

Forest Management Strategies *for* Bobwhite Quail

Population Trends

The northern bobwhite quail historically and traditionally has been one of the most important and cherished of game birds in the South. However, for the last several decades, bobwhite quail numbers have declined at an average of 3 percent per year, and in the last 10 years the rate of decline has escalated to about 6 percent per year.

Quail numbers have had a direct impact on quail harvest and hunter numbers and will impact the future use of this species, as well as numbers of hunters recruited and licenses sold. In Mississippi from 1981 to 1994, according to statewide surveys of hunters, hunter effort has declined from 450,000 to 75,000 days. Bobwhite harvest has declined from 1.5 million in 1981 to less than 200,000 in 1994. Harvest per hunter day declined over the same period, from about 3.3 birds to about 2.3 per hunter day. Hunter numbers declined from about 65,000 to around 15,000 between 1981 and 1994.

Bird numbers have plummeted due to a variety of factors, including large-scale changes in land-use practices, such as cleaner farming and increased reforestation acreage in pine plantations, as well as other less obvious changes such as decreased outdoor burning. Many pieces of the quail puzzle are missing, including effects of pesticides, predators, and weather.

What is known can be put into practice, if there are incentives to landowners to implement the needed management techniques, or the personal interest is strong enough.

Forest History

High quail populations are normally associated with farmland and cultivated areas, but bobwhite numbers can be successfully managed on forest land as well. Bobwhites were likely present in the South before the grasslands were invaded by the now-dominant trees, but its habitat eventually included the southern pine belt from Texas to Virginia. These pine forests were maintained by lightning-set fires that occurred frequently and tended to control hardwood species and brush in favor of pines and small plants that require bare soil to germinate. Even today, the bobwhite habitat needs reflect this strong tie to fire, open habitat, small seed-producing plants, and bare soil areas. Bobwhites neither scratch strongly in leaf litter nor maneuver easily through thick brush.

Pine Species Management

Several pine species are native to Mississippi, and when considering reforestation, you should reforest the species originally present on that site. Longleaf is probably the most compatible pine tree for bobwhites, since it is open growing, allowing more sunlight to reach the forest floor to produce legume seeds and proper cover. Longleaf is adapted to

fire and often can be burned at an early age (2 to 3 years after a seed catch). The seeds of the longleaf are large, nutrient-rich and preferred by bobwhites. On dry sites longleaf pines will often out-perform other pines.

Slash pine also has a fairly open form but is more subject to diseases, such as fusiform rust. It is not the best species to reforest a stand with, from a forester's viewpoint.

Loblolly pine is the most widely grown pine species but does not have the open form of the other pines. It has dense foliage, grows rapidly, and requires a longer wait before burning (for loblolly and slash, practically a wait of 8 to 12 years after regeneration is required). When reforesting an area to loblolly, you can reduce the initial planting density (number of trees per acre) and add one or more years of good bobwhite habitat on the front end of the rotation. Management of the forest for the bobwhite quail hinges on the relationship of tree density to the layer of vegetation that is within 3 feet of the ground.

Forest Management

When the tree canopy closes, sunlight is eliminated from the forest floor and smaller seed-producing plants eventually die out. It is important to keep the stand as open as feasible at all stand ages. Therefore, the key to understanding management of the forest for the bobwhite quail hinges on the relationship of tree density to the layer of vegetation that is within 3 feet of the ground. Virtually all of the bobwhite's food and cover requirements are met in this zone. Forest-management activities, such as thinning, burning, site preparation, and reforestation, can be manipulated to enhance habitats for bobwhite quail.

Thinning

Once trees crowd out understory plants, it is important to open stands back up as soon as possible. Thinning (silvicultural) should be conducted in hardwood and pine forests and should be implemented so the end result will be increased sunlight reaching the forest floor. This allows understory plants to grow and produce food and cover and may be accomplished by precommercial thinning (where pre-merchantable trees are removed), or commercial thinning (where merchantable trees are removed). With loblolly and other pines, generally in Mississippi, commercial thinning can be implemented at age 13 to 18 years, depending on the site quality.

Site quality can be measured as height that trees will reach by a certain age (usually 50 years). A good pine site might be 85 feet at 50 years. In general, tree canopy should never cover more than 50 percent of the ground area. A typical forestry thinning provides space for the residual trees to grow but does not allow sunlight to penetrate to the ground. For the bobwhite, additional tree removal is, therefore, in order. Basal area is the total cross-sectional area of wood in the stand, expressed as square feet per acre. The forestry rule of thumb is usually to thin a stand until the site index and basal area are about equal. But for bobwhite quail, the basal area should be reduced by at least 25 feet below the site index. Thus, if an 85-site index were carrying 100 square feet of basal area, it should be thinned

down to 60 or less basal area. Areas that are thicker and thinner within the stand are desirable, since they allow a more diverse understory. Small clumps of acorn-producing oaks should be left in the pine forest and along drains, and should be thinned as well. Protect other fruiting species, including dogwoods, persimmon, blackgum, and cherry; but in general, dense understory hardwoods should not be present throughout the stand.

Actively thin hardwood stands as well, to promote hard and soft mast production along with low-growing herbaceous species. Retain the best mast producers, such as post, red, white, water, scrub, and live oaks.

