


Rio Grande Wild Turkey In Texas:

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Biology and Management

A photograph of a turkey in a wire cage, serving as the background for the text. The turkey is dark-colored with a prominent tail fan and is positioned in the center of the frame. The cage is made of thin metal wires, and the background is a light, textured surface, possibly straw or hay.

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Among the birds of North America, it could be argued that few rival the showmanship and vibrant plumage of the wild turkey. The unmistakable gobble and showy tail fan of the tom turkey indicate competition to pass on its genes to the next generation. To many people, the sight of strutting gobblers, as males vie for the attention of hens, is an unforgettable scene in spring.

This scene was nearly lost when over-hunting greatly reduced the number of Rio Grande wild turkeys (*Meleagris gallopavo intermedia*) in the late 1800s. By 1920, much of the population was extirpated over its original range and the number of turkeys in Texas fell to approximately 100,000 birds. At that time there were few restrictions on harvest and little understanding of the bird's biology and habitat requirements. Through harvest restrictions and restoration efforts, Rio Grande wild turkey numbers rebounded across Texas and the United States. In Texas and other states, turkeys were restored primarily by trapping and transplanting them from their stronghold in the Edwards Plateau.

However, even wild turkeys in the Edwards Plateau were not immune to population declines, as one area in this stronghold had seen declining numbers since the 1970s (Fig.1). Surprisingly few studies have evaluated the biology and life requirements of Rio Grande wild turkeys, which prompted the Texas Parks and Wildlife Department to partner with university investigators to examine Rio Grande wild turkey populations in different regions of the state (Texas A&M University in the Edwards Plateau, Texas Tech University in the Rolling Plains, and Texas A&M University Kingsville in the South Texas Plains; Fig. 2).

Turkeys in Texas are divided among three subspecies, each occupying

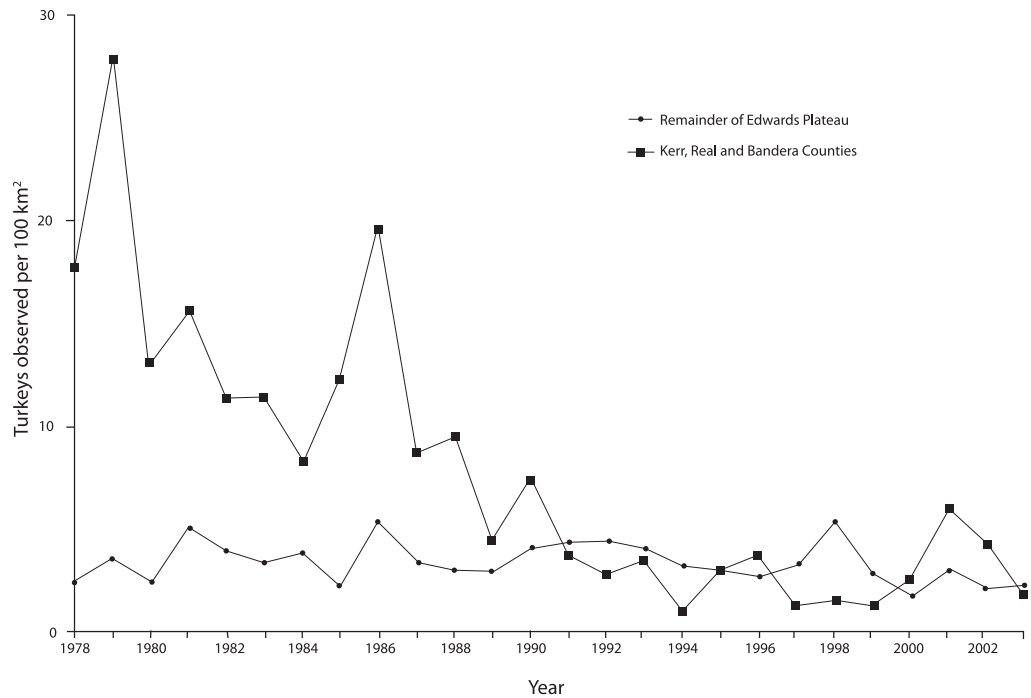


Figure 1. Number of Rio Grande wild turkeys observed during Texas Parks and Wildlife Department summer production surveys in Bandera, Kerr and Real counties and the remainder of the Edwards Plateau, Texas.

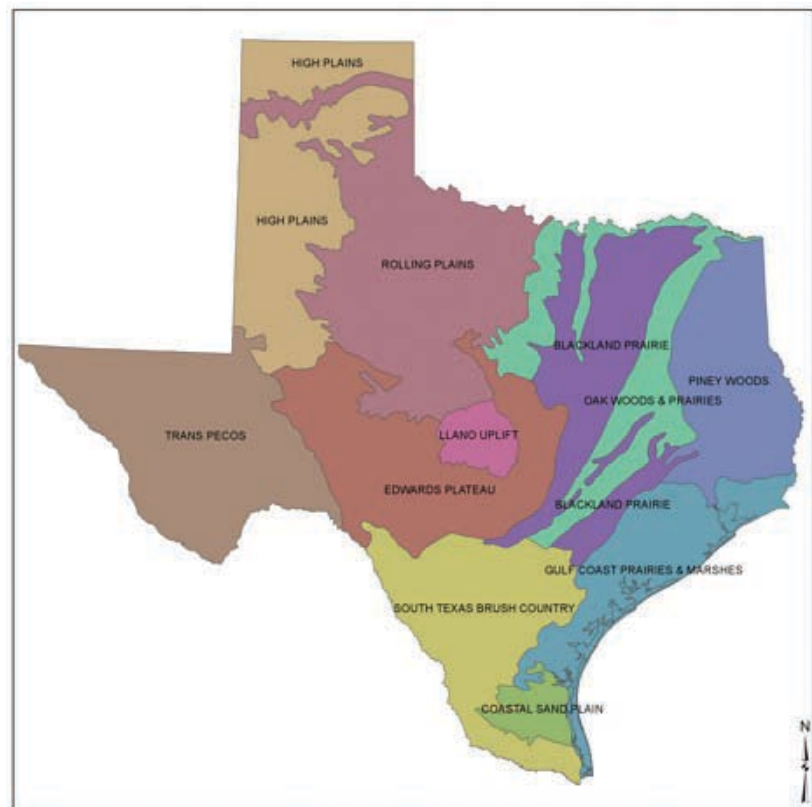


Figure 2. Because of differences in climate, soil types, and communities of plants and animals, 11 natural regions are commonly recognized in Texas: 1) Piney Woods, 2) Gulf Coastal Prairies and Marshes, 3) Oak Woods and Prairies, 4) Blackland Prairie, 5) Coastal Sand Plain, 6) South Texas Brush Country, 7) Edwards Plateau, 8) Llano Uplift, 9) Trans-Pecos, 10) Rolling Plains and 11) High Plains.

