CHAPTER 9

Wild Turkey

James G. Dickson[1]
US Forest Service
Southern Research Station, Nacogdoches, TX

A traditional and very important game species of southern forests is the wild turkey (*Meleagris gallopavo*). The wild turkey is a truly wild creature and inspires an amazing level of admiration and devotion among turkey hunters. Wild turkeys have stout legs that support the heavy bird and are used to scratch for food, and short powerful wings associated with rapid short flight. Wild turkeys can run or fly rapidly for short distances. Of the 5 traditional subspecies of the wild turkey in North America, the 2 genetically most similar (Mock et al. 2001) are found in the South. The Florida wild turkey (*M. g. Osceola*) inhabits peninsular Florida and the eastern wild turkey (*M. g. silvestris*) is found in the remainder of the region (Pelham and Dickson 1992). Consistent with their humid southern forest habitat, both subspecies are characterized by dark tail coverts and tail tips, in contrast to the whitish tips of the western subspecies. The Rio Grande wild turkey (*M. g. intermedia*), a subspecies of the more arid west, occurs and intergrades with the eastern wild turkey in the oak-hickory forests of northeastern Oklahoma.

HISTORY

Wild turkeys were very abundant throughout the precolonial South, based on reports of early European settlers along the coast and travelers into the interior (Mosby and Handley 1943). Early explorers in the region reported numerous and often large flocks of turkeys (see Kennamer et al. 1992:10). The interspersion of mature forests and openings caused by natural phenomena, such as wind storms, and burning by the natives created ideal habitat conditions for wild turkeys.

Early settlers cleared small patches in the forest, and grew crops for sustenance for their families and livestock, with little impact on wild turkey populations. Wild turkeys remained abundant in the region through the early 1800s.

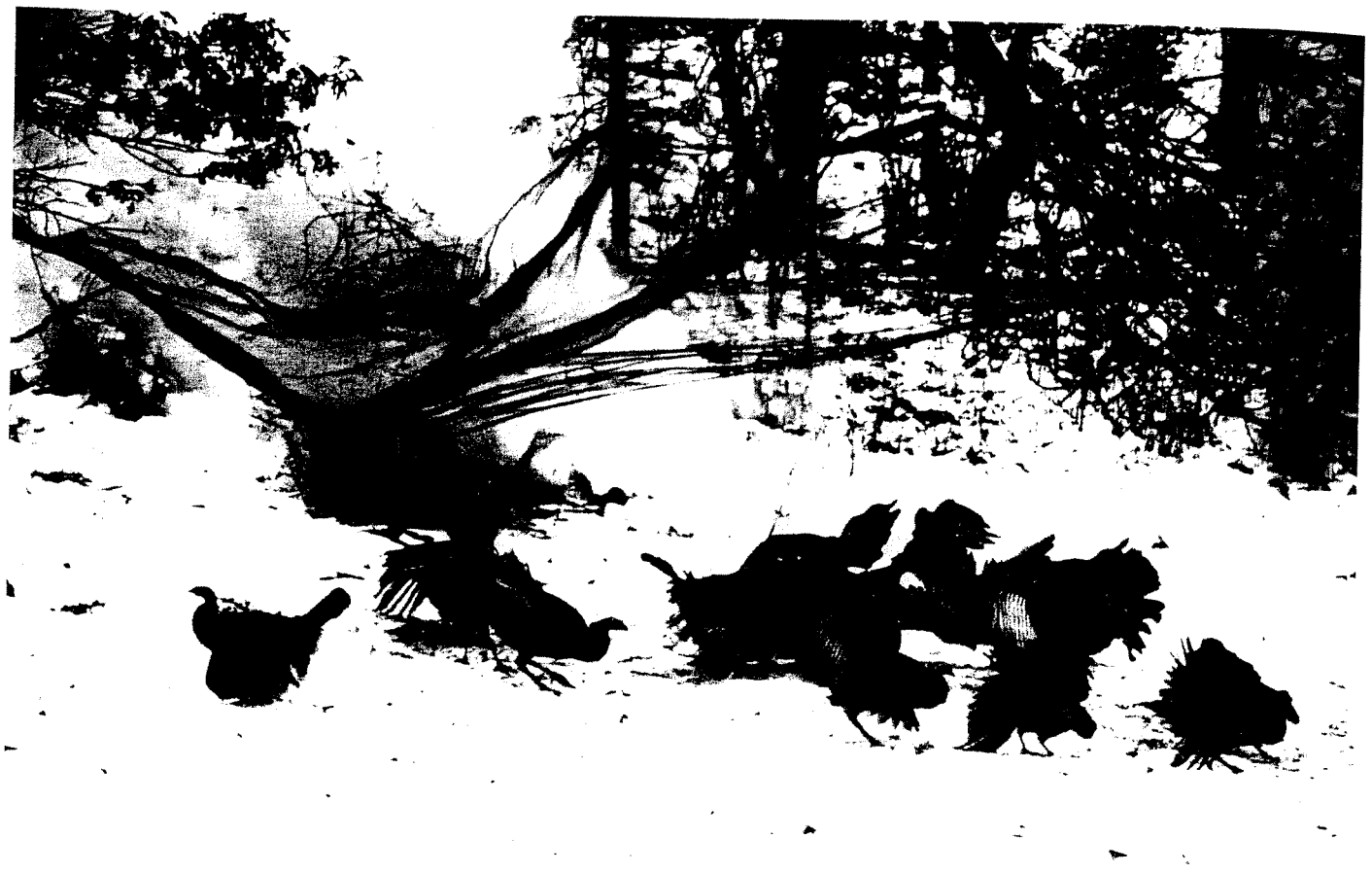
[1]Current Address: School of Forestry, Louisiana Tech University, Ruston, LA

However, settlement by the new Americans and their demands ultimately were hard on wild turkeys. In the latter half of the 1800s and early 1900s as the human population grew, the impact on wild turkey habitat and populations increased dramatically. Also, better access to southern forests and turkey flocks were provided by new roads and railroads. Wholesale cutting of the forests and indiscriminant hunting took its toll. Turkeys of both sexes and all ages were hunted year round, often attracted to bait.

