Title: Bobwhite Populations in the Southeast: What can we expect from Habitat Management?

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In the past, abundant bobwhite populations were an accidental by-product of broadly-applied land management practices that created and maintained a diverse mosaic of early successional plant communities. In modern landscapes, comparable densities will only exist as a result of premeditated, intentional creation and maintenance of early successional plant communities. Stemming the population decline and restoring bobwhite populations to former densities will require creation and maintenance of critical habitat on a massive scale. The Northern Bobwhite Conservation Initiative (NBCI) is an ambitious, range-wide population and habitat restoration plan. The goal for this plan is to restore range-wide northern bobwhite populations to an average density equivalent to that which existed on improvable acres in the baseline year of 1980. Under the NBCI national habitat goals are stepped down to regional goals, which are then stepped down to state-level goals for implementation. Biologists with state wildlife agencies throughout the SE have developed state-level step-down plans for implementation of NBCI habitat goals. The NBCI depends heavily on the ability to influence land use practices on agricultural lands. Converting exotic grasses to native grasses, establishing native grass buffers around agricultural fields, and developing shrub cover in areas lacking winter cover can greatly increase quail habitat in agricultural systems. Heavy thinning, hardwood brush control, and frequent application of prescribed fire can produce excellent quail habitat in pine systems. The NBCI is predicated on the assumption that if we achieve these habitat goals, bobwhite populations will respond. But what level of response can we really expect?

The Good Old Days

Herbert Stoddard, in his classic work, “The Bobwhite Quail: Its Habits, Preservation, and Increase” suggested that on managed lands in the southeast bobwhite populations reached a “saturation point” of fall densities at about 1 bird/acre. He suggested, that although populations might periodically exceed this density, maximum sustained fall densities of 1/bird per acre were to be expected on lands managed to provide the year round habitat requisites. In the intervening years, numerous papers have been published demonstrating densities that exceed this level for some period of time on given sites. Dimnick reported that October bobwhite populations on Ames Plantation in Western Tennessee peaked at 1.5 birds/acre in 1974, but declined thereafter. Kellogg reported late 1960’s fall bobwhite densities of 1.5 – 2.7 birds/acre on Tall Timbers Research Station in northern Florida. On rangelands in Texas, in years with good rainfall, fall densities of 3 birds/acre are not uncommon. Today, on intensively managed quail plantations in northern Florida and southern Georgia, scientists at Tall Timbers
Research Station and Auburn University commonly observe sustainable fall densities of 2-3 birds/ac. In fact, in these landscapes, where bobwhite habitat is intensively and extensively managed, these are the *Good Old Days*.

However, there is the perception among the general public, bird hunters, field trial community, and even biologists that habitat management no longer works and that bobwhite populations cannot be restored on modern landscapes in the Southeast. This perception is largely due to inference of population levels from casual observations or metrics such as covey finds in field trials that are largely uncorrelated with actual population levels. Additionally, landowners often think they are managing for bobwhite, when in reality they are barely scratching the surface with a few food plots, heavy timber stocking, and infrequent fire. These misperceptions lead to faulty conclusions regarding success of habitat management and implementation of harmful alternative solutions such as release of pen-reared birds. However, these stake-holders raise a pertinent question: “Is it possible to produce viable and sustainable bobwhite populations in today’s landscape.” Let’s consider the evidence.

Unlike the Redhills region of Florida and the Albany Georgia area, most of the Southeast does not have the extensive plantation communities comprised of multiple large properties totaling hundreds of thousands of acres of contiguous habitat. However, throughout the South we do have numerous large (3000 – 5000 ac) public and private properties under varying degrees of active management. Bobwhite densities on these managed lands compared with background densities across the unmanaged landscape provide a measure of the relative success of habitat management.

**Breeding Indices**

Breeding populations can be indexed using the mean number of calling male bobwhite heard during a 5-minute early morning call count survey conducted during June. Researchers and biologists with MDWFP and MSU annually survey breeding bobwhites on some of these managed areas. On these lands under varying intensities of habitat management, breeding season call counts commonly range from 2 – 6 birds/point and average about 4 birds/point. These levels are 400 – 1200% greater than average indices (0.59 birds/point) observed during statewide breeding bird surveys. Moreover, breeding bird abundance on these lands is mostly stable or increasing. The presence of stable/increasing, moderate to high bobwhite populations on individual managed public and private properties in Mississippi during a time period when statewide and regional populations are sharply declining provides evidence in support of the efficacy of habitat management.

A fundamental limitation of breeding season call counts is that they are biased because not all calling birds are detected by the observer. However, call-count data can be adjusted for detection probability using mathematical models to produce an estimate of density of breeding birds. Biologists throughout much of the bobwhite range are cooperating in a coordinated monitoring program to measure the population response of bobwhite to region-wide implementation of CP33 Upland Habitat Buffers practice. This
monitoring program has provided additional evidence that in modern landscapes even relatively small changes in land use can produce measurable population responses. CP33 (Habitat Buffers for Upland Birds) is a continuous CRP practice in which agricultural producers create and maintain 30 – 120’ buffers of native warm-season grasses, forbs, and shrubs around crop fields. CP33 buffers typically represent a 2-10% change in land use. During the first 2 years of this program (2006 – 2007), average background densities of bobwhite in agricultural landscapes of the Southeastern Coastal Plain were about 1 calling male/44 ac. On farms with CP33, average densities were 1 calling male/14 acres, a 191% increase associated with a relatively small (5-10%) change in land use!