Wild Turkey Distribution In Texas

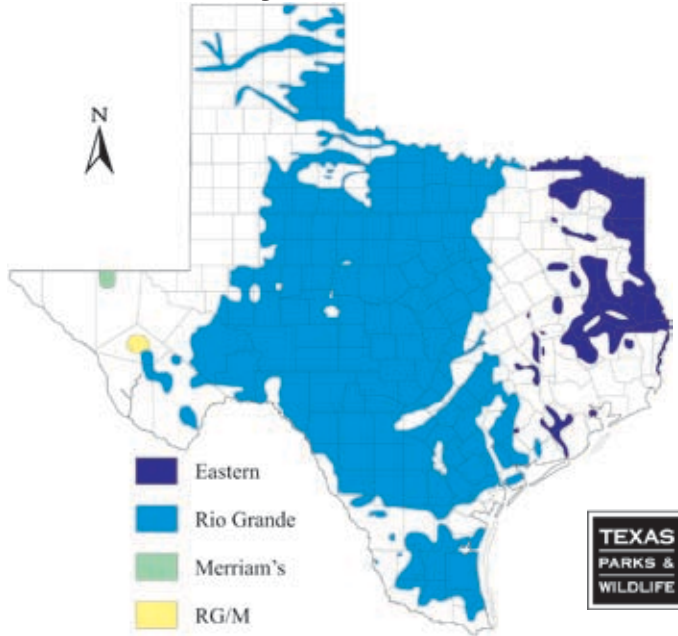


Figure 3. Of the five subspecies of wild turkeys, only the Eastern, Rio Grande and Merriam's wild turkeys occur in Texas. Notice that Rio Grande and Merriam's wild turkeys have hybridized in far western Texas.



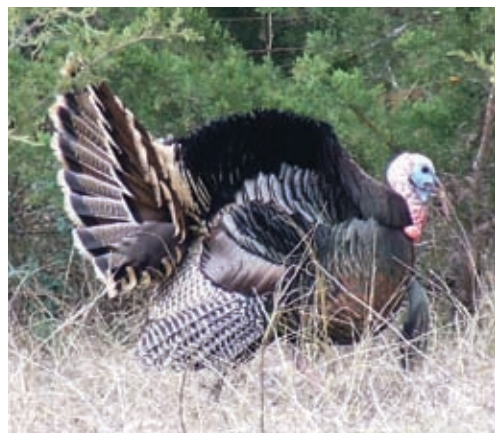
(A)



(B)



(C)



(D)

Figure 4. Difference in color can be noted between female and male Rio Grande wild turkeys. Females (A, B) are much duller in appearance than the brightly colored males (C, D).

ranges that best suit them (Fig. 3). An understanding of the life history, population dynamics, habitat requirements, and general management of the Rio Grande wild turkey will help land stewards enhance habitat to benefit this bird and many other wildlife species.

Life History

Physical characteristics

Aside from the sparsely feathered head and bare legs and feet, the bodies of wild turkeys are covered with 5,000 to 6,000 feathers that provide insulation, lift during flight, touch sensation and ornamentation; feathers also shed water. Feathers are grown during five molting periods—natal, juvenile, first basic, alternate (first winter) and basic (adult plumage). Feather color can be quite dramatic for males, showing iridescent copper, bronze, red, green and gold. Females have these same colors but they are less pronounced and slightly duller, so that females appear browner overall (Fig. 4).

In addition to the feathers that cover the body, toms also have a beard—a group of fibrous bristles that project from the neck above the breast. Unlike true feathers, the beard does not molt. Instead, the beard grows throughout the life of the tom. Beards are first visible at 6 to 7 months of age as they grow past the breast feathers. Females sometimes have beards also (Fig. 5). Beards in females are typically much shorter—only about 7 inches—and usually are sparsely bristled.

The legs and feet of both sexes are covered with scales rather than feathers. As a turkey ages, less of the pigment melanin is deposited in the scales, making the legs look pink or red in older birds. A spur grows on the lower third of the leg and, over time, develops from a small, rounded

bump to a sharp, pointed projection up to 2 inches long. Spurs on females are small and blunted. The growth of the spur in males can be used as an indicator of relative age; small, rounded spurs indicate an immature tom and long, pointed spurs indicate a mature male.

Adult males weigh 17 to 21 pounds and adult hens weigh 8 to 11 pounds. Adult toms stand about 40 inches tall and females stand about 30 inches when at full alert. Surprisingly, poults begin life very small and weigh only about 2 ounces at hatching (Fig. 6).

Population Dynamics

To understand the factors that influence Rio Grande wild turkey populations, scientists must gather information on survival, nesting, production, and movement over time. Turkey movement is tracked by attaching radiotransmitters to individual birds (Figs. 7 and 8). Signals are heard using an antenna and receiver. Scientists monitor the movement of turkeys and their activities over the annual cycle (breeding, reproduction). Once incubation begins, scientists can pinpoint the location of the nest and determine, by repeated visits to the site, if the hen successfully hatched her clutch of eggs or if the nest was destroyed by a predator. Each transmitter has a mortality sensor that sends a faster signal if the transmitter remains motionless for 8 hours. This prompts investigators to home in on the mortality signal and determine the cause of death for the turkey (Fig. 9).

Nesting ecology

Before breeding, male turkeys display by “strutting” on a display or gobbling ground to attract the attention of female turkeys (Fig. 10A). Once a female has selected a male to breed with, she will lie close to



(A)



(B)

Figure 5. Male turkeys grow beards throughout their lives (A). Although most females do not have beards (note the two females in the background of photo A), some do grow beards that are smaller and more sparsely bristled (B) than in males.



(A)



(B)

Figure 6. A Rio Grande wild turkey poult at 3 days of age (A). Note that the natal down is just beginning to be replaced with flight feathers on its wing. Flight feathers grow rapidly and are much more developed in this poult at 8 days of age (B).



Figure 7. A radiotransmitter is about the size of D cell battery (about 3 to 4 ounces) and is attached to a 14-inch antenna. Radiotransmitters send specific radio signals for tracking individual turkeys.



Figure 8. A sock is placed over the head of the turkey to keep it calm while it is fitted with a transmitter, which is worn much like a backpack.



