.



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### Reproduction

Young are born from March to September. Females give birth to three to eight young with an average of four young per litter. Young rabbits are independent in 18 to 21 days. One pair of rabbits has the potential to increase to 25 individuals over the long reproductive season.

### Home Range and Survival

Home range is usually about 10 acres. On average, rabbits survive less than one year.

North Carolina has three species of rabbits: Eastern cottontail, Appalachian cottontail, and marsh rabbit. The Eastern cottontail occurs statewide. The marsh rabbit is found in wetlands on the Coastal Plain and the eastern fringe of the Piedmont. The range of the Appalachian cottontail is restricted to higher elevations in the mountains of western North Carolina. Management activities directed toward improving rabbit populations are similar for each of the three species.

Rabbits are common statewide, but highest densities are achieved in extensive areas of uniform escape cover such as young pine plantations, abandoned farmland, or native grass fields. Rabbits thrive in impenetrable cover of at least one-quarter acre in size that has not been exploited by predators or where mammal predator densities are low (usually resulting from disease outbreaks such as distemper and rabies).

Rabbits have small home ranges and are incredibly productive. Unlike quail, they can be successfully managed on a few acres of land. To be successful, the rabbit manager must focus on increasing survival. Rabbit predators include snakes, house cats, dogs, raptors, foxes, bobcats, crows, and coyotes. Controlling populations of the many predators is beyond the means of most managers. Fortunately, manipulating habitat to manage predation is a productive alternative to reduce losses to predators.

Habitat management for rabbits should focus on maximizing screening cover at ground level, providing dense escape cover to discourage mammalian predators, and providing overhead screening with a minimum of perch sites to protect rabbits from aerial predators. Many of the techniques discussed earlier under grasslands, croplands, and idle-area management will provide excellent rabbit habitat. Some other specific techniques are discussed below.

Brush piles bring the quickest response of all management tools. Rabbits often take over a brush pile the night after construction. Cutting lone trees and snags that serve as raptor perches will discourage predation from above and provide materials to develop a brush pile. Place brush piles close to other cover such as briars, native grasses, fencerows, or



dense young woodlands. Don't burn brush piles left from clearing; instead, windrow them in the center of the field for cover. (See Edge Feathering and Woody Cover Establishment on page 64.)

Create or encourage impenetrable islands of woody or briar cover surrounded by native grasses. This can be accomplished when clearing land by loosely piling brush or identifying areas of blackberry or greenbrier and planting native grasses adjacent to them. Windrows should be considered temporary as they melt away after a few years. Piling brush is an inexpensive way to develop briar, vine and shrub cover. Birds perching on the brush pile will deposit seeds of many desirable cover plants.

Stands of tall-growing native warm-season grasses typically support good rabbit populations. Switchgrass or Atlantic coastal panic grass are good choices, if managing specifically for rabbits, because they provide more dense overhead cover. Properly managed native warm-season grass pastures and hay fields can provide excellent rabbit habitat. Adjacent fencerows should be protected from grazing, and the larger trees along fencerows should be killed and felled. The resulting dense growth will provide good rabbit cover.

Converting areas currently growing fescue, Bahia grass, or Bermuda grass to rabbit habitat requires the use of herbicides. (See the herbicide discussion on page 65.) Likewise, herbicides can be used to create or maintain habitat where trees are shading low-growing cover. Herbicides with the active ingredient imazapic will selectively remove many species of hardwoods and encourage blackberry.

Planting rabbit foods should be considered secondary to providing cover. For suggestions on food plots for rabbits, see discussion of rabbits under Food Plots, page 63, and *Growing and Managing Successful Food Plots for Wildlife in the Mid-South* (University of Tennessee Extension).

We can do too good of a job with habitat management. Extensive areas of great rabbit habitat make it difficult for hunters to harvest rabbits, so cutting shooting lanes just prior to hunting can facilitate harvest by hunters. However, remember that the lanes will allow more loss to predators.

## Gray Squirrel

### Food

Squirrels feed on pine seeds, acorns, hickory nuts, beech nuts, berries and fruits, buds, fungi, and some insects.

### Cover

Squirrels take refuge in large trees. Dens and nests are located in hollow trees and in nests constructed of leaves.

### Reproduction

Two peaks of reproduction result in most litters being born from early February-April or during July-August. Litters average from two to four, and young are independent at 12 to 14 weeks.

### Home Range and Survival

Gray squirrel home ranges average about four acres with those of males slightly larger than females. Average life expectancy is dependent upon mast abundance, and annual survival of young can range from a low of five percent, following a mast failure, to a high of around 30 percent when food is abundant.