With habitat reduction and intense hunting pressure remnant flocks were mostly relegated to remote areas with limited human activity or with good protection. Examples of areas in the South with remnant populations were mountainous areas of Virginia and elsewhere, remote areas in Florida that were considered

A traditional and very important game species of southern forests is the wild turkey. The wild turkey inspires an amazing level of admiration and devotion among turkey hunters *(M. Johnson)*.

Wild turkeys were exploited and populations suffered in the late 1800s as new settlers populated the region. A restoration technique that did not work was the raising of turkeys in pens and release in the wild *(B. Minser)*.



inhospitable at that time, and larger farms and river bottoms in southwestern Alabama.

Eventually people began to realize that natural resources in general and the wild turkey in particular were in critical condition and that something had to be done. Efforts to bring back wild turkeys began around the 1930s and 1940s. Money provided through the Pittman-Robertson (Federal Aid in Wildlife Restoration) Act in 1937 was a major factor in initiating wildlife management and enhanced efforts to protect wildlife populations.

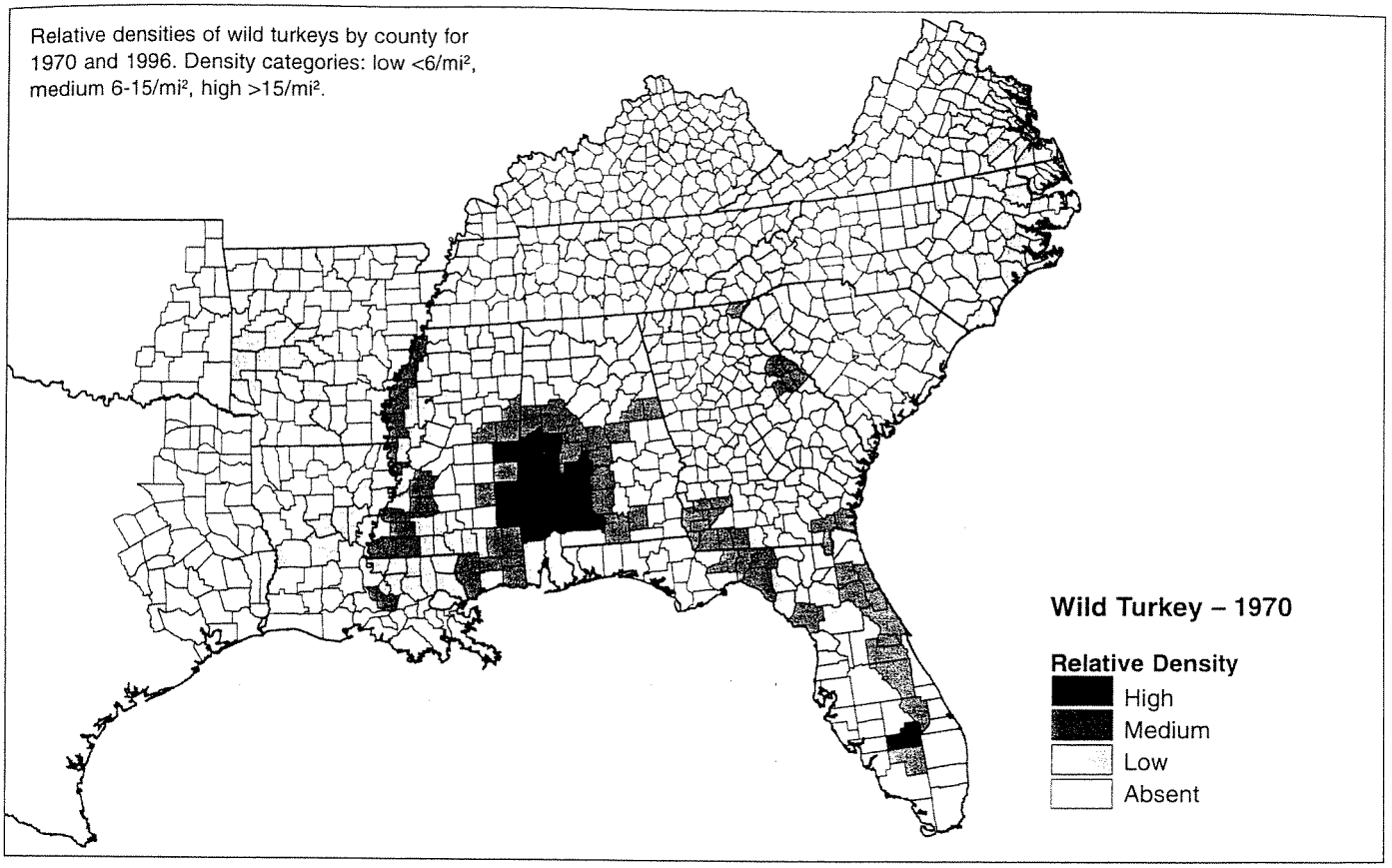
The first restoration attempt was the raising of turkeys in captivity and release in the wild. Although this concept seemed reasonable at the time, it was a costly failure throughout the country. Turkeys raised in captivity were ill-suited for survival in the wild, and their offspring fared worse. Pen-raised turkeys just didn't work.

However, what did work was the trap and transfer of wild turkeys in the wild. The cannon net, which had been used successfully on waterfowl, was adapted for capturing wild turkeys about 1950, and it and the later improved rocket net proved immensely successful in capturing wild turkeys for transplanting in the South.