Figure 9. Transmitters are equipped to give a mortality signal. Often, evidence at the kill site can be used to determine the species of the predator. The turkey on the left was killed by an avian predator, while the turkey on the right was killed by a mammal.

Table 1. Rio Grande wild turkeys nest over several months. The condition of the habitat and the timing of spring green-up likely influence the nesting interval throughout the turkeys' broad range.

Reference	Nesting interval	Region of state
Cook 1972	February–August	Edwards Plateau
Melton (unpublished data)	April–July	Edwards Plateau
Hohensee and Wallace 2000	March–August	Rolling Plains
Huffman 2005	April–July	Rolling Plains
Bailey and Rinell 1967	April–June	South Texas Plains
Beasom 1973	April–August	South Texas Plains



(A)



(B)

Figure 10. Following the male's courtship behavior (strutting and displaying, A) a female will select a mate (B). Breeding primarily occurs in spring and summer (January to August) over the wide range of Rio Grande wild turkey habitat.



(A)



(B)

Figure 11. Little preparation goes into the construction of a Rio Grande wild turkey nest (A). (Note the digital camera used to monitor the nest). A shallow depression in the leaf litter, about the size of a dinner plate, is typical (B).

Table 2. Nest predation by reptiles, birds and mammals can limit the recruitment of young turkeys into the population. Regional differences in nest predation have been noted.

Reference	% Successful nests	% Destroyed by predators	Region of state
Cook 1972	39	44	Edwards Plateau
Reagan and Morgan 1980	23	56	Edwards Plateau
Randel 2003	38	–	Edwards Plateau
Melton unpublished data	15	63	Edwards Plateau
Hohensee and Wallace 2000	16	42	Rolling Plains
Huffman 2005	34	47	Rolling Plains
Ransom et al. 1987	12	58	South Texas Plains

the ground in front of the male and breeding will take place (Fig. 10B). Breeding in Rio Grande wild turkeys in Texas usually begins in early spring in southern Texas and continues through July and August in central and northern Texas (Table 1). After breeding, hens seek out potential nesting sites, such as thick grass clumps, brush piles and understory brush, that offer both shade and visual obstruction of the nest bowl (Fig. 11). Once a nesting location is selected, the hen scratches a shallow depression in the ground, but makes little other nest preparation. Hens usually lay one egg per day. Clutch size averages 10 to 11 eggs, but ranges from eight to 16 eggs. Eggs are cream to tan in color, with some having brown speckles. Incubation begins when the last egg is deposited in the nest and continues for approximately 28 days. After poults emerge, they roost on the ground until flight feathers begin to replace natal down (which is completed at about 2 weeks of age).

Reproduction

Successful reproduction and recruitment in Rio Grande wild turkeys is a combination of 1) nesting and re-nesting rate (proportion of hens that nest), 2) nest success (percentage of hens that successfully hatch their young, and 3) survival of poults until the following breeding season. Nest success is a critical component of reproductive success and, when combined with information on poult production and survival, it helps define the recruitment of young turkeys into the adult population (Table 2).

As with most ground-nesting birds, reproductive success is highly dependent on weather, range and the condition of individual birds. In Rio Grande wild turkeys, a large proportion of hens attempt to nest each year, but during droughts that

proportion may drop drastically, usually with juveniles forgoing nesting. An investigation was conducted to assess poult production in relation to rainfall in the Edwards Plateau, Rolling Plains, Cross Timbers and Prairies, Post Oak Savannah, and South Texas Plains ecoregions (Fig. 2). Poult production was improved by cumulative precipitation over many months rather than by individual rainfall events. Seasonal comparisons indicated that autumn and spring rains were better predictors of poult production than was winter rainfall. Another investigation in the Rolling Plains found that pre-nesting precipitation favorably influenced nest success, but rainfall when hens are initiating nests and incubating eggs tended to decrease nest success.

Movements

Poults leave the nest after about 24 hours, responding to the persistent calling of the hen. A hen and her poults are known as a brood and they move about in a group as they forage for food. Foraging occupies the bulk of the day. Poults gain weight rapidly, averaging about 1.1 pounds per month. Poults consume mostly insects during this stage of growth, but eat seeds and greens also.

Daily movement seems to be random in direction, yet purposeful in the pursuit of food. As turkeys forage, they may move from 300 yards to 2 miles per hour. Typically, several broods (hens and poults) join together after the poults grow larger and form brood flocks. Hens that bred move independently of hens that did not breed, while males typically segregate themselves from the summer flocks into male-only groups independent of juvenile males and non-breeding females. In winter, Rio Grande wild turkeys establish winter roost sites and travel only 1 to 2 miles from these locations. In spring, most hens move less than 2 miles from their

Table 3. Animals that prey on Rio Grande wild turkeys and their nests in Texas.

Predator	Prey on nests	Prey on poults	Prey on juvenile and adult turkeys
raven	√		
striped skunk	√		
spotted skunk	√		
coachwhip snake	√	√	
Texas rat snake	√	√	
coyote	√	√	√
bobcat	√	√	√
raccoon	√	√	√
gray fox	√	√	√
great-horned owl	√	√	√
opossum		√	√
red-tailed hawk		√	
nine-banded armadillo	√		
feral pig	√		

winter roosting sites, but some have been documented to travel as far as 26 miles, presumably to find suitable nesting and brood-rearing locations. Research in the Rolling Plains found most dispersing hens were yearlings.

Survival

Although the Edwards Plateau region of Texas represents the stronghold and geographic center of the Rio Grande wild turkey's historic range, there have been few studies of the biology of this bird. A recent investigation of the survival of Rio Grande wild turkeys in the Edwards Plateau determined that there was little difference between sex or age class (juvenile or adult) survival, with 66 percent living throughout the year. However, work in the Texas Rolling Plains found that juvenile males had a higher survival percentage than adult males (59 versus 36 percent, respectively). That research also showed that survival is lowest during spring (50 to 63 percent) and highest during autumn (96 to 100 percent).

Depredation effects

Many different reptilian, avian and mammalian species prey on Rio

Grande wild turkeys and consume their eggs and poults (Table 3, Fig. 12). From 2005 to 2007, turkey nests in the Edwards Plateau were monitored with motion sensor-equipped digital cameras. Photos implicated raccoons and foxes as the most frequent nest predators. There is evidence that more than one predator species will sometimes depredate a single nest. Occasionally a predator will eat only some of the eggs and then leave the nest. One hen was observed to resume the incubation of remaining eggs after some of her eggs were destroyed, and the hen was believed to have removed the damaged eggs from the area.