The gray squirrel is the most common and widespread squirrel in North Carolina. However, we have Eastern fox squirrels on the Coastal Plain and in the southern Piedmont and midwestern fox squirrels in several northwestern mountain counties. Fox squirrels differ from gray squirrels in that they seem to prosper in more open forests



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or woodlots where they spend considerable time on the ground and where food and cover resources are patchy in distribution. The tiny red squirrel or “boomer” occurs in the Mountains and northern Piedmont. They are most common in conifer forests where they gather and cache large quantities of cones. Two species of flying squirrels and chipmunks, which are not game species, also occur in the state.

The productivity of squirrel populations in a woodland is tied to the annual fluctuations of food resources and nest sites. Populations increase following years of abundant mast. Management consists of protecting mast-producing trees and den trees and providing an adequate number of cavities. Certain practices, such as installing den boxes, are appropriate in young forests where cavities are scarce and are promptly utilized. Others, such as releasing mast trees by cutting adjacent trees, require several years to take effect.

Hardwood and mixed pine-hardwood woodlands, containing trees such as oak, hickory, walnut, elm, maple, beech, dogwood, and mulberry, produce nuts, seeds, or fruits and make excellent squirrel habitat. Mature trees will increase the volume of food produced and the number of cavities available.

Conservative timber-stand improvement, or TSI, which reduces competition among trees, will increase the production of acorns and other squirrel foods. Timber harvest and heavy thinnings that space trees such that squirrels cannot travel through the treetops is detrimental to gray squirrels. Retaining a closed-canopy stand of hardwoods in streamside management zones can be an important long-term management tool.

A mature forest usually has more cavities for squirrels than younger woodlands. In woodlands with fewer than four natural dens per acre, artificial dens will be of value. Competition for dens among squirrels, owls, bees, snakes, and other cavity users is intense. When artificial dens are supplied, some of this competition is reduced. Dens can be built from auto tires, rough lumber, or hollow logs cut in sections. See *Homes for Wildlife II Plans* (Michigan Department of Natural Resources) for details on how to build and install a squirrel den box.

## Eastern Wild Turkey

### Food

Foods include acorns, ash, and beech seeds, berries and fruits, green leaves, tubers, flowers, insects, snails, and even small animals. Young turkeys eat mostly insects during the first few weeks of life.

### Cover

Turkeys roost in trees and forage in open midstory forests, grasslands and cropfields where visibility is good. They use grassy or weedy areas, forest edges, and woodlands with herbaceous groundcover for brood habitat.

### Reproduction

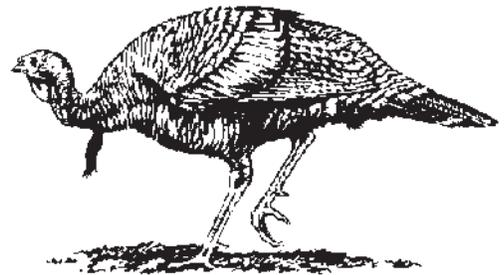
One male will breed with many females. Incubation and brooding is done exclusively by the hen. Turkeys nest on the ground in April-June. They average 10 to 12 eggs per clutch and incubation lasts for 26 to 28 days.

Young leave the nest within 24 hours of hatching, are brooded by the hen, but feed on their own. Young grow incredibly fast and can fly in about 14 days.

### Home Range and Survival

Home ranges are variable in size but average several thousand acres. Average life expectancy is less than 2 years.

Wild turkeys range over large areas and use an extraordinary variety of plant and animal foods during the course of the year. They select habitats that are open enough for them to see potential predators and generally avoid dense young forest stands and areas where human disturbance is high. Key habitat types are mature pine and hardwood forests with mast-producing hardwoods, which are used year-round but are especially important in the fall and winter. Also, openings are used sporadically year-round but especially during the spring and summer.



Because turkeys use a variety of hard and soft mast seeds depending on their availability, it is important to maintain a variety of hardwood species including oaks, ash, dogwood, and beech. Bottomland hardwood stands are especially important. Even narrow streamside management zones with intact canopies can provide travel lanes through otherwise unsuitable landscapes.

One landscape-scale consideration is to manage hardwood and pine forests on a long rotation to minimize the area of young forest stands that turkeys avoid. Pine stands should be thinned and burned frequently to maintain an open midstory (keep visibility high) and to increase the variety of plants in the groundcover. Turkeys use openings, crop fields, and grasslands extensively, and, ideally, between 10-50 percent of the landscape should be in openings.



