AGRICULTURE AND NATURAL RESOURCES FACT SHEET W-27-13

Managing for Bobwhite Quail in Ohio's Agricultural Landscape

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Introduction

The Northern bobwhite is a popular upland game bird found throughout the eastern United States. Bobwhites are roughly the size of a softball and have cryptic coloration to hide from predators. Male and female bobwhites have facial masks and throat patches. On males, these are white; on females, they are buff-colored (Figure 1). Bobwhites are perhaps most recognizable by males whistling "bob-WHITE" during the breeding season.

Figure 1. Bobwhite male (left) and female (right). The female is wearing a radio collar in order to track her movements.

Bobwhite population levels fluctuate naturally in what are often referred to as "boom and bust" years. Nevertheless, bobwhite populations are on long-term declines throughout their range, including Ohio. Ohioans may remember the dramatic declines associated with severe winters in 1977 and 1978. Bobwhite populations are capable of recovering after severe weather events. However, continued loss of habitat, primarily through intensification of agricultural practices and advancing successional stages of vegetation, have inhibited recovery of populations in the upper Midwest.

Ecology of Bobwhites

Bobwhites are associated with early successional habitats consisting of ample grass, forb and woody shrub cover. They spend the majority of their time walking and running on the ground. They use flight primarily as an escape mechanism. Their diet is primarily seeds but is supplemented by insects and fruits during the summer.

Bobwhites are resident birds and face different challenges and limitations during each season. The life cycle of the bobwhite is typically divided into breeding (April–September) and non-breeding (October–March) seasons (Figure 2).

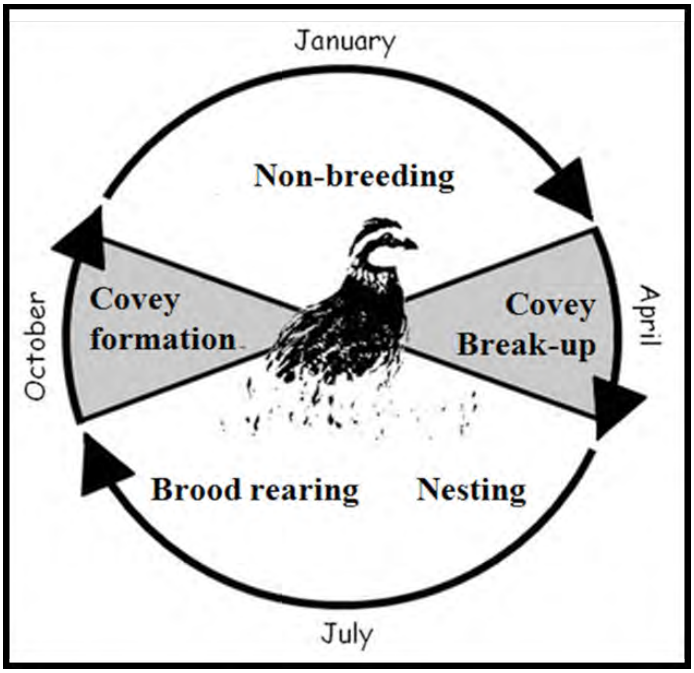

Figure 2. Bobwhite life cycle.
Figure adapted from University of Missouri Extension.

The breeding season begins with covey breakup, followed by a short period when the birds disperse and

find mates. Most birds stay within one-quarter mile of where they spent the winter while others travel several miles away from their wintering locations. Bobwhites in Ohio have been found to move more than 12 miles during spring dispersal.

First nest attempts of the year occur in May but can start as early as April. Nests are built on the ground with residual grasses (Figure 3). Nest cups are concealed with either a woven canopy or placed under clumps of grass.

Figure 3. A bobwhite nest built with residual grasses.

Most nests hatch from late June to early July with a second smaller peak in mid-August. Bobwhites will renest after failed and successful nest attempts. Some females will lay one clutch that is incubated by a male, then another clutch of her own. Nests are usually only incubated by one adult, and about one-third of bobwhite nests are incubated by males.

