



the Upland GAZETTE

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CURE Update and Outlook

During the 1990s, the N.C. Wildlife Resources Commission and N.C. State University conducted a series of research projects studying bobwhites and wildlife ecology on farmland in eastern North Carolina. The research projects began with a study of pesticides and bobwhites and progressed through studies examining the effects of field borders and tillage systems on bobwhite populations, songbirds, insects and water quality. The projects also focused on the impact of mammal-predator control on bobwhites and development of new census techniques. These studies pointed toward restoration of nesting and brood habitat as the most productive avenue to reverse long-term quail population decline on eastern North Carolina farmland.

History of CURE

In August 2000, the Commission's Division of Wildlife Management initiated a new program, which would be the first step toward restoring bobwhite quail and associated wildlife primarily dependent on early succession habitats. This initiative was named the Cooperative Upland-habitat Restoration and Enhancement program or CURE. Since that time, the division staff identified suitable sites to initiate pilot projects on farmland and state-owned game lands, developed management plans for each area, and implemented programs to improve habitat. Additionally, biologists have implemented surveys to monitor habitat changes, bobwhites and songbirds on the CURE areas.

Identifying CURE Areas—Public and Private

The first step in initiating the CURE program was to identify areas of the state where land use was most suitable for developing quail habitat. Using what we know about quail biology, we ran an analysis of North Carolina landscape features and selected areas based on the presence of a large percentage of row-crop farm fields interspersed with forested patches. Landscapes with high percentages of unsuitable habitats such as unbroken closed-canopy forests, suburban areas and wetlands were avoided. The first analysis identified large portions of the upper Coastal Plain as suitable landscapes. Because the division also was asked to work in our best Piedmont habitats, we relaxed our criteria to include grasslands (pastures and hayfields) and identified an area in the western Piedmont where cattle farms are interspersed with woodlots. Staff has been working with private landowners on pilot projects of about 5,000 acres each in the three focal areas, which are dominated by farming landscapes (Figure 1).

The division also wanted to manage quail on public lands. Unfortunately, state-owned lands are all located in forested landscapes and do not fall within the identified CURE focal areas. As a result, they do not provide the opportunity for rapid habitat establishment normally found on landscapes dominated by row-crop farming. However, suitable parcels of four state-owned game lands were selected to

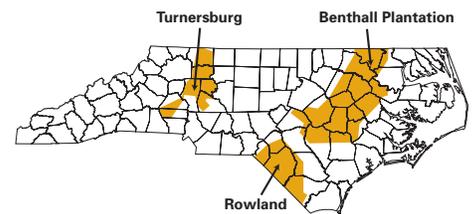


Figure 1. N.C. CURE Focal Areas and Pilot CURE Cooperatives.

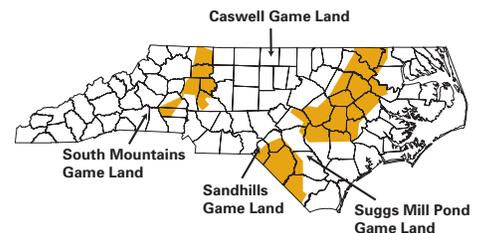


Figure 2. N.C. CURE Focal Areas and location of CURE Game Lands.

be developed into high-quality early succession habitat (Figure 2).

Today, pilot CURE areas have been established on landscapes dominated by agriculture (three private lands CURE cooperatives and one recently established corporate farm) and landscapes dominated by forests (four game land CURE areas). Each of the eight areas is unique in that each presents different opportunities and challenges. Initial quail populations were higher and habitat development was accomplished most quickly on Coastal Plain landscapes dominated by row crops,



North Carolina's CURE Program, designed to recover populations of bobwhites and other early succession birds, is funded through 2009.

where field borders quickly developed into plant communities important to bobwhites. Progress in establishing habitat has been slower on game lands CURE areas, where forestry operations (timber sales primarily) take longer to implement and groundcover requires time to develop following treatments.