Clear-Cutting

Most research indicates that bobwhite populations generally increase to huntable levels during the first 2 to 4 years after clear-cutting. Unfortunately, after this time, stands usually become dense, and bobwhite habitat is lost. Several options can improve or extend favorable conditions for bobwhites under clear-cutting regimens. First, planning is critical. Generally, rotation length of 40 years or longer on pine land and 80 years or longer on hardwood lands can help manage trade-offs between timber production and bobwhites. This allows use of new forests the first 2 to 4 years and later in the life of the stand following thinning, when the stand is once more opened up at the forest-floor level.

On pine sites, generally the more intensive the site preparation following harvest, the longer the habitat will be good for bobwhite quail. Burning following site preparation seems to result in more coveys, along with windrowing or piling debris, which provides edges and transition zones. Leaving hardwood clumps and drainage ways intact also are beneficial.

Long, narrow, winding clear-cuts are better than blocky ones, since diversity is increased in a smaller area. Size of clear-cuts varies, depending on landowner objectives, but considering predator impacts along edges, openings should be at least 5 acres or more. Clear-cuts should be planned so that birds produced in these areas are not stranded with canopy closure but will have suitable habitat to move to as clear-cuts grow up.

Reforestation

Much of the negative side of young forests for bobwhites can be linked to dense, thick stands of trees and vegetation. When trees are planted, whether hardwood or pine, lower densities/stocking rates are preferable. Stockings of 400 to 500 trees per acre allow stands to remain open longer, retaining the seed-producing plants needed by the bobwhite quail. Reforestation work is an excellent time to establish areas to permanent foods such as bicolor lespedeza, or even annual food-planting areas. The typical forest might not provide sufficient sunlight to the forest floor, even when thinned to a desirable level. Permanent openings can be critical to providing adequate brood and nesting cover and a diversity of foods from grass seeds to insects.

Permanent Openings

The typical forest might not provide sufficient sunlight to the forest floor, even when thinned to a desirable level. Permanent openings can be critical to providing adequate brood and nesting cover and a diversity of foods from grass seeds to insects. Roadsides, power line and gas line rights-of-way, log-decks, and skid trails can all be effectively used to provide openings in the forest. Generally, the higher percentage of forest land that can be maintained in permanent openings, the better habitat will be provided.

Prescribed Burning

The most economical, useful tool for managing bobwhites, along with many wildlife species, is the skillful application of fire to the pine forest. The benefits of fire are many and include the following:

- The removal of litter, making foods easier to locate;
- Scarification and subsequent germination of important food-producing seeds that need burned areas to germinate;
- Production of newly sprouted vegetation that attracts and produces abundant insect populations;
- Reduction of invertebrates that parasitize bobwhites; and
- Release of ash and minerals and stimulation of nitrogen building in the soil (fertilizer effect).

Fire is most often underused but can be overdone as well. With regulation changes, liability, and smoke-management concerns and the unpredictable nature of fire, it is imperative that applicators learn how to burn under controlled conditions and from experienced professionals before attempting burns on their own. The best time to burn is from late winter to early spring (before May in most areas). Burning in early winter can expose bobwhites to extended, easy predation, and burning in late spring can destroy nests and increase fire risks. Late-spring burning might have a place with burning of small openings to improve brood habitat, since it can concentrate insects at the right time. Summer burning might increase the production of some legumes but must be carefully conducted to avoid timber and nest damages.

Often, advance planning is critical to burning success, since in most years only two or three winter days are ideal for burning. This makes it imperative that fire lanes be plowed in advance of wet weather but not so early that leaf fall renders them useless.

Rather than a clean, complete burn, a mosaic pattern of about 70 percent burned with the rest of the area scattered in small patches is best. This allows shrubs that produce fruit at 2 to 4 years to mature and allows nest cover to develop. Night burning can aid in accomplishing this tricky result. Areas that are preferred unburned can also be disked around and left unburned.

A steady wind of about 5 miles per hour, temperatures under 35 °F, and 30 to 60 percent humidity provide optimal winter-burning conditions. Generally, backing fires with flame heights of 1.5 feet or less is best for fuel reduction. Always set a small test fire first.

Strip Disking

Disking strips through forested stands can benefit bobwhites by changing plant composition and encouraging growth of legumes, attracting insects, and creating a mosaic of bare ground and vegetation that provides feeding and brood-rearing cover. Disk in wooded areas on the contour and only on sites that are not highly erodible. Often, heavier equipment is needed in forests, unless the forest is open and fire has been frequently used. Fire lanes between different aged stands can aid in meeting this goal, and these areas can be planted to food crops, or left to reseed naturally to wild foods. However it is done, disturbing the soil is critical to management success for bobwhite quail.

Food Plantings

Many types of food planting can be important components in an overall management program but often cannot be managed in a wooded setting. One food plot plant that has been tested and proven is the bush lespedeza. Several lespedezas are preferred, including bicolor and thunberg (more deer resistant than bicolor). These can be planted in plots six to eight rows wide (1 foot between rows) and several hundred feet long (1 to 2 feet between plants) that gently wind through the forest setting. Usually 1,000 to 2,000 plants make a sizable plot. This perennial produces seeds that are relished by bobwhites, and if kept bushhogged, provide good cover.

Summary

Forest lands can be successfully managed for bobwhite quail. Maintain forests in open, daylight conditions, with a variety of native foods available on a year-round basis, along with a complement of brood, nesting, and escape cover available. Practice prescribed burning on pine lands, and maintain permanent openings and food plantings. Diversification of forest types and juxtaposition of stands will help in building populations to the potential of one bird per 2 to 10 acres, depending on site quality.

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