The technique that was immensely successful was the trapping of wild turkeys from the wild and release in the wild *(A. Cornell, D. Dyke)*.

Other factors also contributed to the return of the wild turkey in the South. During and after World War II the rural human population decreased as many people left small farms for industrial employment in cities. The forests, which had been devastated in the early part of the century, were now maturing again. These maturing

Relative densities of wild turkeys by county for 1970 and 1996. Density categories: low <6/mi², medium 6-15/mi², high >15/mi².



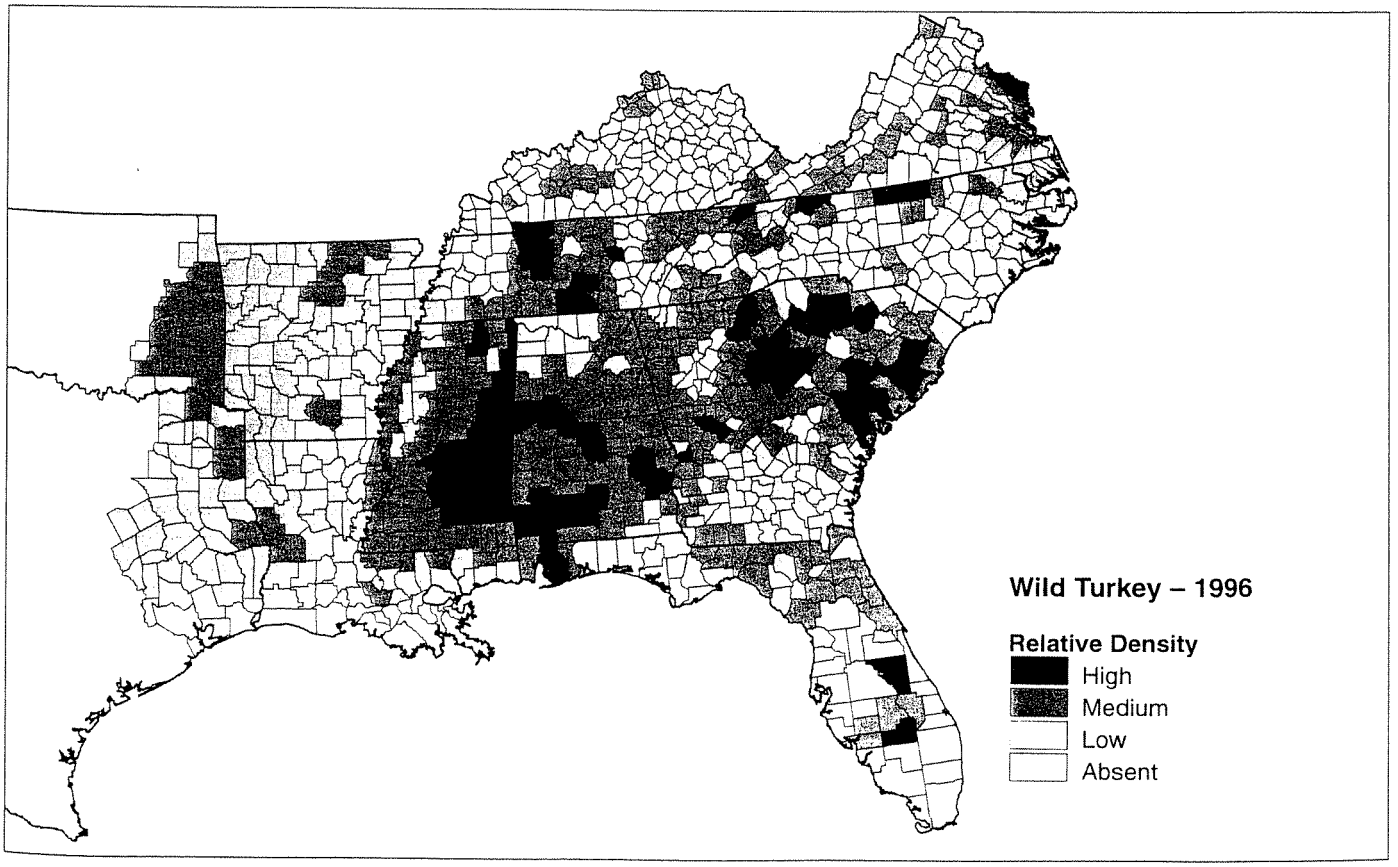


Table 1. Estimated wild turkey harvest and population[a] by state.

	1998-99 Harvest		1970 Harvest	1970 Population
Kentucky	19,225		0	1,000
Virginia	21,564		6,494	22,000
Tennessee	16,961		206	2,500
North Carolina	5,340		<100	2,000
South Carolina	11,261		32	15,000-18000 (1976)
Georgia	47,000	(1998)	<675	<40,000
Florida	35,531	(1997-98)	25,200	NA
Alabama	56,900		28,000	200,000
Mississippi	32,808	(1998)	19,192 (1976)	50,000
Arkansas	15,770		1,164	15,000
Louisiana	4,000	(1998)	3,000	25,000
East Texas	221		0	0
East Oklahoma	2,299		0	<1,000

[a] Populations sometimes are generally estimated as 10 times the gobbler harvest.

forests, along with increased awareness and better protection, helped wild turkey flocks thrive.

The combination of these factors bode well for wild turkeys in the South. By 1959 there was an estimated 227,760 wild turkeys southwide. By 1970 the regional population had increased to almost half a million birds (455,430) (Kennamer et al. 1992). From 1970 to 1999 in the South the population increased from about half a million to over 2 million wild turkeys, and the estimated harvest from less than 100,000 to over 250,000 (Table 1). What a remarkable story!