Private Lands CURE Areas

The Challenge of Managing Quail Habitat

Developing the Turnersburg Cooperative has been challenging. That's because creating and maintaining significant areas of high-quality habitat has been difficult in a Piedmont landscape composed of cattle farms, woodlots, and a rapidly growing number of home sites. Many narrow habitat borders converted from fescue to native grasses or volunteer vegetation have been difficult to maintain and are not providing quality cover. In addition, communicating with owners of 22 small farms who work jobs off the land or lease out their farms has been difficult. The bright spot at Turnersburg has been the successful establishment of native grasses that provide wildlife habitat as well as forage. These areas, subsequently managed with consideration

for both wildlife and forage needs, provide a template for future efforts on Piedmont grasslands. Less than one-quarter of the landscape at Turnersburg is useable by bobwhites during the breeding period of the year. More troubling is the fact that less than 270 acres of winter habitat exists in the 5,371 acre landscape, creating a bottleneck that may account for the fact that quail population trends on the Turnersburg area mirror those of nearby reference routes.

Restoration of Quail Populations Varies

Quail populations have increased significantly, and landowner satisfaction with quail responses has

been high on the private lands cooperative at Rowland in Robeson County. This set of 11 farms is located on a landscape dominated by row-crop farmland and actively managed woodlands. The habitat created by field borders and burned woodlands through CURE is complemented by numerous early-succession habitat patches afforded by grain fields, young pine stands established on farmland, regenerating clear cuts, and grain fields. We estimate that over 60 percent of the landscape at Rowland is useable by bobwhites during some portion of the year. Initial quail populations were high at Rowland and have increased to the point that permit hunts were conducted on this area in 2005 and 2006. The cover is tough, but the quail are there!

Initial quail populations were low on the Benthall Plantation CURE area in Northampton County, where the landscape is composed of fertile crop fields planted with cotton and bisected by wetlands and mature forests. High-quality habitat on crop-field edges is created and maintained through periodic disking and spot applications of herbicide to control hardwood sprouts. Measures of quail populations have fluctuated greatly, and no clear population trends are evident, though populations on a nearby reference route continue to decline. The fact that one-half of the landscape is composed of

unsuitable habitats such as wetland sloughs and mature closed-canopy forests may limit quail population growth.

Work was recently initiated on a large corporate hog farm belonging to Murphy-Brown, LLC. The farm has diverse land uses including hog production, row-crop farming, cattle farming and forestry. The focus on the area is to show contract livestock farmers how both water quality and wildlife can benefit by managing buffers established in volunteer vegetation or native grasses. Funding for this project comes from a grant to improve water quality. Initial quail populations are high, though pocosin habitats surrounding agricultural lands limit the availability of birds to hunters.

Game Lands CURE Areas

The Challenge of Using Game Lands

We have considerable work to accomplish before the CURE projects are completed on the game lands and we can evaluate whether or not the efforts have been successful in restoring bobwhites. For example, on the Caswell Game Land, the staff has marked and sold timber on 850 acres out of a planned 1,500 acres. Habitat development on the forested site is slow because even following a timber sale, harvest can be delayed by weather, and it often takes more than one growing season following harvest for cover to respond and provide useable habitat. The summer of 2006 should mark the largest increase to date in the amount of useable habitat available as timber harvests, subsequent burns, and plantings develop into useable habitat. When we began work on Caswell, we estimated that 11.8 percent (680 acres) of the 5,766 acre Caswell CURE area supported habitat which was useable by bobwhites. Currently we estimate that about 18 percent (1,040 acres) of the area provides habitat suitable for use by bobwhites during some portion of the year. The majority of the non-useable habitat (82.0 percent) was a mixture of mature pine and hardwood stands, many of which will be converted to early-succession habitat. We project that our initial timber sales will be complete in 2009, and within a few growing seasons, will support useable habitat on 51 percent (2,940 acres) of the CURE area. So we are about one-third of the way complete with our plan to increase habitat. To date, our spring call count and fall covey count surveys have not detected a change in quail numbers.

Like the Caswell area, our other game land CURE areas are also “under construction,” with considerable work remaining. The percent of the CURE areas that provided useable habitat during some portion of the year (as measured in the fall of 2005) was 25 percent on Sandhills, 15 percent on South Mountains, and 12 percent on Suggs Millpond area. When complete, these areas will support from 2,500 to 5,000 acres of quail habitat. Our surveys indicate bobwhite populations are increasing on the Sandhills CURE area and remain low, but stable, on the other areas.

