



GUIDELINES FOR BOBWHITE HABITAT MANAGEMENT IN THE CROSS TIMBERS AND PRAIRIES REGION OF NORTH TEXAS

by

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Bobwhite habitat in the Cross Timbers and Prairies Ecological Region of north-central Texas varies considerable in quantity and quality throughout the region due to differences in geology and soil types, the diversity of plant species on the landscape, and the accumulative influences of land-use practices by man. The term “prairies” is somewhat of a misnomer considering the drastic change that has taken place in this region of Texas. The elimination of fire and overgrazing by livestock has transformed much of the historic prairie areas into scattered brushlands with infestations of mesquite, juniper, and other native woody species. In many areas, native grasses have been replaced by introduced species such as coastal bermudagrass to provide forage and permit higher stocking rates for livestock. Considerable acreage throughout the region that once supported populations of bobwhites no longer provides their necessary habitat types or cover needs. As landownership size decreases and land use changes, habitat for bobwhites is often directly impacted. Many of the basic components of good bobwhite habitat become fragmented, depleted, or otherwise altered. Large tracts of continuous habitat that are required to sustain populations of bobwhites are becoming few and far between.

Natural and man-made influences have and always will have dramatic affects on populations of bobwhites in this part of Texas. Annual reproduction is most influenced by rainfall and temperature patterns. North-central Texas is well known for periodic drought, record breaking high temperatures during the summer months, and occasional extremely cold winters. The intensive application of proven land management practices known to improve habitat for bobwhites may ultimately fail if extreme climatic conditions occur that limit reproductive success or survival. In addition, these extremes have a broader overall affect on growth of herbaceous vegetation that provides food and cover required for bobwhites survival. Bobwhites have to compete here in the Cross Timbers and Prairies Region for a “place at the landscape table” with other wildlife and man and his land uses.

The East Cross Timbers Sub-region, a narrow band of timbered country running from near Waco northward into Oklahoma, contains stands of post oak, blackjack oak, and other native tree species in many areas that do not provide ideal habitat for producing high populations of bobwhites. Habitat fragmentation brought about by changing land uses, urban and rural developments, and an expanding human population in this region

has diminished sizeable blocks of habitat for bobwhites. However, agricultural operations and land-use practices that create and maintain openings for livestock grazing or croplands can, with proper management, also provide habitat for bobwhite quail. Sandy soils throughout this sub-region offer the opportunity for landowners to sustain and manage habitat for bobwhites with soil manipulations to produce native foods and seed sources.

Bobwhite habitat is also found in the Fort Worth Prairie and Lampasas Cut Plain Sub-regions which are located in a broad zone between the East and West Cross Timbers and north of the Texas Hill Country. In this region, clay and clay-loam soils produce grasslands that are often invaded by species such as mesquite, Ashe juniper, and other native woody species. Landownership size is relatively large in this sub-region and with proper livestock grazing management and agricultural practices, good populations of bobwhites can be sustained during most years. Other areas remain relatively free of woody plants due to shallow soils and the geologic substrates. In some areas here, habitat for bobwhites is often limited and restricted to property borders, fence rows, and riparian zones along streams. Development and maintenance of cover is critical in this region.

The West Cross Timbers Sub-region, located in the western portion of the region, contains a variety of habitat types for producing and sustaining populations of bobwhites. Woody species such as plum, elbowbush, lotebush, agarita, tasajillo, catclaw, and sumac provides important escape cover and seasonal food sources for them. Manipulation of livestock through rotation grazing systems and prescribed burning programs can help landowners sustain significant quality habitat for bobwhites in this portion of the Cross Timbers and Prairies.

What Does Bobwhite Habitat Look Like? Habitat for bobwhites, as with other wildlife species, is not a separate entity on the landscape, rather a product of the overall complex ecological networks and interactions of plants, soil, air, water, and land-use by man. Habitat is simply described as the place where an animal lives. In the case of bobwhites, they have specific habitat requirements that are necessary for reproduction and survival. Habitat for bobwhites in East Texas may look markedly different from that found in South or West Texas, but the basic habitat requirements are the same. In the Cross Timbers and Prairies, habitat types vary between and within the sub-regions and are determined by the existing plant communities, soils, topography, and current land use. Habitat types include those found in association with post oak-blackjack oak woodlands and associated openings, open rangelands with scattered brush, agricultural lands with field borders, and riparian zones along streams and drainages.

