

Strip Disking and Other Valuable Bobwhite Quail Management Techniques

The bobwhite quail (northern bobwhite, *Colinus virginianus*), is one of the most exciting game birds in the Southeast. A covey rise of 12 or more birds in front of a dog's nose has increased the heart rates of thousands of bobwhite hunters over the decades that man has enjoyed this sport.

For the past several decades, however, bobwhite numbers have been declining, and for the last 10 years, population declines have escalated to as much as 7 percent per year in certain places. Changing land use practices and habitat conditions (food and cover problems) account for most of the downward trend in bobwhite numbers, but other factors such as predation, disease, and environmental toxicants may play significant roles. In parts of the South, where bobwhites have been managed intensively, bird populations have remained stable, which indicates that the bobwhite quail can be managed successfully if proper techniques are employed to create essential habitats.

Life History

Nesting

In the South, male bobwhites usually begin their calling in April to attract a mate. During the breeding season, female bobwhites shift from a seed-dominated diet to an insect-rich diet. Insects provide a protein and amino-acid-rich food resource that is critical for meeting the increased nutritional demands of egg laying. The hen and cock work together to build the nest, which consists of a small pit scratched in the ground, lined with dead plant material and covered partially with vegetation (often dead broomsedge or other *Andropogon* species). The hen begins laying 1-2 days after nest construction is complete and lays one egg per day until a clutch of 12-15 eggs is produced. Eggs are incubated for 23 days, and the entire clutch usually hatches on the same day. Both male and female bobwhites will incubate nests and escort young broods; however, these duties are rarely alternated between sexes. Generally, one or the other sex will assume sole responsibility for the clutch. After hatching, the chicks are led away from the nest in search of protein-rich insects, which provide the bulk of chick diets during the first few weeks of life. The abundance and availability of insects during the first 6 weeks after hatch can potentially influence movement rates, weight gain, feather development, and survival. During the breeding season, eggs, chicks, and parents are vulnerable to a range of potential risks, including adverse weather, predators, and mowing. Annual nesting success ranges from 20-40 percent and varies widely. Adults attempt to renest if the first nest is destroyed. Clutch size declines later in the breeding season, and nest success may decrease (northern part of range) or even increase (southern part of range) in late season.

Brood Rearing

After hatching, the chicks and hen must quickly find a brood-rearing habitat that provides an insect food source and protection from predators. Habitat requirements for brood rearing are distinctly different from those for nesting. Bobwhites nest in areas primarily dominated by perennial grasses (often broomsedge), with a moderate accumulation of dead grass from the previous growing season. In contrast, after hatching, the brood requires areas with little dead litter, abundant bare ground, a canopy dominated by broad-leaved forbs, and abundant insects. Various legumes and low-growing forbs (weeds) provide good cover, produce seeds, and attract insects for the brood. Bobwhites are not strong scratchers and must have a mosaic of bare ground and low-growing vegetation that allows protection; ease of movement; and access to insects, seeds, and other food sources.

Fall Shuffle

In late summer and early fall, family groups may join up, and it is not unusual to see two or more family groups together that may number as high as 30 individuals. Eventually these groups break down into smaller groups or coveys.

Winter Coveys

By November, covey formation is complete. The covey structure increases bobwhite survival by providing more eyes to watch for predators and search for food and by allowing birds to ring roost at night on the ground, which aids in energy conservation. In a high-quality habitat, the winter range of coveys typically contains around 40 acres of a combination of woodland, brush, and cultivated and idle fields.

Covey Breakup

With approaching spring, daylight lengthens and temperatures increase, and the winter social structure of the covey deteriorates. Bobwhites that survived the winter (about 20-30 percent) experience significant hormonal changes, and pair bonds that began to develop in the covey are strengthened.

Food Habits

From mid-spring to early fall, insects are a major component of bobwhite diets. They provide protein and minerals to chicks and egg-laying hens. By age 8-10 weeks, chicks begin consuming a wider variety of foods, such as soft fruits and grass seeds.

In the fall, bobwhites eat a variable diet of grasses, legume seeds, hard mast such as acorns, and waste grain from agricultural crops.

Late winter and early spring is the annual period of lowest food availability. Overwinter deterioration and competition with other granivores (seed/grain eaters) reduce the availability of seeds. Grasses and weed seeds are important as food sources, with most of the seeds consisting of leftovers from the previous growing season. As spring progresses, bobwhites pick up increasing amounts of green plant materials and insects.

Management Practices

Bobwhites have specific habitat requirements that vary seasonally in relation to prevailing environmental and biological processes. Various successional stages of the agricultural/fallow/idle old-field continuum meet different seasonal habitat needs of the bobwhite. Habitat management programs for bobwhites that recognize and attempt to provide for each of these seasonal habitat needs are the most successful.