Harvest and associated population in every state in the region increased during that period. Recent substantial increases have been observed particularly in the northern upland hardwood region in Tennessee and Kentucky where state populations have increased from a few thousand turkeys in 1970 to over 100,000 now.

DISTRIBUTION AND CURRENT POPULATIONS

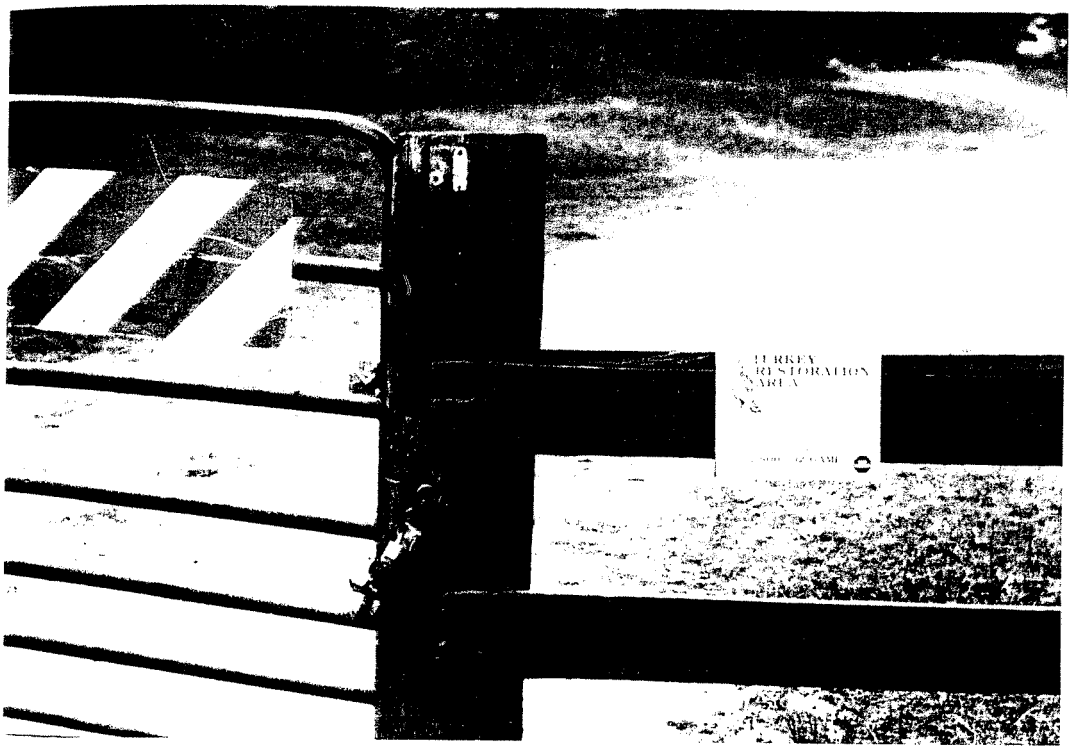
The wild turkey currently flourishes in southern forests. Wild turkeys are found throughout the South, mostly in medium to high densities (Table 1, Tapley et al. 2001).

Currently, lowest state populations (less than 100,000) probably occur in North Carolina and Louisiana, where the recent harvest in each state was estimated at less than 6,000. Also low populations are found in the small eastern Oklahoma area (about 18,000), and the in eastern Texas (5,000) where restoration has been recent. Highest state harvests (over 30,000) were reported for Alabama, Georgia, Florida, and Mississippi, where state populations probably range from 300,000 to 600,000 wild turkeys.

HABITAT

Optimum wild turkey habitat was described by early biologists as a variety of forest stands, many of them mature with abundant oaks, with open understories, interspersed with openings, well watered, and remote from human disturbance (Mosby and Handley 1943). Currently these habitat features are still regarded as ideal, but the wild turkey has proven to be a much more flexible and adaptable species and is found in a variety of southern forests where adequate

We have been effective in developing information to successfully manage wild turkey populations, hunting, and habitat *(H. Williamson).*



Better protection has helped flocks flourish; now there are over 2 million wild turkeys region-wide *(H. Williamson)*.

Optimum habitat is mature forests interspersed with openings.

protection from humans is afforded (Hurst and Dickson 1992).

Openings have long been recognized as an important component of wild turkey habitat. Turkey foods such as green grass and forbs, seeds, soft mast, insects and other invertebrates, and planted crops may be produced in openings (Hurst and Dickson 1992).

Fall and Winter.—During fall and winter turkeys usually associate in flocks by sex and age. Finding food and avoiding predators is their program at this time of year. Winter food is important for survival and preparation for spring breeding activities. Hens, especially juveniles, need to overwinter in good physical condition for spring reproduction. At the same time, gobblers are developing their breast sponge, fatty tissue that provides energy during the spring rituals when they feed little.

During fall and into winter, immature and adult wild turkeys use a variety of field and forest habitats, often based on food availability in proximity to appropriate cover. Fields provide foods, such as insects (until cold weather limits them), succulent forbs, grass seeds, and waste grain in some agriculture fields.

Forests are used frequently in fall and especially winter. Turkey use often is associated with the foods found there, mostly in the forest floor litter. Mature hardwood stands such as hardwood or pine-hardwoods in northern mountains, bottomland hardwoods, and streamside zones provide excellent habitat. Acorns consistently show up in turkey winter diets during years of production wherever oaks occur. A variety of other food items, such as dogwood and blackgum fruit, are taken where available. Snow covering food is not the problem in the South that it is in the northern portion of the wild turkeys' range.