The configuration of herbaceous and woody vegetation on the landscape throughout the year is of primary importance to bobwhites. The habitability of a given piece of land is dependent on its ability to provide food and cover throughout the year to meet the nutritional and reproductive needs of individuals and coveys of bobwhites. Bobwhites occur in populations and are a density dependant species requiring large contiguous tracts of habitat and interaction of numerous individuals and coveys to support sustainable

annual populations. Landowners trying to managing habitat for bobwhites on small acreages with small “islands” of habitat may be unsuccessful unless adjoining landowners are also actively managing similar habitat.

The following terms are descriptive of bobwhite habitat in the Cross Timbers and Prairies as they relate to the basic requirements for survival and reproduction: **interspersion, plant diversity, plant succession, edge effect, limiting factors, and cover**. Cover types can be further defined as **nesting, roosting, loafing, escape, screening, and brood – rearing cover**.

Interspersion refers to a mixture or “patchwork” of habitat and cover types, all in close proximity to each other and connected by travel lanes with overhead screening cover. The degree of interspersion of habitat types on a given piece of land has a direct affect on its carrying capacity for bobwhites. Some habitats may have abundant food sources but lack adequate cover for bobwhites to escape predators; other habitat may have plenty of cover but limited foods; or food and escape cover may be available but found in scattered locations that require bobwhites to be exposed during travel due to the lack of overhead screening cover. Large blocks of open native grasslands, cleared and improved pastures, intensively farmed fields, and dense oak woodlands in the Cross Timbers and Prairies often lack *interspersion*.

Plant diversity is essential to good bobwhite habit. Habitats containing only a few plant species have a low carrying capacity for bobwhites. Good bobwhite habitat has a variety of different plants. Look for a combination of annual and perennial forbs (weeds) and grasses, low-growing vines and shrubs, tall native grasses and woody plants all within a short distance. Some plants produce seeds at different times of the year; others may become dormant and loose their leaves and provide limited cover during certain months of the year. Seeds produced by some plants last a long time and others deteriorate quickly. Monocultures of native or improved grasses are poor habitat for bobwhite quail in the Cross Timbers and Prairies. Insects, which are an important dietary component for bobwhites, are more abundant where plant diversity exists.

Natural **plant succession** is the process of one group of plants replacing another. Plant life on undisturbed land is referred to as a climax community and consist of plants that have evolved and adapted to the soil, animal, and climatic influences for the area. When climax vegetation is removed or disturbed by natural or man-made disturbances, annual weed and grass species will pioneer the site and over time be replaced by perennial grass and forb species or in some cases woody plants. Reversing the invasion of woody plants such as mesquite or juniper may require considerable effort and be at considerable economic expense. Without a long term management strategy, reinvasion will likely occur. Plants not native to the site may also become established and dominant. Bobwhites benefit from early to mid-succession stages of plant succession. Climax plant communities in the Cross Timbers and Prairies Region include tall and mid-grass native prairies, oak woodlands, open savannahs, and bottomland hardwoods along riparian zones.

Today, most native plant communities found in the Cross Timbers and Prairies have been altered due the accumulative influences of land-use practices of man and the elimination of naturally occurring fire. In many areas, habitat for bobwhites has been enhanced as seed producing annual weeds and cool season grasses have replaced native grasses species and brush has encroached into open grasslands or savannahs to provide escape cover. On the other hand, the density and overstory canopy of oaks and other woody tree species have increased in woodlands of the East and West Cross Timbers. Overgrazing of native gasses by livestock has resulted in fewer natural openings and an increase in tree and brush density. Large acreages of improved grasses have been planted that provide poor habitat for bobwhites. Land use practices that result in periodic soil disturbances or the manipulation of woody plant communities often benefit bobwhite quail in the Cross Timbers and Prairies Region.

Edge effect is a term for the transition zone between two different vegetative types. Bobwhites are frequently found along the edge of woody or brushy areas where they border more open grassy or weedy areas. The “edge” provides a secure area for feeding and travel between the two habitat types and an avenue for escape from predators. Here they can feed on seeds, insects or greens and still return to cover quickly if danger approaches from above or on the ground. The quality of bobwhite habitat can largely be determined by the amount of “edge effect” a given piece of land provides. Habitat management efforts are often directed toward increasing the amount of edge or disturbing soil along edges to increase weed seed production.

Limiting factors are the “weak links” of wildlife and wildlife habitat that exert significant negative influences on survival and reproduction. Identifying critical limiting factors will help determine the appropriate strategy for bobwhite habitat improvement and management. Examples of limiting factors for bobwhites and their habitat in the Cross Timbers are: 1) lack of perennial native bunchgrasses such a little bluestem for preferred nesting sites, 2) monocultures of introduced forage grasses that do not provide escape cover, nesting habitat, or food sources, 3) dense stands of post oak, juniper or other woody species with limited openings for growth of grasses and forbs, 4) reduced overhead screening cover for travel in areas overgrazed by livestock, 5) extreme high temperatures during the critical nesting period, 6) prolonged periods of drought, and 7) loss of habitat due to brush removal by herbicides, mechanical clearing or overgrazing.