However, breeding season indices, although correlated with, do not translate easily to fall densities which are of interest to bird hunters, field trialers, land managers, and policy makers. Fall density can be estimated using fall covey counts.

**Fall Density**

CP33 monitoring also provides evidence of the magnitude of fall bobwhite response associated with management. Across the Southeastern Coastal Plain, background fall densities in 2006 were about 1 covey/61 ac, whereas average fall covey density on farms with CP33 buffers was 1 covey/38 ac, a 58% increase. During the second year of the program the response was even greater with background densities of about 1 covey/99 ac and densities on farms with CP33 buffers about 1 covey/24 ac, a 296% increase.

In 2007, surveys were conducted on several managed properties in Mississippi to produce unbiased estimates of fall density (number of coveys/unit area) with known precision. Fall densities estimated from statewide CP33 monitoring provide a point of reference from which to interpret observed densities. Let’s consider an extreme case of a landscape devoid of habitat. The Mississippi Alluvial Valley (The Delta) is one of the most intensively farmed regions of the country. Remnant habitat in this landscape is scarce and fields often so large a bird would have to pack a lunch to make it across (Photo 1). From CP33 monitoring we estimate that on agricultural lands in the Mississippi Delta, in the absence of any habitat management, we see average fall densities of about 1 covey/125 ac or assuming an average of 12 birds/covey, 1 bird/10.4 acres. On farms in this same landscape, addition of CP33 buffers (Photo 2) to crop fields, nearly doubles fall density to an average of 1 covey/70 ac, or 1 bird/5.8 ac.

On our sample of CP33 fields, upland habitat buffers are typically the only management practice being implemented. What densities can you expect from more extensive habitat management where CP33 buffers are simply one component of a more comprehensive conservation management system? In October 2007 we conducted surveys on a managed 7500 ac Coahoma County property (Photo 3). This property was not managed specifically for bobwhite, but approximately 33% of the property was maintained in conservation practices (upland habitat buffers, filter strips, forest riparian buffers, and large block hardwood plantings) that provided early successional habitat.
We documented farm-level fall densities of 1 covey/29 ac, or 1 bird/2.4 ac. Broadly applied conservation practices that created early successional habitat produced bird densities 4 times greater than in the surrounding landscape.

As another example, CP33 monitoring on unmanaged croplands in the Black Prairie region documented average fall densities of 1 covey/110 ac, or 1 bird/9.2 ac in unmanaged landscapes. However, a 5400 ac managed property in Clay County had a 2007 fall density of 1 covey/36 ac, or 1 bird/3 ac (Photo 4). This is a working cattle and rowcrop farm, but approximately 25% of the total property was in one of several conservation practices including; riparian buffers, native warm-season grass buffers, native warm-season grass pasture, or Conservation Reserve Program grasslands. This working farm is carrying fall bobwhite densities 3 times greater than the surrounding landscape.

A basic tenet of bobwhite management is that bird response is intensity and scale dependent, meaning that the more intensive the management, the greater the bird response. Additionally, the same intensity of management will produce a greater per acre bird response if conducted over a larger area. These principles are illustrated on a 3200 property in Panola County (Photo 5). More than 75 % of the total property is actively managed for bobwhite habitat. Management practices include: heavy thinning and prescribed burning of CRP pine plantations (Photo 6); conversion of rowcrop to native warm-season grasses; herbicidal eradication of exotic forage grasses on former pastures; management of grass CRP fields using strip-disking, prescribed fire, and rotational food plotting (Photo 7); establishment of shrub thickets and corridors; and legume field borders on agricultural fields. During fall 2007, this property supported an average covey density of 1 covey/21.9 ac, or 1 bird/1.8 ac. Habitat management on this property produced fall densities 5 times greater than the surrounding landscape.

Density estimates for these 3 properties are based on the entire property, including both managed and unmanaged portions. Density estimates in only the managed portions of these landscapes would easily exceed 1 bird/ac.

Conclusion

Back to our original question “Does habitat management work in today’s landscape?” These examples illustrate that across the Southeast it does. Simply the addition of 5 – 10 % native grass/orb habitats in agricultural landscapes can increase local bobwhite abundance by 60 – 300%. On relatively large, but isolated managed properties in Mississippi, active habitat management will support bird populations 3-5 times higher than the surrounding landscape. Can we expect to support 1-3 bird/ac populations characteristic of intensively managed plantations in the Redhills region? Probably not. But can we produce stable, sustainable populations capable of supporting recreational hunting? Absolutely.
Photo 1. Intensive agricultural landscape in the Mississippi Alluvial Valley, Coahoma County, MS.
Photo 2. CP33 native grass-legume field border along large agricultural field in Coahoma County, MS.
Photo 3. Coahoma County farm with extensively applied conservation practices.
Photo 4. Clay County farm illustrating broadly applied conservation practices in working landscape.
Photo 5. Panola County property illustrating extensively and intensively applied habitat management.
Photo 6. Heavily thinned CRP pine plantation immediately after thinning.
Photo 7. Diverse plant community in CRP grassland managed using strip-disking, prescribed fire, and rotational food-plotting.