In Alabama, Speake et al. (1975) saw a shift in gobbler range from old fields and pastures in fall to mixed uneven-aged stands of pine and hardwood stands in winter. The authors concluded that food availability was the determining factor. In upland hardwood forests of northwestern Alabama, prime winter habitat was creek bottom hardwoods and wildlife openings. In the coastal plain in areas with substantial pine plantations, Kennamer et al. (1980) found that turkeys used natural hardwoods the most and pine plantations the least during winter. Exum et al. (1987) found that gobblers and hens used bottomland hardwoods and burned middle-aged pine plantations more frequently than at random.

Breeding and Nesting.—In late winter the winter social flocks break up and turkeys shift from winter range to spring breeding, nesting, and brood range, with associated openings, shrubby nesting sites, and herbaceous brood habitat. This may be a very limited movement, or it may be several miles.

Turkey hens nest on the ground and most first nesting attempts in the South are initiated from late March through April. After the clutch of 10 or 11 eggs has been completed (normally in April for initial nesting attempts), the hen will incubate almost continuously for about 28 days until the clutch hatches. It takes about 2 days for all the poults to hatch, dry out, imprint on the hen and other poults, and exit the nest.

During incubation when the hen sits on the nest almost continuously, the hen and her nest are particularly vulnerable to predation and disturbance. If the nest is predated or abandoned some hens will renest. Even though most hens attempt to nest at least once each year, hen success is quite variable year to year (e.g.,Vangilder et al. 2001). On average only about half of all hens are successful in hatching any poults each year (Exum et al. 1987, Everett et al. 1980).

The structure of specific turkey nest sites usually exhibits some consistent features. Nest sites usually are characterized by abundant herbaceous vegetation and some woody shrub vegetation. Often there is sparse or no overstory vegetation. Most nests are situated under or adjacent to some form of structure, such as logging slash, brush, or vines. The nest site often is located within 100 yards of an opening, such as a woods road or food plot.

Wild turkey hens nest in a variety of different general habitat types; such as pine plantations, older pine-hardwood stands, agriculture fields, rights-of-way, and miscellaneous other vegetative types. In the coastal plain, typical nest sites were described as open pine woodlands or near openings such as roads surrounded by dense ground cover which had not been burned for several years (Wheeler 1948, Stoddard 1963, Exum et al. 1987). Nest locations were determined from results from 4 different areas in Alabama and 1 in Kentucky. Speake et al. (1975) determined that 75% of the nests were situated in old field stages of succession and the remainder were located in bottomland hardwood, upland hardwood, pine-hardwood, or pine stands. Of 48 nests in south-central Alabama, a few were found in agriculture fields (6%), bottomland hardwoods (10%), and cut-over areas (10%), but most of the nests (71%) were in slash pine plantations of all ages (Exum et al. 1987). In South Carolina and Mississippi studies, pine regeneration stands were selected for nesting (Seiss et al. 1990, Still and Baumann 1990). In a mature upland hardwood forest, Everett et al. (1985) found that power

Wild turkeys are opportunistic feeders. During the warmer months a variety of insects are consumed by adults and especially young turkeys *(P. Pelham, G. Hurst)*.

line rights-of-way were preferred nesting habitat; almost one third of the nests found were in rights-of-way which comprised less than one percent of the area. Upland hardwood forests were not selected as nesting habitat. The rights-of-way provided low, brushy vegetation appropriate for nesting in an area dominated by mature hardwood trees.

Broods.—Recently hatched poults follow the hen who leads them away from the nest when all are hatched and dry. The small poults are foraging soon after hatching. They grow rapidly and to satisfy their need for protein they consume large quantities of arthropods, such as grasshoppers and spiders. The hen and her young brood seek out and feed in lush herbaceous vegetation, ideally which is dense enough to produce the arthropods, but is not too dense for the young poults to get through. The best young brood foraging areas usually have vegetation tall enough (about 2 feet) to hide the poults from numerous predators, but low enough for the hen to see over. Nearby or interspersed tree or brush cover affords protection from predators (Hubbard et al. 2001).

Radio-instrumented hens and young poults have provided specific data on different habitat types used. In pine forests of eastern Texas, hens with broods selected areas of sparse overstory and midstory trees with abundant ground cover that had been burned (Campo et al. 1989). In the coastal plain of Mississippi, mature bottomland hardwoods with sparse shrub cover and moderate ground cover was preferred habitat (Seiss 1989).

In Alabama, hens with broods (n=85) used several types of openings, such as pastures, hayfields, grainfields, and old fields (Speake et al 1975). In another study, Hillestad and Speake (1970) found that hens with new broods moved into and used a lightly-grazed old field and made regular use of the woods-pasture edge.

Mortality of young turkey poults less than 2 weeks old before they are able to fly to roost is very high; usually less than half survive (see Vangilder 1992). Studies of radio-instrumented poults have shown that poult survival is directly related to the type of brood habitat selected by brood hens (Everett et al. 1980). Hens that took their broods to small ryegrass food plots and mature hardwood forests raised only 9% of 86 poults to 2 weeks of age, whereas hens that took their poults to

grazed pastures and woods' edge raised 36% of 116 poults.

Improved pastures, cutover hardwoods, wildlife openings, and rights-of-way were preferred brood habitat by 23 hens that were successful in raising their broods in northwestern Alabama (Everett et al. 1985). Upland hardwood sites were avoided by successful hens. In upland hardwood forests of northeastern Alabama (Metzler and Speake 1985), poult survival in 21 broods was greater in taller dense herbaceous vegetation which probably allowed hens with broods some visual protection from predators. Old fields afforded better cover than grazed pastures. In a recent Alabama study, hens successful in raising poults to 2 weeks of age selected brood habitat that had fewer large trees, less shrub level vegetation, and denser herbaceous vegetation than habitat selected by hens that were unsuccessful in raising their broods or random habitat (Peoples et al. 1996).