Many poults are lost to predation during the first few weeks because they are flightless and vulnerable; however, once they grow flight feathers (fledge), mortality declines, usually at about 10 to 14 days (Fig. 13). Survival increases as poults begin to fly into roost trees rather than roosting on the ground. Roost trees offer protection from ground-dwelling predators. While the annual survival of juvenile and adult birds is relatively high, the loss of adult



(A)



(B)



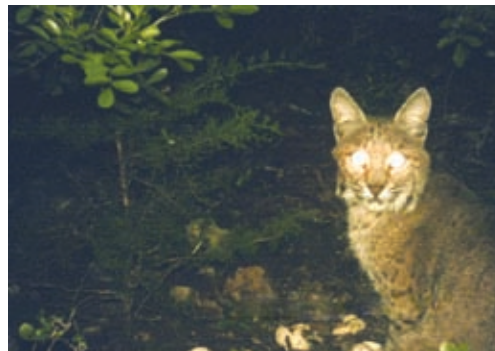
(C)



(D)



(E)



(F)

Figure 12. Predators such as raccoons (A) gray foxes (B), Texas rat snakes (C), spotted and striped skunks (D), feral hogs (E) and bobcats (F) can affect turkey populations by consuming eggs in nests, thus reducing population productivity.



(A)



(B)

Figure 13. Flightless Rio Grande wild turkey poults are easy prey for predators like this coachwhip snake (A). Two poults transmitters were recovered from this nest, where adult red-tailed hawks were feeding their chicks (B).

females increases during the breeding season while they are incubating eggs.

Diseases and parasites

Rio Grande wild turkeys, like the other subspecies, are susceptible to a variety of diseases. In nature, diseases sometimes have to run their course, as there is no good way of gathering and treating wild animals. Furthermore, the cost would be very high. It is important to separate wild birds from domestic fowl to safeguard against disease transmission.

Mycoplasmosis, salmonellosis and aspergillosis are diseases that affect the poultry industry and also may affect wild turkey populations. In 2001, reticuloendotheliosis virus (REV) was found in two of 70 wild turkeys surveyed in the Edwards Plateau. This virus may suppress the immune system, cause abnormal internal growths, and lead to lower body weights. Although fairly common in domestic poultry, 2001 was the first time REV was documented in Rio Grande wild turkeys. For information about these and other diseases, see Texas Cooperative Extension publication B-1031, "Poultry Disease Manual."

Avian pox, a viral infection, is one of the most recognizable turkey diseases. It is transmitted when the virus contacts the eyes, mouth, respiratory tract, or cuts on the skin. It can also be transmitted by mosquitoes. The virus causes wet lesions in the mouth or trachea or dry, prominent lesions near the eyes and/or mouth. Lesions may prevent turkeys from foraging, which causes them to lose weight and makes them more vulnerable to predators. Turkeys that show signs of disease should not be consumed.

Hunting effects

A major goal of game management is to make sure population numbers are not adversely affected by hunting pressure. State agencies often limit the number of turkeys that can be taken by individual hunters as a way to prevent over-harvesting. Agencies embrace maximum sustainable yield practices, which is the maximum number of Rio Grande wild turkeys that can be harvested without harming the population's ability to rebound the next nesting season.

Until the early 1990s, hens were protected from harvest in Texas. That changed from 1990 to 1995 when 84 of 146 counties were opened to either-sex hunting outside of the breeding season during the fall of the year. It is assumed that killing some females before nesting will not affect the population number. A recent investigation examined differences between gobbler and hen harvests, based on turkey densities and units of effort spent to harvest turkeys in the fall season. Modeling indicated similar outcomes for both sexes and showed that the current level of harvest (including hens) did not negatively affect the population.

Hunting is often considered the main limiting factor for Rio Grande wild turkeys in some regions of Texas. However, work in the Edwards Plateau and Rolling Plains has shown that harvest represents only a fraction of the total mortality. In the Rolling Plains, 18.5 percent of mortality was from harvest during 2000–2002, while in the Edwards Plateau, less than 5 percent of total mortality was from hunting during 2001–2007. The effect of hunting on specific properties will depend on the intensity with which turkeys are managed (limits on hunter access, permits, etc.).

In the pursuit of Texas Rio Grande wild turkeys, hunters help pay for

conservation efforts that benefit both non-game and game species through fees on hunting licenses and excise taxes on arms and ammunition. Through the Federal Aid in Wildlife Restoration Act (popularly known as the Pittman-Robertson Act), the United States Fish and Wildlife Service returns a portion of this money (an average of \$9.8 million annually) to the state for conservation activities conducted by Texas Parks and Wildlife. Overall, hunting generates about \$3 billion for the economy of Texas each year and money spent in the counties to which hunters travel is important to many townships (Fig. 14).

Habitat Requirements

Food

It is not surprising to find that the diets of Rio Grande wild turkeys are broad, given their widespread distribution across Texas and the U.S. (Fig. 3). Green foliage and seeds from grasses and forbs (weeds), mast, and animal matter are all important components in the diets of these birds. Seasonal differences in food items have been noted (Tables 4 and 5). Web tools for identifying plants can be found at Texas Cooperative Extension's natural resource site (<http://texnat.tamu.edu/plant.htm>) and Texas Parks and Wildlife's Texas Plant Identification Database (<http://tpid.tpwd.state.tx.us>).

Cover

Rio Grande wild turkeys are widely distributed in Texas; consequently, they encounter an extensive array of habitat types. Turkeys need high-quality roosting sites. Large, healthy turkey populations have long been associated with major watercourses in Texas because these areas have an ample number of tall, hardwood trees that are ideal for roosting habitat.



Figure 14. Wild turkey hunters in Texas contribute to the conservation of the species by fees on hunting licenses and a federal tax on arms and ammunition.

