HABITAT MANAGEMENT FOR BOBWHITES:

A BASIC GUIDE FOR THE LAND MANAGER

Habitat Needs of Bobwhite Quail

In his book "Beef, Brush and Bobwhites - Quail Management in Cattle Country", Fred Guthery has an opening two paragraphs which rather sums up how the quail manager must look at habitat. He says:

> "Imagine you're 6 inches tall, weigh 6 ounces and would rather walk than fly. Your view of the world would change. A knee-high shrub would become a small tree, a dense stand of bluestem would become an impassible jungle, a 1-mile jog would telescope into a half marathon.
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> You're beginning to see through the eyes of a bobwhite. These are delicate, immobile birds that require a variety of habitats. They're largely concerned with living space from ground level to a height of about 3 feet on areas no larger than 20 city blocks. Therefore, managers must create crazy-quilt patterns of cover on small areas; "patches" in the quilt must fulfill seasonal and annual cover needs"

The preferred habitat of bobwhites is a mixture of grassland, cropland, brushy areas and woodland interspersed to provide abundant areas of "edge" - those margins where two or more cover types come together. Grasslands are utilized mainly for nesting cover and brooding, cropland for feeding and dusting, and brushy areas, thickets and woodlands for escape cover, loafing and winter protection. The bobwhite is dependent upon "edges" where it can move quickly from nest to feeding areas, from food supply to escape cover; where changing from one activity to another is but a matter of a quick walk or flight of a few seconds duration. The greater the interspersion of type combinations, the greater the amount of edge and bobwhite quail.

Characteristics of Specific Cover Needs

Nesting Cover

Bobwhites construct their nest on the ground, typically in the protection of a clump of grass that they can walk to and yet provides some overhead protection. The nest bowl is made from dry vegetation from the previous year's growth. About 80% of quail nests are found within 20 to 25 feet of an edge where habitat types change and which serves as a travel lane for the birds. Most nests are built in a grass clump from 6" to 18" tall. Native prairie grasses with their clump-type growth form are ideal nest cover. Prairie grass sites with a clump density of no more than one 12" diameter clump per 4 sq. ft. (2' X 2' area) are the best. This allows for sufficient nesting clumps (about 10,000 per acre) and is thin

enough to allow the birds to walk through the cover. Even much thinner nesting cover allows for plenty of nesting clumps and easier travel. In Texas, biologists consider about 250 nesting clumps per acre (or 1 clump per 13' X 13' size area) to be about the minimum.

Brood Cover

The greatest mortality of quail occurs in the first four weeks after hatch. This is a critical period which often determines whether the fall population will be a bumper crop or less than desired.

Quail chicks have only a few requirements but these are a must! Chicks need freedom of movement at ground level, overhead concealment and a diverse assortment of green plants or plant parts within pecking height - which for a baby quail is only about two inches. The ground cover must be very open with only 30% to 50% vegetative coverage. This means that as much as 70% can be bare ground. The low-growing greens attract insects such as beetles, grasshoppers, leafhoppers, ants and other invertebrates which compose almost the entire diet of quail up to three weeks of age. Recently burned prairie units are ideal as are old field sites, weedy strips, legume plantings and small grain and legume mixes. The brood cover must be near (within 100 yards) of midday loafing coverts which is typically woody cover thickets or stands of taller dense weeds.

Loafing Cover and Winter Protection

Bobwhites require some type of shrubby/woody cover for loafing, headquarters sites, and protection from winter snow and winds. These areas provide a safe, comfortable resting site between morning and evening feeding periods. They will utilize tall grasses and weed patches but prefer woody plants. Many of these sites become what are known as "covey headquarters" which are those select sites around which a covey will center its daily activities. A covey may have several headquarters within its home range that it uses from time to time depending upon the weather and available food. Loafing and headquarters sites may be as small as 100 sq. ft. but ideally are at least 400 sq. ft. or more. Larger, denser sites are required for protection during extremely cold winter weather. No less than 5% nor more than 25% of a covey home range should be in woody cover that is 3' to 6' tall.

Covey headquarters and loafing sites are easily made by protecting existing thickets from fire or grazing, felling a tree covered with grape or greenbrier vines or planting small thickets to low growing shrubby species such as American plum, black berry, fragrant sumac, tartarian honeysuckle, Bessy cherry, Nanking cherry, or dogwood.

Winter Food

Bobwhites will utilize numerous kinds of seeds, grains and berries to satisfy their food requirements. Studies have shown that over 1,000 different plants are included in the diet. However there are a relatively few that are of the most importance.