Because of the long growing season, fertile soils, and abundant rainfall in the Southeast, agricultural lands, if left undisturbed, will rapidly develop into dense young forests and subsequently will become unsuitable for bobwhites. Specific management practices that are beneficial for bobwhites generally involve setting back plant succession to very early stages, similar to those found in fields one or two years after cultivation. In the South, habitats, whether open fields or wooded areas, that are allowed to grow up longer than three to four years without some type of soil or vegetative disturbance quickly grow out of good bobwhite habitat. Typically, management practices for open fields include prescribed burning annually or every two years, bush-hogging, disking, planting agricultural crops, and protection of some areas that grow up into brushy escape cover. For wooded areas, the same management practices apply, but concentration on opening up or daylighting canopies by selective thinning or clearcut timber harvests (to encourage understory plant growth) is important. Prescribed burning on a one- or two-year rotation is critical in pine forests for controlling the leaf and needle litter layer and hardwood understory and for promoting growth of legumes.

In addition to disturbances, providing a mosaic or mix of different habitat components (nesting, broodrearing, feeding, or escape cover) in close proximity is essential. Small patches of various habitat types such as brushy fence rows and ditch banks should be left within cropland or old-field areas. Small woodlots should be bordered by transition zones of brushy cover that gradually fades into an opening or field. Artificial brush piles or windrows can be placed in large fields to break them up into smaller units and increase habitat diversity.

Strip Disking

Although bobwhite numbers are down, significant management opportunities are available to many landowners in the South. Hundreds of thousands of acres of old fields and young forests may provide excellent bobwhite habitat. Presently many of these habitats are in poor shape for bobwhites because they have grown up into thickets of less desirable grasses and brush that are too dense to provide access to birds and that contain a less desirable plant mix.

Herbert Stoddard, a renowned Florida researcher in the 1920s, observed that the grass-bound field is the greatest enemy of the bobwhite quail. Bobwhites like to have their feet touch bare ground because this makes it easy for them to feed on seeds and insects. Thus, the key to bobwhite management is to strike a balance between providing a mix of bare

ground that allows bobwhites to feed and travel freely and vegetation that provides food, nesting habitat, and protection from predators.

Thick turf or dense vegetation that forms a barrier to bobwhite feeding can be solved in old-field habitats with a tractor and set of disk blades. The technique simply involves disking strips through a field or open woods during the fall or spring. These strips should be 30 to 50 feet wide and separated by undisked strips of 60 to 100 feet. Disked strips should be as long as possible and should follow the contour of the land to prevent erosion. The undisked areas will provide nesting habitat, while the adjacent disked areas that subsequently grow up into succulent forbs and legumes will provide habitat that is rich in insects and seeds. Strip disking should be thought of as a rest-rotation system. After a year has passed, disk the previously undisked areas and let the previously disked areas grow for up to two years. This system develops a mosaic of vegetation that is zero to one, one to two, and two to three years old. Do not allow areas to get older than three years. Strip disking enhances habitat quality in a number of ways, including releasing grass-bound fields, reducing litter accumulation, creating bare ground, stimulating germination of desirable seed-producing plants, and increasing insect populations by as much as four times. Strip disking will maintain nesting cover and produce adjacent brood habitat on a scale that will positively impact bobwhite populations. It will provide more insects and plenty of natural seeds at a much lower cost than planting food plots, although planting some of the strips to grains or legumes will further enhance habitat quality by providing additional winter food resources. Although planting of winter food resources is an important management tool and can enhance local habitat quality, vegetation succession management is the single most important aspect of bobwhite habitat management in the Southeast. Strip disking is an efficient and cost-effective vegetation management tool and should be broadly implemented to enhance bobwhite habitat quality.

As an example of successful strip disking, a landowner with 3,400 acres near Cotton Plant, MS, kept records between 1987 and 1991 that show an increase in covey numbers from 16 to more than 100 as a partial result of a switch to this management technique. Although not a cure-all for bobwhite quail, strip disking can be a valuable management technique that may help return the bobwhite to good population numbers.

Conservation Reserve Program

Most contracts with the Conservation Reserve Program (CRP) do not allow strip disking as an approved practice. However, with the cooperation of the Natural Resource Conservation Service (NRCS) and the Farm Service Agency (FSA), existing contracts may be modified to incorporate strip disking. If fields are enrolled in CRP, contracts must be modified before incorporation of strip disking; otherwise, compliance may be lost and payments could be forfeited.

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