Table 4. Important food items used by Rio Grande turkeys in the Rolling Plains and Edwards Plateau ecoregions of Texas.

animal matter	little barley
bristlegrass	hackberry
Texas cupgrass	milk vetch
bumelia	croton
skunkbush	littleleaf sumac
pricklypear	squirreltail grass
white tridens	grama
tasajillo	plantago
wild onion	juniper
rescuegrass	walnut
ground-cherry	pigeonberry
filaree	wild mercury
silverleaf nightshade	ephedra
honey mesquite	gaura
pecan	agarita
sand dropseed	green matter
lotebrush	catnip noseburn
bladderpod	tobosa
panicgrass	evening primrose
broomweed	

Turkeys tend to remain within $\frac{3}{4}$ mile of riparian corridors in the Rolling Plains because these are the places where large trees are mostly found in that ecoregion. Rio Grande wild turkeys are gregarious and sometimes

Table 5. Important food items used by Rio Grande turkeys in the South Texas Plains.

green matter	lime prickly ash
paspalum	groundsel
animal matter	crabgrass
signalgrass	granjeno
bristlegrass	condalia
lantana	palafoxia
windmillgrass	coreopsis
wild tobacco	beggar-tick
panicgrass	polytaenia
flat sedge	pinnate tansy mustard
croton	smallflower corydalis
oak acorns	Texas virgin's bower
honey mesquite	yellow wood sorrel
false dandelion	buffelgrass
euphorb	Texas grass
ground-cherry	dropseed
milk pea	sida
pricklypear	stiffstem flax
hackberry	grape



Figure 15. Tall grasses like bluestem provide concealment for nesting Rio Grande wild turkeys.

nomadic, having separate summer and winter ranges. They are known to gather into large flocks of several hundred birds in the winter. In the Rolling Plains, turkey numbers at traditional roost sites peak in late January and February. The large trees and wary birds in the flock provide security for the turkeys during the winter roosting period. Roost trees usually produce mast, an important food source for turkeys. For roosting cover, they tend to seek large trees (40 feet tall) with broad canopies and many horizontal limbs, such as



Figure 16. Overflow from windmills is an important manmade water source for Rio Grande wild turkeys.

live oak, hackberry, pecan, elm and cottonwood. Gobblers may use winter roosts throughout the year, whereas hens disperse in search of nesting cover and brood-rearing locations in the spring and summer. Nesting hens and those with young poults roost on the ground. Otherwise, hens roost singly or in small groups in trees. For additional information, see the management section that follows.

One study in the Edwards Plateau reported that as females left winter roost sites, they selected nest sites near roadways. It was suspected that the grass cover in these areas provided better concealment than adjacent areas that were overgrazed. Eighty-seven percent of nests were placed in grasses 18 inches high (Fig. 15) and most were within $\frac{1}{4}$ mile of a water source. Researchers in the Rolling Plains also found that hens were attracted to areas near roads during the summer. Another study in the Rolling Plains indicated that ground level vegetative structure

was a key factor for poult survival. This study found that low-growing shrubs provided escape cover for preflight poults but that after about 10 days, when poults had gained flight feathers, they relied less on ground cover for protection from predators and used other kinds of habitat.

Water

Wild turkeys obtain water in three forms—free water, metabolic water and performed water. Free water (drinking water) is surface water taken from ponds, creeks, water troughs and similar sources (Fig. 16). Metabolic water is derived when foods are broken down (digested) into their chemical components. Performed water is liquid that is bound within the food itself (e.g., succulent leaves). Turkeys will drink from standing water sources, but hens and poults that are feeding on succulent plants and insects may derive adequate water from food items.

Management Considerations

Grazing

The quality of rangeland can be degraded by domestic and wild herbivores when their numbers are not managed carefully. Much of western Texas has a long history of overgrazing and heavy browsing from cattle, sheep and goats, and some pastures still show signs of overuse (Fig. 17). Land that was once described as prairie is now described as scrubland because of the combined effect of prolonged drought, fire suppression and overgrazing. The increasing number of white-tailed deer and exotic herbivores makes the problem worse.

Although the effect of wild herbivores on turkey populations is not well understood, the effect

of cattle grazing has been studied. Studies indicate that turkey nests can be trampled by domestic livestock. Using artificial nests in controlled experiments, similar rates of loss were detected under continual (19.6 acres per steer) and short-duration grazing (13 acres per steer) systems. It is likely that excessive grazing also increases the depredation of turkey nests.

Continuous grazing had more effect on nest predation than a four-pasture, deferred rotation system with either high or low intensity. Researchers in the Rolling Plains found that nesting hens avoided grazed pastures and selected ungrazed pastures, but that males did not show a preference. Studies showed that high livestock numbers negatively affected food sources, particularly the mast-producing plants that are important in the diets of Rio Grande wild turkey. For this reason, low to moderate stocking rates would be wise when trying to increase turkey numbers.

Roosts

Roosts are essential to wild turkey survival, especially outside the breeding season. Rio Grande wild turkeys are nomadic and often have separate summer and winter roosting areas. High-quality roost sites, combined with large flock size, give protection from predators (Fig. 18). Also, roost trees often produce mast, an essential food for turkeys in the fall and winter. Roosts sites are fairly plentiful, but may be declining in some ecoregions. Roosts are typically found in hardwood trees along riparian corridors in many regions of Texas, but in some parts of the South Texas Plains turkeys often use artificial roosts.

To protect turkey roosting sites, do not clear mature hardwoods and keep activity around them to a minimum. The seeds from understory brush are deposited in bird droppings and as these plants mature they may provide



Figure 17. Overgrazing and overbrowsing of livestock and wild herbivores can adversely affect the food sources and nesting cover of Rio Grande wild turkey.



Figure 18. When available, Rio Grande wild turkeys roost during the night in large, hardwood trees.



Figure 19. When natural roost sites are scarce, as in the South Texas Plains, turkeys will use artificial roosts like this converted windmill stand with horizontal poles.



Figure 20. Mechanical treatments are often used to reduce brush cover and structure. Mechanical methods kill the tops of plants, but many brush species vigorously re-sprout from the roots. Prescribed burning or spot treatments with herbicide can lengthen the life of the original treatment.



Figure 21. Shallow disking—breaking the soil 2 to 4 inches deep—promotes the germination of adapted forbs and grasses that provide forage for wild turkeys. Here, the natural seed bank yielded a stand largely composed of dove weed.

ambush sites for predators. Work in the Rolling Plains has shown that turkeys prefer to roost where there is an open understory. Invasive brush should be removed mechanically or by using herbicides in individual plant treatments. This is usually done

on traditional winter roost sites while turkeys are not using the location, because roosting turkeys should not be disturbed. Ground-applied herbicides containing tebuthiuron or hexazinone should not be used because they will kill live oak

trees, thus destroying the roost site (see Texas Cooperative Extension publication B-1466, “Chemical Weed and Brush Control Suggestions for Rangeland,” for herbicide recommendations).

In the South Texas Plains and the Rolling Plains, where there may not be enough suitable roosts, turkeys sometimes use power poles as roost sites. Birds in southern Texas often use live oak mottes as roosting habitat and as a food source. Birds may also use mottes for shade during the summer to assist with thermoregulation. When natural roosts do not exist, artificial sites can be built by setting horizontal boards between two poles approximately 20 feet off the ground, leaving 3 feet between the boards (Fig. 19). The efficacy of artificial roosts is being tested in the South Texas Plains.