What Types of Cover Do Bobwhites Require? Bobwhites require several types of cover for survival and reproduction. Cover must be available throughout the year to provide places for nesting, feeding, roosting, escaping from predators, and for protecting broods.

Nesting cover – Bobwhites in the Cross Timbers and Prairies prefer to build their ground nests in clumps of warm season perennial grasses such as little bluestem, sideoats grama, and Indiangrass, although other types of vegetation may also be used. Perennial grasses that have not been overgrazed during the previous fall and winter provide overhead

residual screening cover which helps reduce detection of nests by aerial predators. Bobwhites often avoid dense grassy or heavy thatched areas for nest building, preferring some bare ground to facilitate movement. Clumps of pricklypear with enclosed perennial bunchgrasses may also be used in some areas.

Roosting cover – Open areas containing growths of relatively short grass or other vegetation and limited overhead obstacles are preferred for roosting. Bobwhites roost in circular groups with heads pointed outward to allow flushing in the dark to escape predators and prevent collisions with each other. Roosting areas can often be identified by locating their small piles of droppings.

Loafing cover – Following the morning feeding period, bobwhites spend the middle of the day “loafing” within cover of sufficient density to prevent detection or penetration by predators. During this period of relative inactivity, they may dust, preen, and restrict movements for an extended period of time. Examples of loafing cover types use by bobwhites in the Cross Timbers and Prairies include plum thickets, clusters of grape vines, patches of greenbriar, sumac motts, or any dense cluster of woody or weedy vegetation adjacent to or within openings which allow escape by flight or running. These areas are also important to provide protection from wind, heat, or cold, depending on the season.

Escape cover - Bobwhites must have areas of dense vegetation with an overhead canopy within a short flying distance to escape predators, both aerial and ground varieties. Thickets of low brush and vines, dense post oak woodlands, mesquite and pricklypear flats, creek bottoms, ravines, brush piles, tree-lined field borders, or other dense vegetation areas with grassy or weedy patches are often used by bobwhites in the Cross Timbers and Prairies. Escape cover becomes increasingly important during the winter months in north Texas as most woody species are deciduous and provide less escape cover than during other times of the year. These areas also provide thermal protection from icy winds and periods of freezing precipitation. Some of the woody species that provide important escape cover for bobwhites in the Cross Timbers and Prairies are lotebush, elbowbush, sand plum, agarito, live oak and other oak species, juniper, lime pricklyash, and skunkbush sumac.

Screening cover – Bobwhites may become exposed to aerial predators without sufficient overhead screening cover, particularly if the habitat is fragmented and not connected by travel lanes of good cover. Screening cover provides security for movement during feeding periods by coveys, individual quail during the breeding season, and movement of chicks following hatching. Growths of a wide variety of annual and perennial weeds, low brush, and other herbaceous vegetation are used by bobwhites as screening cover including sunflowers, ragweed species, broomweed, and tall grasses that often grow along weedy fence lines, field borders, and cropland edges.

Brood-rearing cover – Brood-rearing cover includes areas of herbaceous vegetation that provided security for young quail as they move about during their early growth stages.

Young bobwhites are most vulnerable to predation during this period and require cover that provides concealment from aerial predators. Good bobwhite habitat should contain sufficient areas of grass, weed, or brush cover during the post nesting period of mid to late summer to improve survivability of young birds. These weedy and grassy areas also support insects and other invertebrates highly sought after by young bobwhites.

Habitat Management Practices for Bobwhites: Managing habitat for bobwhites in the Cross Timbers and Prairies Region of Texas can be a very challenging endeavor for most landowners. Habitat management practices are often thwarted by seasonal weather extremes which limit their success. Each parcel of land may have different potential for significant habitat improvement or carrying capacity for populations of bobwhites. In most cases, changes of current or historic land use practices will be required to make meaningful improvement in the quality of habitat. Making concessions to livestock or other agricultural operations may not be in the economic interest of many landowners. Long term planning to annually provide all components of quality bobwhite habitat, however, is fundamental to success. Getting Mother Nature to cooperate is something else. The old adage “If you build it they will come” is a philosophy landowners interested in propagation of bobwhite quail should consider and adhere to in the Cross Timbers and Prairies. It is also very important to have a working knowledge and understanding of the natural history and biology of this species prior to initiating a habitat improvement program.