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When managing openings in forested landscapes for turkeys, it's important to consider year-round needs. Brood habitat is generally low-growing grasses or forbs that are open enough to allow the young birds to move freely through them. Openings can be maintained by burning, mowing, grazing, or rotating grain and legume crops. Openings managed for brood habitat should be several acres in size and are better if they contain scattered trees and an occasional clump of low-growing shrubs, vines, or brambles that can provide escape cover, shade, and soft mast. Wide fire lines and access roads that are maintained in wheat or legume crops can be an important resource during the spring and summer and during mast shortages.

Detailed information on managing food plots for wild turkeys is available at *Growing and Managing Successful Food Plots for Wildlife in the Mid-South* (University of Tennessee Extension).

## White-tailed Deer

### Food

Deer eat a variety of plant materials. Green leaves, buds, and flowers are browsed. They also feed on acorns, grains, berries and fruits, and mushrooms. Conflicts frequently arise because deer feed on agricultural crops and ornamental plantings.

### Cover

Deer often spend the daylight hours in thickets and young forests with high-stem density. They are most active early, late, and at night and use edge habitats effectively to elude predators.



### Reproduction

One buck will breed with several does, and one doe may breed with more than one buck. Fawns are dropped in May-July, with the peak around June 1. Does can give birth to one to four fawns. Young does occasionally have single fawns, while older does frequently have twins. Triplets and quadruplets are not common. Fawns are dependent on does for nursing for approximately 10 weeks.

### Home Range and Survival

Deer home ranges average about 1 square mile (640 acres), but are highly variable. Home ranges are largest for adult bucks and during the breeding season. Over half of yearling bucks disperse from two to 30 miles. Average distance

moved for dispersing individuals is around five miles. In a heavily hunted population, average life expectancy is less than two years for bucks but typically greater than two years for does.

North Carolina land managers and hunters expend more time and energy on land management for deer than any other wildlife species. Deer are primarily browsers and are able to exploit a variety of foods and habitats during the year. What deer eat depends on the types of food available, food abundance, and time of year. They are also mobile and can travel considerable distances to reach food or cover in areas that are poorly connected to each other.

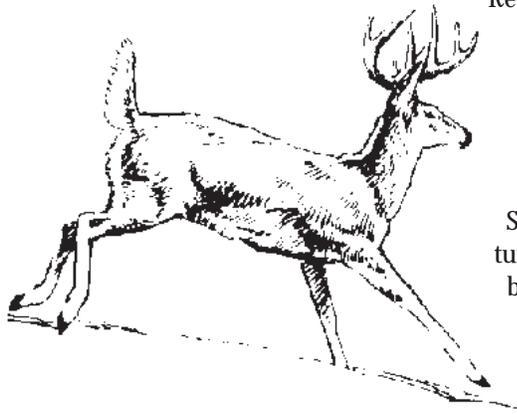
Deer are widespread and abundant, and one of the greatest challenges of deer management is to attain an adequate harvest. When deer populations are allowed to grow unchecked, they quickly reach densities that impact plant communities to the point that they and other wildlife species are negatively affected. Though the primary purpose of this publication is to address habitat management, it is worthwhile to stress the importance of killing does to reduce high deer densities and to reduce harvest pressure on antlered bucks, especially if the objective is to increase the number of mature bucks in the population.

Concentrated deer use at feeders can have negative implications. Concentrated use increases the potential for spread of disease and also damages the nearby understory plant community with overbrowsing.

### *Forest Management Considerations for Deer*

At its most basic level, forest land management for deer should be concerned with providing a variety of foods that are within reach of deer (four feet or lower). Because deer use browse resources during much of the year, it is critical to encourage low-growing forbs, shrubs, and saplings to provide foods when mast is not available. In forested landscapes, frequent disturbance by timber harvest and burning is required to keep browse resources within reach of deer. Without disturbance, browse resources are shaded-out or quickly grow out of the reach of deer.

Variety is also important when considering browse resources. The greater the variety of mast-producing trees, the more likely one or more of the species will produce during any given year.



Retaining areas of dense cover is an important deer-management strategy. If burning large areas for deer, consider retaining some areas of dense, young regeneration or thickets for bedding cover. Livestock and deer compete directly for food, and heavy livestock use eliminates cover. Livestock can be excluded by fencing woodlots. Native grasses can provide fawning, bedding, and escape cover in open landscapes.