Only one-third of nests typically survive to hatch, but large clutch sizes (9–18 eggs) and renesting attempts can offset high nest predation rates. Low nest success is common for grassland-nesting species. Chicks are able to walk and feed themselves within one hour of hatching and can fly at about 2 weeks old. The fate of chicks after hatching is perhaps one of the least understood aspects of bobwhite ecology. Some studies indicate that less than 40 percent of chicks survive to one month of age.

Bobwhites begin to form their wintering groups, or coveys, in the fall (Figure 4). Optimum covey size is about 12 birds, which promotes thermoregulation while roosting, efficient feeding and predator detection. Annual survival of bobwhites is low. Up to 80 percent of the fall population will not survive through spring, with or without hunting. This means that only 2 out of every 10 birds will survive for an entire year, which is why hunting is generally considered to be compensatory—meaning that 80 percent of birds that are harvested would have died anyway from natural causes. Bobwhite hunting in Ohio is currently limited to 16 counties in southwestern Ohio. Check with the Ohio Division of Wildlife (wildohio.com or 1-800-WILDLIFE) or check publications for more information on open counties and bag limits.

Figure 4. A bobwhite covey.

Habitat Requirements

Habitat loss is the primary cause of declining bobwhite populations. Historically, bobwhites were found statewide, but changes in land use and agricultural practices have made most of Ohio unsuitable for bobwhites. Bobwhites are now found primarily in the southwestern corner of the state. It is important to think of bobwhite habitat from a bobwhite's eye view. Bobwhites live on the ground, so relatively open ground cover with dense overhead protective cover is ideal for these birds.

Bobwhites are often referred to as an "edge" species and prefer early successional habitats. Succession is a way of describing the natural development of plant communities through time. The most common example of succession is the growth of an idle crop field from weeds into grass, and then ultimately into a woodlot. Bobwhites prefer habitat on the young end of that spectrum and are typically found in areas that have been growing for less than 20 years (Figure 5).

Bobwhites need cover for protection from predators and year-round food sources, but the habitat needs of bobwhites change seasonally. The ideal landscape for bobwhites is where breeding and nonbreeding habitats and food and cover are found close together (Figure 6). Food sources are usually abundant during the breeding season but can be scarce during the winter, especially during prolonged snow cover.

Nests are typically built in grassy areas such as Conservation Reserve Program fields, hayfields, pastures and fallow fields or any area where appropriate cover and nesting substrate are available (Figure 7). Bare ground and insect abundance are important

components of brood-rearing habitats. Brooding chicks (Figure 8) need habitat with open areas at ground level (no thatch or litter) with an overhead canopy of vegetation. This provides areas in which they can easily walk to find food while providing overhead protection from predators. Grasslands provide excellent nesting and brood-rearing benefits with proper management. Grasslands and crop fields are important to bobwhites during the spring and summer but have relatively less value during the nonbreeding season.

Woody cover is the most important habitat element for bobwhites and is used year-round in Ohio. Shrubs and brush provide essential cover for bobwhites during heavy snows, so woody vegetation is the key for winter survival. Woody vegetation remains upright during heavy snows. Woody cover is also used during the breeding season because it provides shade (i.e., loafing areas) and protection for brood-rearing.

Figure 5. This female bobwhite was found in early successional habitat.

Figure 6. The best landscape for bobwhites is where all habitat requirements are close together.

Figure 7. An example of bobwhite nesting habitat (left), a female bobwhite sitting on a nest (middle), and a bobwhite nest concealed by grasses (right).

> "What about the future of bobwhite in Ohio? That depends upon the amount of food, cover and protection we provide for these birds. The killing of every animal that may in any way prey upon bobwhite will not bring birds back to a foodless, coverless farm... It is only when the proper amounts of food, cover and protection are given that bobwhite can reach his maximum numbers on a farm."
>
> —Milton Trautman, Ohio naturalist and biologist, 1935

Figure 8. Bobwhite chicks.