The following habitat management practices are presented in general terms and are based on existing information and management practices developed and used throughout the range of bobwhites. There are others. Do not expect implementation of these habitat management practices to result in “overnight” populations of bobwhites. Implementation of some of these habitat management practices may be used to address deficiencies in habitat for bobwhites found here in the Cross Timbers and Prairies.

Fallow Disking - Soil disturbance by fallow disking during the winter months in the Cross Timbers and Prairies Region is the most cost efficient way to promote growth of annual native plants such as annual sunflowers, croton (dove weed), western and giant ragweed, broomweed, and a wide variety of other native plants. Plant growth stimulated by this technique will vary depending on the soil type, past land use, existing soil seed bank on the site, and timing of the operation. Disking should be done during the period from October to January and prior to spring green up. Best results can be expected on sandy or sandy loam soils. Be sure to check county soil maps and avoid tillage of soils subject to erosion or those located on steep sloping terrains. Soil should be disked 2-4 inches using a tandem or offset disk plow. Disking may be conducted in strips along brush lines, fence rows, or near dense vegetation. Other larger areas such as old field 1-5 acres in size may also be disked. Alternate plowing of disk strips from year to year may increase the variety of warm and cool season weeds produced. A disk strip 12 ft. wide and one mile long will cover approximately 1.45 acres. Twelve foot disked strips every 75 yards on a section of land (640 acres) results in a total of 32 disked acres (22 one mile

strips). Refer to “*Quail Management Handbook*” by A.S. Jackson (page 15-20), “*Beef, Brush and Bobwhites*” by Fred Guthrey (page 71-75), and “*Fallow Disking as a Management Tool for Wildlife*” by Danny Davis, TPWD, for more details on how to conduct follow disking.

Livestock Grazing Management – Likely the most significant opportunity landowners in the Cross Timbers and Prairies Region have to manage and improve habitat for bobwhites is through use of proper livestock grazing practices. Bobwhites are directly impacted by livestock grazing and their influence on herbaceous plants and grasses throughout the year. Landowners must make informed decisions on stocking rates, duration of stocking, seasons of use, rotation of livestock between pastures, how close pastures are grazed, and when to rest pastures. Livestock grazing practices that do not take into account the seasonal and year round habitat requirements for bobwhites for food and cover will result in lower carrying capacity potential. Pastures that are severely grazed during any period of the year will negatively impact bobwhites. Conversely, ungrazed lands with rank stands of tall grasses and thatching are not preferred by bobwhites except for use as escape cover. Since residual cover from perennial bunchgrasses serves as an important source of nesting cover, overgrazing during the fall and winter months should also be avoided.

High intensity-low frequency rotation grazing systems are more conducive to supporting bobwhites by helping to improve plant diversity and the weed-forb component in the plant community. Other rotation systems that provide periods of plant rest and recovery during different seasons of the year are also beneficial to bobwhites. Soil disturbance from grazing livestock also promotes growth of plants used by bobwhites for food and cover. During periods of drought, livestock numbers should be reduced early on to prevent degradation of vegetative resources used by bobwhites for food and cover. Bobwhites become increasingly exposed to predators due to lack of cover during periods of drought and survival going into the fall and winter is dependant on timely reductions of livestock grazing pressure.

Prescribed Fire – Fire is another land management tool landowners may use to manage or improve habitat for bobwhites in the Cross Timbers and Prairies Region. Prescribed fire should only be used under a predefined prescription that takes into account the amount and type of fuels to be burned, air temperature, relative humidity, and wind speed and direction. Although limited research has been conducted in this part of Texas, the fundamental principles of the use of fire to manage wildlife habitats may be applied.

Fire may be used to help control the spread or invasion of small woody plants into openings or grassland areas used by bobwhites for nesting, roosting, or escape cover. Growth of a wide variety of annual and perennial plants that provide food and cover for bobwhites are also stimulated by cool season prescribed fires that burn during late winter months. Dense stands of ungrazed or undergrazed perennial grasses with an accumulation of dead thatch also benefit from periodic burning that increases sunlight penetration to the ground to stimulate growth of plants. Not all areas should be burned at

the same time to maintain sufficient food and cover for bobwhites. Repeated burns may be applied at 2-3 year intervals depending on other land uses, fuels, and plant responses.