Small clear-cuts can be used to provide food, cover, and hunting opportunities through time. For example, if a 100-acre tract is clear-cut, there will be abundant browse for five to 10 years. The stand will then go through a stage where browse resources are limited by shade from the forest canopy and cover is so thick that hunting may be difficult. If the same 100 acres were broken into 20-acre management units that are clear-cut at 10-year intervals, there will always be an abundance of browse, cover, and stands open enough to facilitate harvest.

Clear-cuts and young forest plantations are often boom-then-bust for harvesting deer. They are great places to see and harvest deer for the first few years. Then they become a great refuge but a challenge to hunt for 10-15 years until they are thinned. By planning ahead, you can provide hunting opportunities throughout the life of the stand. Consider the following ideas when planning clear-cuts or planting forest plantations:

- Hunting opportunities can be enhanced by leaving islands of mature mast producers one to two acres in size when clear-cutting. Groups of trees are preferred to scattered or isolated mast trees because single trees suffer high mortality, and clumps of trees one to two acres in size are large enough to retain an open midstory. Clumps or islands of mast producers with adjacent shooting lanes or food plots in the young regenerating forest will provide excellent hunting locations while the surrounding stand is too dense to hunt.
- Plan wide firebreaks, food plots, or shooting lanes when planting young forest plantations, clear-cutting, or thinning. Maintain these openings by clearing and planting food plots or by spot-spraying or cutting regenerating trees. See *Increasing Pine Plantation Wildlife Habitat and Recreational Value with Hub and Spokes* (Wildlife Trends) for a discussion of some management options that provide hunting opportunities in young plantations.

Food plots for deer are more effective if located near areas of heavy cover such as young forest stands, brushy draws, native grass stands, and thickets. Screen food plots from roads or other areas frequented by people by leaving or planting a band of tall shrubs, native grasses, or evergreen trees. Food plots that are located near other fall and winter foods such as mast-producing hardwoods are often more productive. Because considerable annual expense will be devoted to planting and maintaining food plots, locate them on the most fertile sites you have available. Take soil samples and follow recommendations for lime and fertilizer in food plots as you would any other agricultural crop.

There are a number of excellent resources available that discuss crops suitable for food plots and how to plant and manage them. One excellent publication is located at *Growing and Managing Successful Food Plots for Wildlife in the Mid-South* (University of Tennessee Extension). Unfortunately, there are some exaggerated claims by folks who sell seed for food plots, deer food pellets, and mineral supplements. So use common sense; if it sounds too good to be true, it usually is.



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## Mourning Dove

### Food

Doves are primarily seed eaters. They eat a variety of crop, weed and grass seeds.

### Cover

Nesting usually occurs in trees though, occasionally, nests also are found on the ground. Doves nest in a variety of locations but frequently choose evergreens such as pine and cedars. Doves prefer feeding areas with light or no plant litter covering the ground surface.

### Reproduction

Doves nest five or six times per year and lay two eggs in each nest. Eggs are incubated by both sexes for about 14 days before hatching, and young fledge in 13-15 days.

### Home Range and Survival

Mourning doves are migrants, with birds from the mid-Atlantic states and New England wintering in North Carolina. The birds that summer in North Carolina move southward, but remain in the southeastern states. Nesting birds will feed up to one mile from the nest. Mortality averages about 60 percent annually.

Mourning doves are found statewide but are most abundant in agricultural landscapes. Unlike quail, doves have the ability to cross miles of unsuitable habitat to exploit resources, so they can feed in fields that are isolated from nest and roost sites and other cropland. Doves are common in many habitat types ranging from farmland to suburban landscapes and most nests are in trees, on hedgerows, and in woodland edges. Most dove management is geared to attract birds for hunting.

Doves are migratory and congregate in flocks. Generally flocks begin forming in midsummer and populations appear to peak in late summer and early fall. The flocks are mobile from mid-September through winter. Movement of flocks can be a blessing if they show up on your field the day before the season, or a curse if they abandon your field shortly before your planned hunt.

Most dove management consists of manipulating agricultural crops or planting food plots to attract birds for hunting. Some homeowners feed doves at bird feeders. The key to attracting birds is to provide abundant seeds and bare ground. Good agricultural crops for attracting doves are sunflower, corn, milo, buckwheat, millet, and wheat.

Fields for hunting can be prepared by mowing, light disking, spraying with herbicide, dragging down, or burning crops to place seed on bare ground. Rotate crops or field locations or use herbicides to control grassy weeds such as crabgrass and fall panicum because they compete with crops and form a thick thatch that buries seeds out of reach.