Brush

The encroachment of woody species on prairies in western Texas probably aided the distribution of Rio Grande wild turkeys over the last 200 years. High-quality habitat should have very diverse plant species, including woody plants, grasses and forbs. Land dominated by dense stands of juniper or mesquite are of less value to wild turkeys. Finding a balance in plant composition, using habitat management techniques, is one goal of good land stewards.

It is unlikely that land managers can eradicate all brush and this mindset should be avoided, as many species vigorously re-sprout from roots. Texas Cooperative Extension’s range scientists advocate tactical brush treatment systems (TBTS). Under this strategy, individual herbicide treatments target lesser-valued brush species. The most recent herbicide application recommendations can be found in the Texas Cooperative Extension publication B-1466A, “Chemical Weed

and Brush Control Suggestions for Rangeland—2007 Update.”

Land managers are faced with the question of how much brush should be removed (Fig. 20). The exact amount will depend on the site, but biologists recommend that no more than 50 percent be removed. Different brush species have varying degrees of value to turkeys and other wildlife. For more information see Texas Cooperative Extension publication L-5332, “Woody Plants and Wildlife: Brush Sculpting in South Texas and the Edwards Plateau.” When considering brush management options, leave mast-producing trees and shrubs and suitable roost trees. Avoid clearing large blocks and leave mottes to connect fragmented habitat.

Water development

Wildlife managers should strive to increase the useable space of the property. Increasing the availability of water is an important way to do that. If there are too few water sources, water collection devices such as guzzlers can be constructed and deployed to alleviate the problem. Detailed plans and suggestions for placement are available in Texas Cooperative Extension publication B-6182, “Harvesting Rainwater for Wildlife.”

Farming practices, cultivated food plots and soil disturbance

Clearing in the bottomlands of rivers and streams has been reported to be a major reason for the decline of Rio Grande wild turkeys in Mexico. Although it is easy to recognize that large-scale land alterations can reduce wild turkey numbers, farming on smaller acreages may add value to turkey habitat. Turkeys use a wide variety of plants, including cultivated grain crops.

Although natural areas sustain turkey populations, the cultivation of small-scale food plots can be

beneficial because it creates diversity and alternative food sources in the landscape. However, there are no studies indicating that food plots or supplemental feeding increase turkey production or survival. Before implementing this practice, land managers should consider the costs associated with farming, food plot preparation, or supplemental feeding. There may not be adequate rainfall to sustain plants that are not adapted to the area. If plots can be irrigated, plants to consider for warm-season food plots include lablab, soy beans, cowpeas and milo; for cold-season plantings, consider white clover, hairy vetch and wheat. These plants were evaluated as deer forage, but they should do well for Rio Grande wild turkeys as well. Recommendations for planting times, seed depth, and seed-bed preparation can be found in Wildlife Management Bulletin No. 3 published by the Caesar Kleberg Wildlife Research Institution.

One simple way to promote the germination of beneficial forbs that are adapted to local weather is to use a technique called shallow disking (Fig. 21). In areas with suitable soil depth, the ground is lightly disked, breaking the surface 2 to 4 inches deep. This is usually done from January to March. Disked strips should be near cover and should be long and narrow (length varies by site; about 100 yards by 20 feet wide). Strips should be refreshed every other year. A side benefit to this technique is that strips can double for fire breaks when prescribed burning is used.

Prescribed burning

Rio Grande wild turkeys can benefit from prescribed burning. Burning is best done in the fall and winter. If done in the spring or early summer it would destroy nests and kill poults. Because turkey hens seek nesting areas that have fine fuels, it is best to hold off summer burning until

poults have gained flight feathers. Adult birds can move away from oncoming fire easily. Winter burning stimulates forbs, which produce important hard-coated seeds and green foliage. Winter burning also can be beneficial for invertebrates (grasshoppers, beetles and spiders), another important food source for turkeys, especially poults.

It is important to show locations of prescribed fires on a detailed map so that good records can be kept. This is also useful when planning future burns. Extremely hot and intense fires should not be conducted under roost trees, as the risk of killing high-quality hardwoods is too high. When planning prescribed fires, it is a good idea to create a patchwork of burned and unburned areas as this will leave some escape and nesting cover untouched. Often managers use the technique of back burning, by allowing the flames to move against the wind. This keeps the fire less intense and allows it to creep along, leaving a mixture of burned and unburned areas. Of course, back burning must meet your goals, such as promoting forb growth. If the objective is to decrease brush and open up rank grass for brooding areas, then more frequent and more intense burns are required. Using head fires or burning with the wind will achieve these conditions. Prescribed burning takes practice, the right equipment, and favorable weather conditions to do correctly.

In many Texas counties, prescribed burning associations are growing more popular as landowners recognize that burning rangeland helps reduce brush, release nutrients into the soil, and promote the seed germination of forbs and grasses. By working cooperatively, landowners gain valuable field experience and learn more about using prescribed fire as a habitat management tool. More information on prescribed burning

can be found in Texas Cooperative Extension publication SP-248, "Fire as a Tool for Managing Wildlife Habitat."

Predator management

The effectiveness of removing predators to enhance populations of game species has long been a controversial subject. Wildlife managers look for correlations between predator and prey populations. It could be reasoned that low harvest of predators would allow them to flourish and cause populations of Rio Grande wild turkeys to decline. Managers might jump to the conclusion that predators are having the greatest effect on turkey populations when, in fact, predators are only one of many factors that limit turkey populations, and many of these factors work in conjunction with each other. Population declines could be attributed to low rainfall, overgrazing, disease, or changes in agricultural practices.

For example, the intensive control of raccoons and foxes might increase the survival of nests but have no effect on poult survival because of predation by hawks (which can not be killed legally). In this case there would be no benefit to the turkey population. Removing predators such as coyotes and foxes might create an overpopulation of herbivores such as rabbits, which would further exacerbate overgrazing problems and leave turkey nests and poults more vulnerable to remaining predators.