Key Terms

Buffer strips: Bands or strips of perennial vegetation maintained at the edges of crop fields. Buffer strips provide wildlife habitat while reducing soil erosion and capturing nutrient and chemical runoff.

Edge feathering: A management practice along forest edges that involves felling of undesirable trees to create immediate downed woody cover and allowing the growth of woody cover and annual plants. Edge feathering turns hard edges into soft edges that make ideal bobwhite habitat.

Forbs: Wildflowers or broad-leaved plants in grasslands. Forbs are key for good bobwhite habitat.

Hard edge: An abrupt change in habitat type (e.g., a mature forest next to a crop field).

Soft edge: A smooth transition from one habitat type to another, most often referring to woody cover and young trees or shrubs between a mature woodlot and open land.

Succession: The natural and sequential change in plant species composition in an area, from short-lived annual plants to long-lived perennial plants. The most common example of succession is the growth of an old field from weeds into grass, and then eventually into a woodlot. Bobwhites are early successional birds and prefer areas that have been growing for less than 20 years.

Warm-season and cool-season grasses: Two types of grasses found throughout Ohio. Cool-season grasses are typically non-native grasses that grow as a sod, covering the entire ground. Warm-season grasses grow in bunches and create a patchwork of grass cover and bare ground. Bobwhites will use both types of grasses for nesting cover, but only warm-season grasses during the winter.

Woody cover: Shrubby and brushy cover. Trees are normally not included as woody cover, as they do not provide the habitat near the ground that bobwhites need. Woody cover is the most important component of bobwhite habitat in Ohio.

How Does Bobwhite Habitat Look?

No Bobwhites

This forest was not used by bobwhites and would benefit from habitat management such as edge feathering, which creates woody cover at ground level.

Bobwhites

This forest was used by bobwhites throughout the winter. The thick woody cover along the edge provides protection from predators next to food sources in cropland.

No Bobwhites

Cool-season grass fields are rarely used during the winter, especially after vegetation becomes compressed due to snow fall. This field would benefit from having brushy/shrubby cover and more forbs added.

Bobwhites

This field provides good habitat for bobwhites through the winter. Partridge pea provides bare ground understories, overhead cover, produces seed pods and remains upright even during heavy snow.

Bobwhites

Nesting and brood-rearing fields should have diverse plant communities and limited ground litter. Bare ground is important. It allows chicks to move easily through vegetation. Discing and interseeding forbs are good methods for increasing bare ground in grasslands.

Management Options

Habitat management is the key to productive bobwhite management. Efforts that focus directly on predator management, feeding or releasing captive-raised birds may at best produce marginal short-term gains but no long-term benefits. Much of Ohio's working lands can support bobwhites! Bobwhite home ranges in Southwest Ohio consisted of 29–35 percent row crop fields and 9–16 percent pasture or hay fields (Table 1). However, natural habitats such as grasslands (28 percent) and woody cover (9–17 percent) were also important components of bobwhite home ranges (Table 1).

Table 1. Bobwhite core home range compositions in Southwest Ohio during the breeding and nonbreeding seasons.

	Core Home Ranges	
Habitat Type	Breeding Season	Nonbreeding Season
% Grassland	28	28
% Woody Cover[a]	9	17
% Woodlot	6	15
% Other[b]	7	4
% Pasture/Hay	16	9
% Row Crop	35	29

[a]Woody Cover = primarily fencerows and riparian corridors

[b]Other = residential areas, bodies of water, impermeable surfaces (e.g., parking lots, roads)

Bobwhites need a mosaic of different habitat types. The goal is to provide them in proximity to one another. A misconception is that a single landowner can create his or her own bobwhite microcosm no matter what the rest of the landscape contains. Bobwhite conservation starts at the farm level but needs to have a landscape-level perspective. Linear fencerows and riparian corridors that connect habitat patches can be just as valuable to bobwhites as a single large tract of grassland.