Agricultural Crops/Food Plots – Bobwhites benefit from many of the agricultural crops grown in portions of the Cross Timbers and Prairies Region where sufficient adjacent cover and travel lanes exist in close proximity to croplands. Although not planted specifically for bobwhites, seeds and fruits from milo, wheat, corn, peas, vegetables, peanuts, and other regionally grown crops are readily eaten when and where available. The seasonal home range of bobwhites changes throughout the year and may include these croplands where they generally feed along the edges or near cover. Waste grains that accumulate on the ground following crop harvest are also available to bobwhites but limited screening cover for feeding birds may increase aerial predation. Leaving unmowed or unharvested strips of grain crops along field borders or fence lines will provide food with screening cover. Planting large acreages to agricultural grain crop specifically for bobwhites is probably not cost effective. Remember, as you go west in the Cross Timbers and Prairies Region of north Texas, annual rainfall diminishes, making crop production an unreliable enterprise. Any plantings of annual agricultural crops as food plots for bobwhites should be in linear strips, located near edges or transition between cover types, and planted on soil types and locations capable of supporting good growth. Avoid planting on locations subject to erosion.

Native annual or perennial forb species may also be planted for use by bobwhites for food and cover. Native annual sunflowers are relatively easy to grow and do well on most sandy or loamy soils and are used by quail for food and cover. *Refer to “Sunflowers for Wildlife in the Cross Timbers” by Jim Dillard (TPWD) for additional information on growing native sunflower species.* Native perennial species such as Illinois bundleflower, partridge pea, Maximilian sunflower, and western ragweed are other choice plants used by bobwhites in the Cross Timbers and Prairies.

Mowing – Mowing during late winter months may be used to remove or reduce rank growths of perennial grasses, greenbriar, standing residual weedy patches, or other small woody plants invading openings. Reduced canopy of herbaceous vegetation will help this year’s plants to germinate and grow. If pastures are mowed for weed control, leave strips unmowed along borders, fence lines or around loafing cover areas. Be selective on locations to be mowed and leave sufficient food and cover acreage unmowed for wintering bobwhites.

Brush Management – Most large scale brush management operations in the Cross Timbers and Prairies are primarily directed toward increasing productivity for livestock grazing or reclaiming lands invaded and dominated by species such as pricklypear, mesquite, juniper or oak species. Post oak and blackjack oak woodland areas are also frequently cleared to plant improved forage grasses for cattle, goats, or horses or for other rural or urban land uses or developments. If brush management is being considered and maintaining or improving bobwhite habitat is an important objective, consider the habitat requirement for bobwhites prior to brush management operations and plan accordingly.

Consider the terrain to be managed, soil types, and diversity of species present. As many soil types found in the East and West Cross Timbers are highly erodible, check the county soils maps prior to any brush management involving extensive soil disturbance by heavy equipment. Develop a long range plan to maintain brush management practices because regrowth or invasion by unwanted species will likely continue to occur.

Leave sufficient woody vegetation in density, distribution, and configuration to accommodate bobwhites for use as cover throughout the year. The “50-50” rule for good woody cover for bobwhites is that they should never be more than 50 yards away from a clump of brush or other escape cover 50 feet in diameter. Different species are dominant throughout the region ranging from post oak and blackjack oaks in the eastern areas to mesquite and juniper in the west. Most woody species provide some degree of cover for bobwhites and it’s primarily a matter of working with what you have. For example, where cover may be lacking or limited, half-cutting mesquite may be an appropriate practice for creating escape or loafing cover. In some areas, brush species such as lotebush or agarito that otherwise have little value as food or forage for livestock or white-tailed deer may be good food or cover plants for bobwhites. Prior to brush management operations, check with local land resource agency personnel with Texas Parks and Wildlife, Texas Agricultural Extension Service, or Natural Resources Conservation Service for assistance in identifying woody plants important to bobwhites.

Summary Meaningful habitat management for bobwhites in the Cross Timbers and Prairies will continue to be increasingly important to this species as it competes for space on the landscape during the 21st Century. There will be many changes to the land in this region of Texas where the demand for rural land for development and home sites continues to increase. In other parts of the United States, bobwhite populations are becoming perilously low and their future is uncertain. The significance that individual landowners place on habitat management for this species as a game bird and member of the biotic community may ultimately determine the future of this endearing bird of the Cross Timbers and Prairies.

Many state and federal agencies offer assistance programs to help landowners manage their wildlife and habitat resources. Texas Parks and Wildlife Department’s Private Lands and Habitat Program has a staff of regional technical guidance wildlife biologists and other district wildlife biologists who are available upon written request to help landowners develop management plans to address their long term goals and objectives for habitat enhancement and wildlife management. For more information, contact Texas Parks and Wildlife Department, 4200 Smith School Rd. Austin, TX 78744.