To the manager wanting to maximize quail populations knowing which seeds provide the most energy to quail is of utmost importance. Raising or encouraging those plants for winter food supply which provide a low calorie food source is not only wasteful but can actually be detrimental to the quail. Quail food habits are almost as much a matter of availability as they are selectivity. Therefore if a low quality seed is in abundance the birds will utilize it. On poor feed quail will not be as fat and not be able to withstand severe winter weather, hens will enter the breeding season in poorer condition, lay fewer eggs and experience more physiological stress.

The seeds which contain 80% or more of the energy required to maintain a quail in winter are (in decreasing order of importance):

Food Item	**% of Requirement**
Giant ragweed	99.2
Western ragweed	89.1
Corn	88.7
Soybean	86.7
Sorghum	85.1
Sunflower	83.8
Osage orange	81.6
Dogwood	81.2

Having several of the above seeds available to quail within their home range would offer some degree of insurance against crop failure.

In most plans we will try to maintain one food plot (or feeder station where plots are not feasible) per 40 acres at the maximum density to one per 160 acres at the minimum density. The plots need not be more than 2-3 acres and in fact several smaller plots with better distribution would be better. The exception would be those fields managed for doves where larger fields are needed to attract the birds.

Description of Selected Habitat Management Techniques

A few management techniques will be of the most importance in developing quail habitat. These include controlled burning, disking, mowing, planting of food plots, legume seeding, shrub and shelterbelt planting, and 1/2 cutting. A short discussion of each of these is presented here to better understand each.

Controlled Burning

Fire is one of the most important quail habitat management tools in our area. Burning performs several vital functions including removing accumulated litter, stimulating new growth and controlling excessive woody invasion. Native rangelands that are burned periodically have a wider diversity of plants beneficial to quail than unburned prairies. Also quail utilization of burned prairies will be greater than on unburned prairies for four reasons: 1) The litter has been removed from the ground level which aids in bird movement, 2) Burned units attract a greater density and diversity of insects which are critical to quail chicks, 3) Seed production is greater on burned prairies and 4) The ability of birds to feed on those seeds is improved.

Burn when there is a 5-15 mph wind, preferably in the stable atmosphere of one day after a storm front has moved through and when the humidity is above 40%. Remember that the wind tends to increase in speed throughout the day and generally decreases toward evening.

For best wildlife response burn in small units. On any area of 40-60 acres or larger burn only 1/3 of the unit annually. Use fire breaks that are maintained by disking or fall mowing. Burning only 1/3 of the unit annually allows a portion of the area to be in ideal nesting cover, a portion that is good nesting and fair brooding and an area that regrows to ideal brooding sites.

If control of excessive woody plants is the objective of the burn then a "hot" fire is best. This is one which, after the backfires are secure, is set to travel with the wind and generate a lot of heat as it consumes the litter. "Cool" fires are most often used by wildlife managers. These are generally fires set to back into the wind or where the line of fire is parallel with the wind. Cool fires are easier to control and do a good job of leaving some woody cover intact. Cool late afternoon and nighttime burns are very good. The purpose is not generally to completely sweep the entire area black with a fire but rather to enhance the "crazy quilt" pattern. Nighttime fires set when the wind is decreasing and humidity rising tend to go out in some spots and burn through the heavier cover creating a patchwork design.

Disking and Mowing

The disk is another relatively inexpensive and effective tool available to the quail manager. Too often quail populations are perennially low in an area simply because birds are not able to move from one habitat to another. Quail must be able to walk between their food, cover and water needs and if the vegetation is too thick to allow this or there are inadequate travel lanes then the potential population density of quail will be reduced.

Disking also does a couple other beneficial things for quail. If a disked area is allowed to regrow into the annual weeds and grasses that normally invade disturbed soil then there will be additional areas for chicks to catch insects and a winter food supply in the

weed seeds. Also the bare soil areas are needed by quail for dusting sites so the birds can rid themselves of external parasites.

Normally the strips are disked deep enough to thoroughly disturb the soil and kill existing vegetation. About 3" to 4" depth is enough. The strips can be in various widths depending upon the equipment used, however, about 10' to 15' is about the minimum. Strips up to 10 yards wide are fine as long as they are allowed to revegetate to annual weeds and grasses.

In some places disking will be impossible due to the erosion that might occur on the strip or because of shallow, rocky soils. In either of these instances mowing can be used as the alternative.

Areas mowed as travel lanes should be cut as short as possible and preferably in the fall. With successive years of fall mowing a carpet of Kentucky bluegrass tends to invade these strips which offers green winter browse for quail, rabbits and other animals. Also a mowed strip covered with bluegrass is a more effective fire break. Mowed strips should also be at least 15' wide. Mowing should be considered only a substitute for disking where disking is not possible since a mowed strip does not possess many of the beneficial attributes described above for the disked strip.