Conservation Programs

A wide variety of U.S. Department of Agriculture conservation programs are available to provide financial assistance for habitat management on your property. Programs differ in eligibility requirements, function (erosion control, wildlife habitat) and scale (whole farm, field, drainage ditch). Contact your local Farm Service Agency (FSA) or Natural Resources Conservation Service (NRCS) office for more information on the program that is right for your goals. Inquire about CP33 and CP42 programs that include bobwhite-friendly plants, shrubs and brush (Table 2), even on small areas of your property.

Table 2. Bobwhite-friendly plants.

	Plant Species	Nesting	Brood-Rearing	Food	Winter Cover
Grasses	Little Bluestem	✓	✓		
	Big Bluestem	✓			✓
	Broomsedge	✓			
	Indian Grass	✓	✓		✓
	Switch Grass	✓	✓		✓
	Panic Grass	✓	✓		
Forbs	Partridge Pea		✓	✓	✓
	Common Ragweed			✓	
	Great Ragweed			✓	
	Ticktrefoil (Beggar's Lice)		✓	✓	
	Beggar Ticks		✓	✓	
	Lespedezas			✓	
	Pokeweed			✓	
	Sunflowers			✓	
Shrubs	Briars (Blackberry, Raspberry)		✓	✓	✓
	Dogwood		✓		✓
	Poison Ivy		✓	✓	✓
	Greenbrier		✓	✓	
	Hazelnut			✓	✓
	Elderberry			✓	
	Wild grape			✓	✓

Ask an Expert

Creating and maintaining effective wildlife habitat can be easily done without sacrificing productive agricultural practices. Contact a wildlife biologist or habitat specialist for more detailed information on what you can do (or should not do) to create effective bobwhite habitat on your property. The Ohio Division of Wildlife, Ohio Department of Natural Resources and local FSA or NRCS offices provide a variety of resources and support for landowners.

What Can I Do in My Fields?

Effective bobwhite habitat management on your farm relies as much on what you don't do as what you should

do. Many of the plant species that provide excellent bobwhite food and cover are already growing on your property or are present in the seed bank. All you need to do is provide them with an opportunity to grow in areas that are not (or should not) be actively farmed or mowed. Annual weeds (e.g., ragweed, foxtail, beggar's lice) are considered bobwhite-friendly plants because of the food and cover they can provide (Table 2). Shrubs and brush (e.g., brambles, dogwoods, greenbrier) will grow in areas that have not been mowed or sprayed in a few years and provide excellent cover through the entire year. Mowing and herbicide application can be important management tools to control undesirable plants or improve stands, but try to avoid overuse.

What Can I Do in My Woodlots?

Although woody plants provide important bobwhite habitat, bobwhites do not use forests with closed canopies. Bobwhites do well in open woodlots that contain mature trees with thick shrub and brush understories. A closed canopy of mature trees prevents growth of the woody understories that bobwhites use for food and cover. Woodlot management for bobwhites should include some tree cutting in dense woodlots to provide immediate cover under downed treetops and to promote the growth of brush and shrubs. This can be achieved through firewood cutting, timber stand improvement or edge feathering (Figures 9 and 10)—a woodlot management practice that creates immediate woody cover and promotes the growth of bobwhite-friendly plants, shrubs and brush (Table 2).

Bobwhite Myths

Misconception: Turkeys prevent bobwhite populations from recovering.

People misinterpret the relationship between turkeys and bobwhites, as they notice the decline of bobwhites with an increase in turkeys on their property. Turkeys are not known to predate or disturb bobwhite nests. The opposing population trends reflect different habitat preferences of these two species as woody succession occurs. Bobwhites like thick, shrubby vegetation while turkeys prefer trees and growing woodlots. As land is left alone without any management or disturbance, it eventually converts from good bobwhite habitat into good turkey habitat, resulting in the decline of bobwhites and the rise of turkeys.

Misconception: Predation by coyotes prevents bobwhite populations from recovering.

Bobwhites are an important prey species for many predators in the Midwest. Their reproductive capacities (i.e., renests, large broods) enable them to deal with high predation rates. However, rising coyote populations are often blamed for the decline in bobwhite numbers. Recent research in Ohio revealed that coyotes are only a minor predator of bobwhites. The primary predators of bobwhites by a wide margin were hawks and owls. In fact, coyotes will push fox, one of the more efficient mammalian predators of bobwhites, off their territories.