At about 2 to 3 weeks of age poults can fly and start roosting overnight in trees. Survival then is better and poults begin using more open areas, such as grazed pastures (Metzler and Speake 1985) or mowed fields (Hillstad 1973). In Georgia, broods moved to a complex of old fields, Bahia grass fields, grassy depressions, and young pine and oak stands (Hon et al. 1978). The rapidly growing poults start eating more plant food found in openings and fields (Blackburn et al. 1975, Hamrick and Davis 1971).

Roosts.—In the South where extremely cold winter weather is not normally a problem, wild turkeys roost in a variety of tree species on different sites. In areas with some topographical relief, turkeys often roost on the upper portion of slopes, just off ridge tops. Turkeys often roost in pines in uplands, and conversely, where available, turkeys roost in cypress or bottomland hardwoods over water (Still and Baumann 1990). During cold weather in winter, roost trees that provide some

Herbaceous vegetation is particularly important habitat for young poults *(G. Wunz).*

protection, such as large pines and magnolias, have been selected (Wheeler 1948). Pine plantations frequently are selected as roost sites where they occur (Smith and Teitelbaum 1986, Exum et al. 1987). Broods particularly use pine plantations for roosting during spring and summer.

Water.— Water was long thought to be an important part of wild turkey habitat; however, recent information suggests that turkeys in the humid South can get adequate moisture from their diet, such as dew, insects, and succulent berries. In a south Alabama study, hens with their broods made no attempt to go to permanent water sources (Exum et al. 1985).

FEEDING AND FOODS

Turkeys are opportunistic feeders; a lot of how and what they eat is dependent on what is available and what they can find and consume. Wild turkeys feed in different ways. Turkeys find most of their food on or near the ground. They can dig tubers and other food from the ground with their strong feet. And, during periods when they cannot reach their normal food, such as with extended flooding or snow covered ground, turkeys will feed from trees and shrubs on buds and fruits, such as sumac.

Wild turkeys are omnivorous; they eat a wide variety of types of foods and specific items (Hurst 1992). They eat some animal matter, including insects such as grasshoppers, other arthropods such as spiders, and some small vertebrates such as tadpoles and anoles. But the main food for adult turkeys is plant material. Turkeys feed directly on grass and forbs, consume grass seed such as Panicum and Paspalum, and take large amounts of soft fruits and berries such as blackberries and American beautyberry when they are available during the growing season. They consume large quantities of hard mast, such as oak acorns and beech mast, during fall and winter when it is available. Turkeys also consume cultivated crops, such as corn, soybeans, and wheat. Food habits vary by season and by life stage, summarized as follows.

Poults.—Young poults feed voraciously, grow fast, and consume mostly insects and other arthropods early in life. The diet of a young poult the first week of life usually is about 90% animal matter (Hurst 1992). It has been said that young poults will eat anything slow enough to catch and small enough to swallow.

Poults imprinted to turkeys or chickens feeding in fields or forest stands ate beetles, true bugs, grasshoppers, and leafhoppers; along with dewberry fruits and seeds of sedges, nut rushes, and panic grasses (Hurst and Stringer 1975). In middle-aged slash pine plantations in south Alabama, dropping analyses showed 60 percent insects and 40 percent fruits of blackberry, blueberry, and huckleberry, and nozeburn seed (Exum et al. 1985,1987). But at least in some situations poults eat mostly plant material. In a 2-year-old pine plantation where insects were scarce and seeds were abundant, 94% of the diet of chicken-imprinted poults was seeds of nut-rush, sedge, panic grass, and blackberry fruits (Hurst 1992).

Juveniles.—Within about a month of age, the diet of young turkeys has changed from predominantly animal matter to predominantly plant material and is similar to adults (Hurst 1992). Several food habits studies conducted in Alabama in mid-to-late summer showed that a variety of grass and forbs, grass seed, fruits, and some insects were consumed. Hamrick and Davis (1971) found that in forest/field habitat the dominant food item of juvenile turkeys was Bahia grass seed, and grasshoppers were the most important animal food. Blackburn et al. (1975) found that foods in grassland habitats were consumed in proportion to their abundance. The most important foods were carpet, Bahia, and crabgrass seed; and blackberries. Primary foods of juvenile turkeys in south Alabama were determined to be insects, fruits, green vegetation, and *Paspalum* and crabgrass seed (Exum et al. 1987).

Adults.—As with juveniles, adult turkeys consume a wide variety of many different food items, mainly dependent on availability (Hurst 1992). They feed on green forage and grass seed, such as wood sorrel, panic grass, and *Paspalum*, including domestic forages such as oats, wheat, and ryegrass. They eat fruits of shrubs, such as dogwood, saw palmetto, blackberry, American beautyberry, and huckleberry. They eat fruits of vines, such as poison ivy, pepper vine, and grape. Seed of trees, such as oaks, pecan, hackberry, blackgum, and pines are relished. Turkeys feed on domestic crops, such as corn, soybeans, and chufas. Adult turkeys also eat a variety of invertebrates wherever they are easily found.

DISEASES

The wild turkey can be infected with many different diseases, but not much is known about direct mortality from diseases and even less is known about long-term effects of diseases on turkey populations. Two of the more important diseases of wild turkeys in the South are avian pox and histomoniasis.

Avian pox, also known as fowlpox, is a contagious virus that infects both wild and domestic turkeys. It has been commonly diagnosed from sick and dead turkeys in the southeastern states. The most obvious symptom is wartlike-like growths, particularly on unfeathered body parts, such as the head, legs, and feet. The disease normally is not fatal unless the eyes are obstructed and the bird starves or is predated. Mosquitos can be vectors, or turkeys can be infected directly from other turkeys.