Timing is everything when it comes to doves. If crops ripen or fields are prepared too long before the planned hunt, birds may eat most of the seed and leave the area. If crops are ready too close to the hunt date, birds often don't have time to locate foods. A good plan is to prepare a few strips to begin attracting birds about one month before the planned hunt and prepare the remainder of the area one to two weeks before the hunt.

Forest-management practices such as thinning and burning maintain an open canopy, provide bare ground, and encourage seed-producing grasses and forbs to benefit doves. Natural stands of pokeweed in young pine plantations sometimes attract large numbers of doves.

## Songbirds

Learning to identify and appreciate songbirds and managing land to benefit them can add to the enjoyment of owning property. Most of the practices discussed in this publication can be tweaked to benefit one or more species of declining songbird. Managing to provide habitats that contain adequate food, cover, and space to support declining songbird species can help to stabilize local populations. Changes on a regional scale will be required to reverse long-term declines.

Opportunities to benefit declining songbirds are numerous. Landowners may find it rewarding to add to their knowledge of the natural history of the many bird species that share their land. Following are three examples of birds that are still widespread on working farms and forests, but are experiencing long-term population declines. Note the similarity between population declines, habitat requirements, and management recommendations for these birds and those of the quail whose population has averaged a 4.2 percent annual decline in the southeast since 1966.

### *Prairie Warbler*

#### **Status**

Prairie warbler populations are declining throughout their range. Declines in the southeast U.S. averaged 1.9 percent annually over the past 40 years.

#### **Habitat Description – Early Succession Shrub/Scrub Habitats**

Prairie warblers are actually not a prairie species, but inhabit young regenerating forests, open canopy forest with lots of low-growing shrubby understory, and overgrown old fields and rights of way. The common thread is that preferred habitats are dominated by shrubs and saplings.



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### Management Recommendations

Use frequent overstory thinning to allow sunlight to reach groundcover, and control midstory hardwoods by prescribed burning on a one- to three-year rotation. When regenerating forests, avoid controlling all woody plants with intensive herbicide applications. Maintain rights of way and old fields by disking or burning on a three- to five-year rotation.

The following birds have similar habitat requirements as the prairie warbler at some time of the year: common yellowthroat; yellow-breasted chat; Eastern towhee; white-throated sparrow; dark-eyed junco; American woodcock; quail; golden-winged warbler (which is restricted to high elevations); and painted bunting (which occur only along the coast).

### Grasshopper Sparrow

#### Status

In the southeastern U.S., grasshopper sparrow populations have suffered on average a 3.9 percent decline annually since breeding bird surveys began in 1966.

#### Habitat Description – Large Openings Dominated by Short Grasses

Grasshopper sparrows inhabit areas of short grass, six inches to two feet in height, interspersed with patches of open ground. Optimum habitat consists of an open mix of clump grasses, forbs, and patchy openings with few shrubs. Grasshopper sparrows require openings of 25 acres or more and prefer much larger openings within which woody vegetation is sparse.

#### Management Recommendations

Management opportunities are restricted to open landscapes dominated by grasslands or cropland. Maintain a mosaic of habitats dominated by grasses around one foot in height by light grazing, disking, and burning patches of short grass. Conduct management activities outside of the nesting season. Management will be more effective on infertile sites where sparse stands of grass can be easily maintained. Where possible, configure habitat in large blocks, rather than narrow strips, to reduce nest predation.



BRADY BECK

The following birds have similar habitat requirements and will benefit from management activities directed toward the grasshopper sparrow at some time of the year: Eastern meadowlark; barn owl; loggerhead shrike; American kestrel; and savannah sparrow.

## Field Sparrow

### Status

Field sparrows have undergone long-term declines averaging 2.4 percent per year for the past 40 years.

### Habitat Description – Tall Grass Interspersed with Shrubs or Young Trees

Breeding habitat consists of old fields with tall grass and scattered young trees, native grass or weedy pastures, and young pine plantations with a grass-dominated groundcover.

### Management Recommendations

Field sparrows require openings of a minimum of 5 acres. Manage native grasses with fire, light grazing, or rotational disking to prevent trees from overtaking the area. Though field borders are important winter habitat, where possible, configure habitat in large blocks, rather than narrow strips, to reduce nest predation.



STEVEN BULLOCK

The following birds have similar habitat requirements as the field sparrow at some time of the year: Eastern kingbird; quail; Eastern towhee; indigo bunting; blue grosbeak; song sparrow; common yellowthroat; and brown thrasher.