Misconception: Bobwhite coveys are tight groups that stay in the same area year-round.

Coveys are groups of bobwhites that form in October, and later dissolve during March and April. The primary function of a covey is to help individuals avoid predators. Warmth during winter is also a benefit. Coveys tend to form in the same location year after year, which leads to the misconception that the same individuals or their descendants reappear in the same location. Coveys dissolve in spring, and individuals form pairs during the breeding season. Bobwhites move around throughout the summer and their populations turnover quickly, so it is rare for the same individuals to rejoin and reform the same covey as in preceding years. The tendency for coveys to be in the same areas year after year is because those areas have good habitat. A single covey may be regularly found in more than one location within a year. One cannot count the number of places where coveys are found to determine population size.

Misconception: Hunters should shoot into coveys every year to prevent inbreeding.

Hunters used to feel obligated in the early 1900s to hunt and break up each covey on their farm to prevent inbreeding. Coveys break up naturally in the spring, prior to the breeding season. There is little reason to be concerned about inbreeding, especially because bobwhites and other wild animals have natural behaviors and instincts to avoid inbreeding.

Figure 9. This is an example of a hard edge where management practices like edge feathering and a buffer strip could be implemented to create bobwhite habitat.

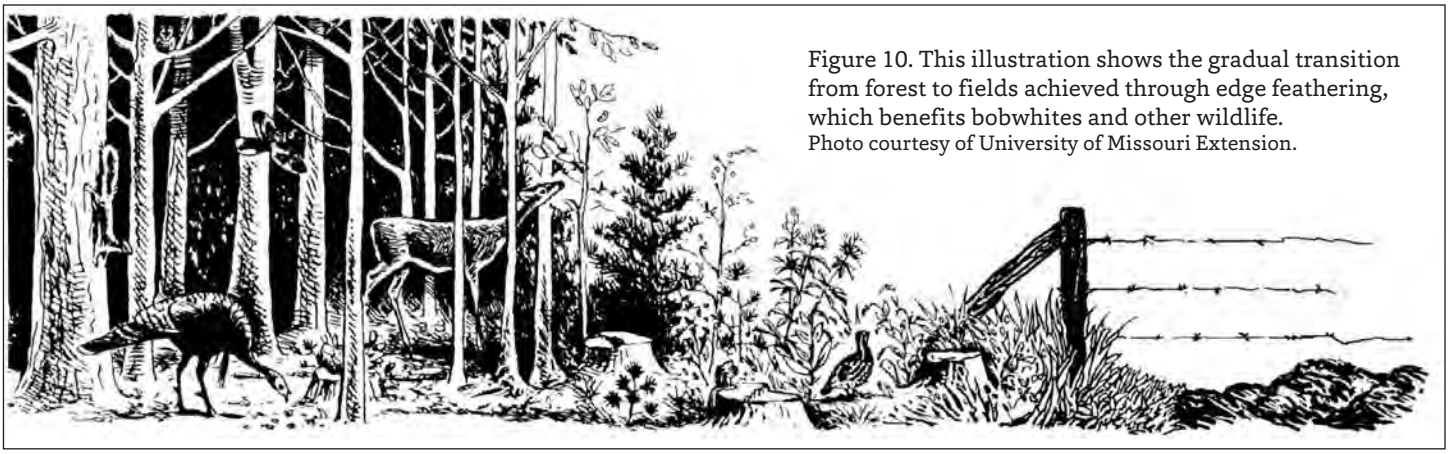

Figure 10. This illustration shows the gradual transition from forest to fields achieved through edge feathering, which benefits bobwhites and other wildlife.
Photo courtesy of University of Missouri Extension.

Misconception: Releasing pen-raised bobwhites will help populations recover.