Histomoniasis, also known as blackhead disease, is caused by a protozoan which is carried by a cecal nematode worm. The disease is characterized by necrosis of the ceca and liver. The disease may be transmitted by the nematode through turkey feces or by consumption by turkeys of earthworms which have ingested the infected nematodes. It has been diagnosed in turkeys in the South and can be carried by other gallinaceous birds, such as pheasants and barnyard chickens. More information on these and other diseases can be found in Davidson and Wentworth (1992).

INTERACTION WITH OTHER SPECIES

Wild turkeys are part of complex ecosystems that are continually changing over time and interact with a number of other animals. Wild turkeys have evolved with predators and predation is part of what makes them wild. Predation helps insure that unfit individuals are culled and populations are fit. We know generally which animals prey on wild turkeys, but we don't know what long-term effects predators have on wild turkey populations at different predator and turkey densities in a variety of habitats.

Nest and Poult Predators.—Turkey nests and flightless young poults are predated heavily by a number of animals. Raccoons and skunks have been consistent nest and young poult predators, and opossums, dogs, crows, foxes, hawks, owls, and snakes have been implicated as well.

Adult Predators.—Overall wild turkey mortality is substantial; very generally about one half of all hens and a third of all gobblers die each year (Vangilder 1992). Mortality for hens is highest during the nesting and brooding season and predators are mainly responsible. Although predators kill some gobblers, usually adult gobblers are pretty hardy and hunting is the main mortality factor. A number of animals, including bobcats, coyotes, dogs, foxes, owls, and other species, prey on grown turkeys.

Wild turkeys can be impacted by human-related disturbances and harassment by dogs can be a problem. Also, free ranging dogs have been implicated as a substantial nest predator (Speake 1980). Coyote populations have expanded throughout the South, and while coyotes do kill an occasional turkey they are not thought to be a serious turkey predator. Previously, bobcats have not been regarded as a substantial predator. However, recent studies elsewhere (for example in Missouri, Vangilder 1996) have shown that bobcats were a significant predator of adult turkeys. Bobcats currently may have an impact on turkeys in the South with bobcat populations apparently higher now than previously.

Predator control may enhance turkey survival in the short term and on a local basis. But specific control of predator populations is difficult, costly, and not a good long-term solution. Creating high quality habitat helps turkeys withstand predation and reproduce more consistently.

Feral Hogs.—Hogs are widespread and potentially affect turkeys and management activities. Although on a local basis hogs may consume or trample some nests, generally throughout the South I do not think wild hogs are a significant predator.

Hogs, and probably deer also, compete with turkeys for some cultivated foods, such as chufa or grain crops, and natural foods as well. For example, acorn production in mixed hardwood forests is quite variable year to year (Dickson 1990). In years of very low production where hog densities are high they compete with turkeys and other native wildlife for a limited acorn supply. On the other hand hogs may uncover some foods which turkeys find; turkey scratchings are observed in hog rootings. Also, hogs may promote some small spots of grass-forb growth with their rootings, which may be beneficial to young poults.

But hogs certainly can be a problem with management activities, such as maintaining food plots. It is recommended not to release hogs into new areas and where they are established to keep hog numbers at a modest level, which is difficult to accomplish.

MANAGEMENT

People.—People and their activities are a primary factor in wild turkey management. Wild turkey populations usually will tolerate some interactions with people, but turkey populations do not prosper in areas of intense unrestricted hunting. If populations are viable and normal reproduction and recruitment is occurring, gobbler hunting during spring in a sporting manner will not jeopardize turkey populations. However, year-

round illegal hunting, such as hunting hens and poults in the fall or turkeys over bait, can suppress populations.

Limiting Factors.—Habitat can be manipulated to minimize the effects of limiting factors and benefit turkeys in a number of ways. But the manager should be cautious not to create an attractant to turkeys, such as food plots adjacent to roads, where they could be exploited by illegal hunting.

Studies have shown that wild turkeys in the South may use anywhere from a few hundred to a couple of thousand acres of range annually. Also, flocks use different habitat types which may be quite different during different seasons. So an inspection and assessment of total turkey habitat suitability is necessary to determine what habitat features may be limiting for wild turkey year-round needs. For example, in the hardwood mountains of the Appalachians or the extensive bottomland hardwoods along major rivers, mast-producing hardwoods may provide good winter habitat, but grass-forb vegetation in openings suitable for brood habitat probably is limited. In such situations, openings with herbaceous vegetation, such as small fallow fields, could benefit poults and enhance population recruitment. Throughout much of the South it appears that the extent of grass-forb vegetation appropriate as brood range may be a widespread and important limitation. Most forest stands lack adequate herbaceous vegetation and small patch farming has diminished drastically.

Nesting and Brood Habitat.—Low dense vegetation, such as that found in fallow fields, power and pipeline rights-of-way, and small young clearcuts or partial cuts can be provided as nesting habitat. Areas with grass-forb vegetation with abundant arthropod populations, such as fallow fields, idle crop fields, wildlife openings, and unimproved pastures can be provided for brood range. Nesting and herbaceous brood habitat should be widespread and in close proximity to each other in order to help limit predation. Limited nesting and brood habitat may concentrate predators and result in high predation rates. Also, after hatching, hens take their broods from the nest site to appropriate early brood range. If this is some distance from the nest site these movements may result in substantial poult mortality.

Fall and Winter Habitat.—Improvement and maintenance of turkey habitat can be accomplished in silvicultural manipulations. Trees or stands particularly valuable for wildlife can be favored, and nesting and brood habitat can be created by harvesting (Swanson et al. 1996).