Studies evaluating the effect of intensive predator control on upland game birds have produced conflicting results, making it difficult for managers to decide on a plan. Landowners and managers have to ask themselves if the benefit is worth the cost. Costs of personnel, fuel and supplies are increasing to the point that one must consider

whether funds could be spent in a wiser way. For instance, developing high-quality nesting habitat, through habitat management, might increase the number of turkeys by giving them better concealment. And habitat improvement might have a longer lasting effect than predator management. Some researchers believe that intensive predator removal could create a vacuum that would be quickly filled by predators moving in from surrounding areas. Predator management done over large areas, cooperatively with neighbors, seems like a better strategy than operating alone. Wildlife cooperatives or associations are gaining in popularity; they help landowners coordinate predator management and other wildlife management activities. Approaches to an integrated pest management strategy for predators are described in Texas Cooperative Extension publication B-6146, "Predator Control as a Tool in Wildlife Management." Most predator management measures will likely have negligible results at an individual ranch level unless they are highly intensive and conducted continuously.

Summary

Rio Grande wild turkeys are widely distributed across Texas so there is no one-size-fits-all management strategy for this species. It is important to understand how turkey life history directly influences potential management actions. With this knowledge, managers can focus on implementing sound wildlife management plans. For example, food availability is often one of the first items addressed by land managers, when most ranges do not have limited food resources and need better nesting and brooding habitat instead. With a 60 to 75 percent nest failure rate and a poult survival rate of just 12 to 50 percent,

it is easy to see that understanding turkey reproduction and recruitment are critical to maintaining healthy populations.

Clearly, the goal of habitat management should be to improve nesting sites, brooding areas and roosting locations. Habitat management techniques must be adapted to fit the ecosystem in which they are implemented, as differences in climatic conditions, soils and vegetation communities will affect their success.

All managers should strive to increase the amount of useable space on their properties. This means increasing the diversity, structure and arrangement of plants to develop

sources of food, water, shelter and space. Shallow disking is a simple way to get started and it promotes plants already conditioned to grow in local areas. Water deficiencies can be addressed by deploying water guzzlers in areas devoid of water sources, thus increasing the use of those areas. On properties choked with brush, tactical brush treatment systems will allow managers to reduce brush species with little value to turkeys and retain those with higher value, like mast-producing species. On open range, it may be necessary to connect habitat blocks by keeping brush in certain areas to form travel corridors. Prescribed burning is a tool that can reduce brush and rejuvenate rangelands.

In some cases, vegetation for turkeys can be enhanced with slight adjustments in plans geared toward livestock management. Examples include using rotational grazing rather than continuous grazing, or adjusting the deferment time of a pasture to coincide with the turkey nesting season. Managing habitat will lead to better turkey production than will predator management alone. If predator removal is part of a plan, it should be intensified from January to March just before the nesting season. By developing a well-defined wildlife management plan and a monitoring system to gauge results, hunters and land managers can have a positive effect on Rio Grande wild turkey populations across Texas.



References

- Baker, B.W. 1978. Ecological factors affecting wild turkey nest predation on south Texas rangelands. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 32:126–136.
- Bareiss, L.J., P. Schulz and F.S. Guthery. 1986. Effects of short-duration and continuous grazing on bobwhite and wild turkey nesting. *Journal of Range Management* 39:259–260.
- Beasom, S.L. 1973. Ecological factors affecting wild turkey reproductive success in south Texas. *Dissertation*, Texas A&M University, College Station, Texas.
- Beasom, S.L. and D. Wilson. 1992. Rio Grande turkey. Pages 306–330 in J.G. Dickson, editor. *The wild turkey: biology and management*. Stackpole Books: Harrisburg, Pennsylvania.
- Beck, J.R. and D.O. Beck. 1955. A method for nutritional evaluation of wildlife foods. *Journal of Wildlife Management* 19:198–205
- Blakely, H.L. 1944. Welfare of the wild turkey closely associated with range management. Agricultural Experiment Station Program Report 894, College Station, Texas.
- Brunjes, J.H., IV. 2005. The population biology and landscape ecology of Rio Grande wild turkeys in the rolling plains of Texas and Kansas. *Dissertation*, Texas Tech University, Lubbock, Texas.
- Butler, M.J., M.C. Wallace, W.B. Ballard, S.J. DeMaso and R.D. Applegate. 2005. From the field: the relationship of Rio Grande wild turkey distributions to roads. *Wildlife Society Bulletin* 33: 745–748.
- Cathey, J.C., R.A. Persyn, D.O. Porter and M.C. Dozier. 2006. “Harvesting Rainwater for Wildlife.” Publication B-6182, Texas Cooperative Extension.
- Collier, B.A., D.A. Jones, J.N. Schaap, C.J. Randel, III, B.J. Willsey, R. Aguirre, T.W. Schwertner, Nova J. Silvy and M. J. Peterson. 2007. Survival of Rio Grande wild turkeys on the Edwards Plateau of Texas. *Journal of Wildlife Management* 71:82–86.
- Cook, R.L. 1972. A study of nesting turkeys in the Edwards Plateau of Texas. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 26:236–244
- Davis, M. 2006. “Poultry Disease Manual.” Publication B-1031, Texas Cooperative Extension.
- Exum, J.H., J.A. McGlincy, D.W. Speake, J.L. Buckner and F.M. Stanley. 1985. Evidence against dependence upon surface water by turkey hens and poults in southern Alabama. Proceedings of the National Wild Turkey Symposium 5:83–89.
- Fulbright, T.E. 1999. Food Plots for white-tailed deer. Caesar Kleberg Wildlife Research Institution Wildlife Management Bulletin No. 3.
- Glazner, W.C. 1945. Management of turkeys in lower south Texas. U.S. Department of the Interior, Fish and Wildlife Service, Pittman-Robertson Quarterly Report 5:158–160.
- Hall, G.I. 2005. Relationships between cattle grazing and Rio Grande wild turkeys in the Southern Great Plains. *Thesis*, Texas Tech University, Lubbock, Texas.
- Hernandez, F. 2001. Predator control and upland gamebirds in south Texas. Proceedings of the roll of predator control as a tool in game management. pp. 120–131.
- Hohensee, S.D. and M.C. Wallace. 2001. Nesting and survival of Rio Grande turkeys in north central Texas. National Wild Turkey Symposium Proceedings 8:85–91.
- Holdstock, D.P., M.C. Wallace, W.B. Ballard, J.H. Brunjes, R.S. Phillips, B.L. Spears, S.J. DeMaso, J.D. Jernigan, R.D. Applegate and P.S. Gipson. 2006. Male Rio Grande turkey survival and movements in the Texas Panhandle and Southwestern Kansas. *Journal of Wildlife Management* 70:904–913.
- Houchin, R.L. 2005. Coyote predation on the Rio Grande wild turkey in the Texas Panhandle and southwestern Kansas. *Thesis*, Texas Tech University, Lubbock, Texas.
- Huffman, R.T. 2005. The effect of precipitation and cover on Rio Grande wild turkey nesting ecology in the Texas Panhandle and southwestern Kansas. *Thesis*, Texas Tech University, Lubbock, Texas.
- Huffman, R.T., M.C. Wallace, W.B. Ballard, G. Hall, R. Houchin, R. Applegate, S.J. DeMaso and P.S. Gipson. 2006. Nesting habitat of Rio Grande wild turkeys. Pages 103–111 in J. W. Cain III and P.R. Krausman, editors. *Managing wildlife in the southwest: new challenges for the 21st century*. The Southwest Section of The Wildlife Society, August 2005, Alpine, Texas.
- Koerth, B.H., W.M. Webb, F.C. Bryant and F.S. Guthrey. 1983. Cattle trampling of simulated ground nests under short duration and continuous grazing. *Journal of Range Management* 36:385–386.