Wild bobwhites in Ohio are uniquely suited to live in their northern environment. Ohio bobwhites are larger than wild bobwhites native to other portions of their range (e.g., Texas and Georgia), which helps them survive harsh northern winters. They also tend to produce larger clutches of eggs, which helps them cope with inherently lower survival. Pen-raised bobwhites are almost always from different lineages than native Ohio bobwhites and are therefore less capable of surviving in northern environments. Releasing pen-raised bobwhites in Ohio will not have long-term positive results on population sizes. In fact, introducing captive-reared bobwhites may be detrimental because they could potentially dilute the genetics of our native birds.

Misconception: Bobwhites need artificial food and water sources throughout the year to survive.

Bobwhites inhabit environments from the deserts of northern Mexico to the farm fields of southern Michigan (Figure 11). This illustrates the tremendous ability of bobwhites to adapt to a variety of landscapes and environmental challenges. They seldom need food or water from artificial sources, especially in Ohio. Bobwhites get water from dew or absorb it naturally from the food they eat. Waste grain from agricultural fields supplements what bobwhites cannot find in their environments. The only period of the year when food is limiting is during periods of prolonged snow cover. Supplemental food may help during these periods, but a better alternative is to leave a few rows of standing crops near woody cover to allow access to food above the snow.

Programs to Consider

Federal and state voluntary programs exist to aid landowners in creating and maintaining wildlife habitat. Various conservation practices exist, and financial incentives or technical assistance are provided to help establish wildlife habitat. These programs can also address other environmental issues such as soil erosion.

- **Environmental Quality Incentives Program (EQIP):** This voluntary program provides financial and technical assistance to agricultural producers to help plan and implement conservation practices that address natural resource concerns. The program targets opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland.
- **Conservation Reserve Enhancement Program (CREP):** This voluntary land-retirement program helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat and safeguard ground and surface water.
- **Conservation Reserve Program (CRP):** This voluntary program is available to agricultural producers to help them use environmentally sensitive land for conservation benefits.

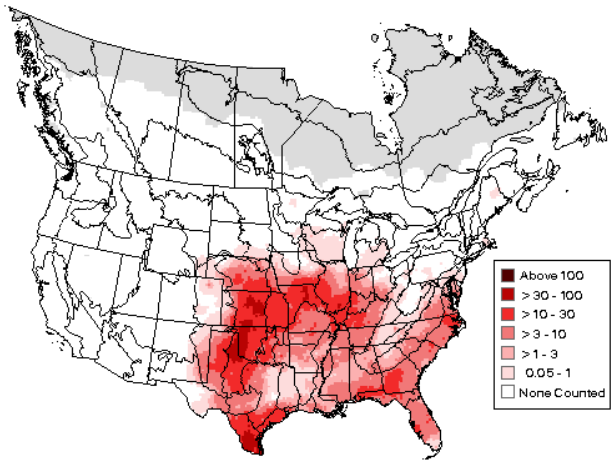

Figure 11. Summer distribution map for bobwhites based on 2006–11 data from the North American Breeding Bird Survey. The darker red coloring indicates areas of higher relative abundances.

Additonal Resources

Educational Publications

Quail-friendly plants of the Midwest. University of Missouri Extension Publication (extension.missouri.edu/p/MP903)

Establishing and Managing Early Successional Habitats for Wildlife on Agricultural Lands. University of Missouri Extension Publication, MP907 (extension.missouri.edu/p/MP907)

Enhancing Wildlife Habitat on Farmlands. Ohio State University Extension Publication, W-14-2002 (ohioline.osu.edu/w-fact/0014.html)

Habitat Management Practices for Bobwhite Quail. University of Missouri Extension Publication, G9432 (extension.missouri.edu/p/G9432)

Bobwhite Conservation Organizations

National Bobwhite Conservation Initiative (bringbackbobwhites.org)

Quail Forever (quailforever.org)

Other Resources in Ohio

Ohio Division of Wildlife (wildohio.com)

Partners for Fish and Wildlife Program, Region 3. U.S. Fish and Wildlife Service. (fws.gov/partners/aboutus.html)

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