Particular habitats used at this time of year and desired habitat conditions, often keyed to foods available, are explained in previous sections. The best wild turkey winter habitat contains a variety of stand ages from early to late successional, particularly mature stands, interspersed with openings. Acorn production is quite variable so a variety of red and white oaks and trees other than oaks, such as sweet pecan and black gum, are important for adequate winter habitat.

Pine Stands.—Generally, mature pine or pine-hardwood stands are good turkey habitat. When these stands are harvested wild turkeys use the cut over area for a couple of years, especially if some residual mature trees or mature adjacent stands are left unharvested. Because of overstory removal and increased sunlight to the ground recently harvested stands quickly develop abundant herbaceous vegetation and soft mast, such as blackberries and American beautyberry. However, within 2 or 3 years vegetation normally becomes too dense for wild turkey use except for hens, which will nest around the edges of young stands. Pine plantations usually remain too dense for general turkey use until plantations are about 10 years old when canopies of the rapidly growing pine trees are closing and shading out understory grass, forbs, and shrubs.

When pine canopies close in young pine stands, understories normally are sparse enough for some wild turkey use, but shaded understories usually are mostly devoid of turkey food items, such as grass seed, forbs, and fruits of shrubs. In middle-age pine plantations from 10 to 20 years-old, thinning of the stand, especially in conjunction with burning, opens up dense stands to sunlight which enhances understory growth valuable for turkeys.

But older pine and pine-hardwood stands grown for sawtimber products are better wild turkey habitat. Mature pines are used for roosting and produce some seed consumed by turkeys. The combination of mature pines or pine-hardwoods, and openings can comprise good turkey habitat. Mature pine stands which have an open understory with some herbaceous vegetation and some fruit producing shrubs, such as dogwood or American beautyberry, in a landscape with mature hardwoods and small agricultural fields, or herbaceous fallow fields usually are good turkey habitat. The mature hardwoods can be distributed throughout pine-hardwood stands, in distinct hardwood stands, or in streamside zones or hardwood corridors traversing pine stands.

Burning.—Many important wild turkey foods such as native legumes are fire adapted and promoted by fire.

Today in the South as turkey flocks flourish, many youngsters and women as well as traditional male hunters are enjoying the tremendous sport of turkey hunting *(J. Dickson, J. Langston, J. Robertson).*

Prescribed burning is an important land management practice conducted in middle-aged to older pine stands which can control the development of dense understories and helps promote understory grass, forbs, and shrubs, all important for wild turkeys. In pine plantations burning is particularly useful after a thinning. Light is increased, and understory vegetation develops. Prescribed fires have to be hot enough and frequent enough to kill small woody vegetation. Air pollution and the threat of litigation are two problems with burning.

Wildlife Openings.—Planting of wildlife openings can enhance wild turkey habitat suitability. An obvious benefit is that turkeys feed directly on foods produced. Plots can be planted to produce during the cool season or growing season, or both. Chufa, a nut sedge, is a favorite food of wild turkeys. It grows best in a sandy loam soil and the tuber is readily scratched and eaten by wild turkeys. It is also relished by several other species, including hogs and raccoons. Clovers are an excellent choice for turkeys. There are a number of particular varieties suited for local conditions, and available to wildlife at different times of the year. Clovers have a high vitamin A content, valuable to pre-nesting hens. Also, clovers may contain a high density of arthropods valuable for young turkey poults. Wheat and oats plots, normally planted for deer, can be useful to wild turkeys. The seeds or young succulent plants may be consumed and fallow plots with arthropods may be used by hens with broods. Small grains, such as millet, milo, and Egyptian wheat may provide supplemental food during the growing season.

Feeding.—The direct provision of supplemental foods has limited value in sound turkey management. Feeding may concentrate human or natural predators. Also, there may be problems with disease transmission, such as histomoniasis, at long term feeding sites. Corn feeding in many areas has been a tradition. While it is high in carbohydrates and provides energy, it has little of the other essential nutrients needed by animals. Aflatoxin is a fungus that sometimes develops in corn and other grains grown under droughty conditions. It may debilitate or impair turkeys that feed regularly on infected grain. Birds are more susceptible to Aflatoxin than mammals. The problem is that some corn which may have higher levels of Aflatoxin than the USDA standards permissible for livestock food is sold as deer corn and consumed by wild turkeys.

HUNTING

Turkey hunting is important in the South. Most of the southern states have a limited fall hunting season. But the fall harvest southwide is small (only 12% of the total harvest in 1994) and substantial only in Florida (48% of total state harvest) and Virginia (55%) (Kennamer and Kennamer 1996). In the South the main hunting season and harvest occurs during spring.

The sport of hunting the wild turkey by calling is a well-steeped tradition in places in the South where there have been turkey populations historically and has become a tremendous new sport in areas where new turkey flocks flourish. There is no other excitement like hunting the wild turkey!

Spring turkey seasons and bag limits in the South generally are liberal (Kennamer et al. 1992), but they are more restrictive where populations are low, such as eastern Texas. Spring seasons start in March in some southernmost states and in April in the others. Spring seasons in most states extend more than a month. Bag limits for states range from a low of 1 on some areas with newly established populations to a high of 5 or 6 for some states. Hunting wild turkeys over bait is illegal in all southern states. Decoys are legal in all states except Alabama. Hunting turkeys with rifles is legal only in Virginia, Florida, Mississippi, and Oklahoma in the fall.

CONCLUSION

The wild turkey was very abundant in the precolonial South, was reduced drastically by the early 1900s, and has been restored in remarkable fashion throughout. Turkey populations now thrive in southern forests; estimates surpass 2 million Southwide. Turkey hunting has become a tremendously popular sport and spring ritual throughout the region. The gobble of old long beards greeting spring dawns is a welcome sound thrilling southern hunters. The future also looks bright; the main obstacles will probably come in the form of challenges to hunting and management, and loss of habitat.