Food Plots

Food plots can vary greatly in size but generally from 1/4 acre to 2 acres is sufficient for bobwhites. On areas where there may be severe competition with other animals, especially deer, the larger food plots will be needed. Where no deer problems are likely to occur then the smaller ones are sufficient. On larger food plots or even portions of crop fields managers plant only 1/2 to 1/3 of the plot annually and allow the remaining portion to grow into summer annuals in the idle years.

Care must be taken that quail are always able to walk through the food plot to gather seeds. If the plot is planted too thick or becomes choked with weedy grasses then quail use and food plot effectiveness will be reduced. Use the following seeding rates for the various food plot crops:

Crop	**Lbs. per acre**
Milo (with planter)	4 to 5
Milo (broadcast)	6 to 8
Soybeans (with planter)	30 to 40
Soybeans (broadcast)	50 to 80
Corn (with planter)	12 to 15

Corn (broadcast)	15 to 20
Sunflowers (with planter)	3 to 4
Sunflowers (broadcast)	4 to 8
Egyptian wheat (planted)	4 to 5
Egyptian wheat (broadcast)	6 to 10
Proso millet	20 to 30

Some additional food plot crops that have worked well for quail are: buckwheat, sorghum Sudan grass, Rox orange cane, peredovic sunflower, WGF sorghum, bobwhite soybeans (a reseeding variety of field soybeans), various peas and cowpeas. All of these should provide high energy winter foods.

Soil samples should be taken for any quail food plot area to determine the fertility and recommended fertilizer rates. Follow the recommended rates for producing a medium milo or corn crop.

Allowing some "weeds" to grow in the food plot is not necessarily bad however a thick mat of annual grasses such as crabgrass or foxtail will hinder the quails ability to forage for seed. At least 1 cultivation is usually needed to get the grain seed plants off to a good start ahead of the weeds and grasses.

Legume Seeding

The seeding of disked strips with wheat or oats and a legume crop is recommended. Legumes are important to the hen in spring when she is gaining physiological condition for nesting. Green legumes also attract a diverse array of insects beneficial to quail chicks.

The legumes most often used by the quail manager are: Korean lespedeza, ladino clover, white clover, red clover, and subterranean clover. All of these can be broadcast seeded in late winter onto bare soil or drilled.

Any strips disked as a fire break or disked as a travel lane for quail or even portions of some of the larger food plots can and should be planted to a legume crop or a small grain and legume mixture.

Half Cutting and Shrub Planting

In many areas the amount of woody cover at "quail level" is deficient or essentially non-existent. Where there are trees that can be used a lot of half cuttings can be made.

Half cutting of trees means cutting a tree 1/2 to 2/3 of the way through leaving a hinge of bark attached so that the tree falls over yet remains alive. Essentially this creates a living brush pile. This is particularly useful in making covey headquarters. The effect is enhanced if trees can be found which have a vine such as river grape or greenbrier attached which will then proceed to cover the entire brush pile. Several trees in one site, half cut so that they fall onto each other making a brush pile of from 20 to 50 feet, across are particularly effective.

In places where there is no woody cover existing that can be halfcut or protected with disking the manager may have to replant some small shrub thickets. The best shrubs for our area are: American plum, fragrant sumac, autumn olive, red cedar, dogwood, blackberry, multiflora rose, granjeno (spiny hackberry), lote bush (chaparral), black brush, Texas persimmon, and lime prickly ash. Where no native shrubs exist at a site where a thicket is needed then we have little choice but to plant. Any planting will have to be protected from fire and grazing for at least several years until it is well established. All of the shrubs we plant for these purposes are bare root seedlings. Plantings are made at any time from mid-March to mid-May; however, the earlier the better. Site preparation is very important to the survival of seedlings. Any vegetation that will compete with the seedling's moisture or nutrients should be killed. If the planting site is currently in cultivation, disking once or twice may be adequate to kill existing competition and prepare a mellow soil. If it is in grass sod then you must plow the area to be planted. Allow the plowed site to mellow over winter and disk again in the spring to prepare the soil.

Spacing of plants is important. Between row spacing can be dictated by the equipment used to cultivate (or disk) between the rows however the rows or shrubs should be no closer than 8' nor more than 12'. Spacing within the rows should be 10' for red cedar and 5' for shrubs.

Care after planting is also very important. The thickets must be protected from livestock. They must also be kept weed and grass free at least for the first year or two by cultivation and/or hoeing or mulching.