- Korschgen, L.J. 1967. Feeding habits and food. Pages 137-198 in O.H. Hewitt, editor. *The wild turkey and its management*. The Wildlife Society: Washington, DC.
- Leopold, A.S. 1948. The wild turkeys of Mexico. *Transactions of the North American Wildlife Conference* 12:393-401.
- Leopold, A.S. 1959. *Wildlife of Mexico. The game birds and mammals*. University of California Press: Berkeley, California.
- Litton, G.W. 1977. Food habits of the Rio Grande turkey in the Permian Basin of Texas. Austin: Texas Parks and Wildlife Department Technical Series No. 18.
- Lyons R.K., T.F. Ginnet and R.B. Taylor. 1999. "Woody Plants and Wildlife: Brush Sculpting in South Texas and the Edwards Plateau." Publication L-5332, Texas Cooperative Extension.
- McGinty, A. 2007. "Chemical Weed and Brush Control Suggestions for Rangeland-2007 Update." Publication B-1466A, Texas Cooperative Extension.
- Mosby, H.S. and C.O. Handley. 1943. *The wild turkey in Virginia: its status, life history and management*. Richmond: Virginia Division of Game, Commission of Game and Inland Fisheries. P-R Projects.
- National Wild Turkey Federation. All About Turkeys. http://www.nwtf.org/all_about_turkeys/history_rio_grande_wild_turkey.html
- Pattee. O.H. 1977. Effects of nutrition on wild turkey reproduction in south Texas. *Dissertation*, Texas A&M University, College Station, Texas.
- Phillips, R.S. 2004. Movements, survival, and reproduction of Rio Grande wild turkeys in the Texas Panhandle. *Thesis*, Texas Tech University, Lubbock, Texas.
- Quinton, D.A., A.K. Monte and J.T. Flinders. 1980. Brush control and Rio Grande turkeys in north-central Texas. *Journal of Range Management* 33:95-99.
- Randel, C.J., III. 2003. Influences of vegetation characteristics and invertebrate abundance on Rio Grande wild turkey populations, Edwards Plateau, Texas. *Thesis*, Texas A&M University, College Station, Texas.
- Ransom, D., Jr., O.J. Rongstad and D.H. Rusch. 1987. Nesting ecology of Rio Grande turkeys. *Journal of Wildlife Management* 51:435-439.
- Reagan, J.M. and K.D. Morgan. 1980. Reproductive potential of Rio Grande turkey hens in Edwards Plateau of Texas. *Proceedings of the National Wild Turkey Symposium* 4:136-144.
- Rollins, D. 2004. "Predator Control as a Tool in Wildlife Management." Publication B-6146, Texas Cooperative Extension.
- Rollins, D. 2005. "Fire as a Tool for Managing Wildlife Habitat." Publication SP-248, Texas Cooperative Extension.
- Suarez, R. 2002. Texas turkey talk. Texas Parks and Wildlife Department. TPWD BK W7000-0827 Austin, Texas.
- Schwertner, T.W. 2005. A simulation model of Rio Grande wild turkey population dynamics in the Edwards Plateau of Texas. *Dissertation*, Texas A&M University, College Station, Texas.
- Spears, B.L., W.B. Ballard, M.C. Wallace and R.D. Applegate. 2003. Coyote, *Canis latrans* - Rio Grande turkey, *Meleagris gallopavo intermedia*, interactions. *The Canadian Field-Naturalist* 117:645-647.
- Spears, B.L., W.B. Ballard, M.C. Wallace, R.S. Phillips, D.P. Holdstock, J.H. Brunjes, R.D. Applegate, M.S. Miller and P.S. Gipson. 2005. Survival of Rio Grande wild turkey chicks. *Journal of Field Ornithology* 76:12-20.
- Spears, B.L., M.C. Wallace, W.B. Ballard, R.S. Phillips, D.P. Holdstock, J.H. Brunjes, R. Applegate, M.S. Miller and P. S. Gipson. 2007. Habitat use and survival of preflight wild turkey broods. *Journal of Wildlife Management* 71:69-81.
- Swearingin, R.M. 2007. Winter roosting ecology of Rio Grande wild turkeys in the Rolling Plains of Texas. *Thesis*, Texas Tech University, Lubbock, Texas.
- Williams, L.E., Jr. and D.H. Austin. 1988. *Studies of the wild turkey in Florida*. Gainesville: Florida Game and Freshwater Fish Commission. Technical Bulletin 10.
- Williams, L.E., Jr. 1981. *The book of the wild turkey*. Winchester Press.
- Willsey, B.J. 2003. Survival and mammalian predation of Rio Grande turkeys on the Edwards Plateau, Texas. *Thesis*, Texas A&M University, College Station, Texas.

Glossary of Terms

corridor – a narrow strip or land path used by animals to travel across open landscape

brood – the young of a family group, including the female and poults

brooding – the act of caring for young

ecoregion – a unit of land having similar soil types, climatic conditions, and communities of plants and animals

gobbler – a mature adult male turkey

depredate – to plunder or ransack

hen – a female bird

juvenile – a young turkey less than 1 year old

lesion – an open injury to the body or organs, usually well-defined in a circular pattern similar to a blister

maximum sustained yield – the maximum number of animals or plants that can be harvested without harming the population's ability to rebound the next season

natal down – the soft, fluffy, underdeveloped feathers of newly hatched birds

poult – a young turkey of either sex

production – output of reproductive effort, as in the number of eggs or poults created

recruitment – the process of adding new individuals to the population, as in growth by reproduction

roost – a support or perch on which birds rest for the night

spur – a stiff projection on the legs of turkeys, much more elongated and pronounced in males

tom – a male turkey

yearling – a turkey between 1 and 2 years old





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