Our Land Management staff is excited that we have been given the opportunity to manage the game land CURE areas intensively. We look forward to applying our management skills across the forested landscapes to link early-succession habitats that are currently isolated by blocks of mature timber. Our goal for the game land CURE areas is to implement quail hunting by permit when quality hunting opportunities can be offered.

The Next Step

We do not have all the answers, but we have learned much. We plan to put this knowledge to work as we expand the CURE program by offering the opportunity to participate to landowners adjacent to our current private and game land CURE areas. The Wildlife Resources Commission voiced continued support for the Cooperative Upland-habitat Restoration and Enhancement Program (CURE), at its October 2005 meeting. Program funding was authorized through June 2009, and staff was directed to work toward identifying stable long-term funding sources to support upland wildlife habitat management on private lands.

We entered the CURE program with the knowledge that restoring bobwhites following 30 years of population decline was not going to be easy or rapid. Our efforts, to date, have not brought back quail to previous numbers, but within a relatively short time, populations on CURE areas are stable or increasing when compared to reference routes. We have had a few disappointments and setbacks, but each has taught us a lesson that we will be putting into practice as we move forward. ♦

Look for Part 2: “Lessons from CURE” in the spring issue of the Upland Gazette.

A Challenge of the Mind

Does predation undermine habitat-based bobwhite quail restoration efforts?

Editor's Note: Does predation (by foxes, coyotes, rats, even raptors) undermine habitat-based bobwhite quail restoration efforts? In this article, Donald F. McKenzie, coordinator of the Northern Bobwhite Conservation Initiative (NBCI), replies to those arguments while reasserting the need for a habitat-based approach.

do not doubt that the influence of predation on quail populations has changed and increased over the decades. Nor do I dispute that some intensive predator control would result in some improved nesting success and survival of quail and some increase in population at some level. These points and logic have some merit that I do not discount.

However, I do not agree with the premise that habitat improvement alone is not enough. I am unconvinced that wildlife conservationists have yet conducted any habitat improvement effort massive enough and on-target enough to demonstrate that quail cannot be recovered through habitat management alone. To be more straightforward, in my view, no “massive” habitat improvement effort has ever been conducted for quail; thus, there is no basis for any conclusion that massive habitat improvement cannot work.

For discussion purposes only, I might be more receptive to an argument that the habitat restoration task is simply too massive to be attainable in our lifetimes than I am to an argument that massive habitat improvement has been proven not to work. There have been numerous small- to modest-sized habitat improvement efforts across the Southeast, with widely varying levels of implementation and success. The details of each one of these case studies can be evaluated and discussed at length, and lessons learned. I see many of these as demonstrations of the success that is possible at much larger scales. But putting them all together still would not constitute what I consider a massive effort when compared with the scale of landscape conversions in the past.

Fescue and “coastal” bermudagrass were officially released by the U.S. Department of Agriculture in 1943; bahia was officially released in 1944. In the 60 years since, some 120 million acres of land in the 22 states comprising the Northern Bobwhite Conservation Initiative have been converted to these three tame grasses, neutralizing those acres as quail habitat. About 210 million acres of land in those states is in annual crop cultivation, the practice of which has changed dramatically and unfavorably to quail over the same period. Some 40 million acres has been established to dense pine plantations.

To make all these conversions worse, fire has been virtually eliminated as an ecological management tool across almost the

entire Southeast. Further, untold millions of acres of all forest types across the 22 NBCI states are unmanaged, resulting in closed canopies and no quail habitat. Finally, the combined effect of all these changes is exacerbated when considering the impact that physical fragmentation of remaining suitable quail habitats has on resulting isolated quail populations. The cumulative sum of all these hostile land-use changes and the resulting habitat fragmentation causes the cumulative sum of all previous quail habitat improvements to pale in comparison. Even the 250,000 acres currently allocated for CP33 is a drop in the bucket compared with the need.

The largest “pure” habitat restoration effort I know of with respect to quail is ongoing in the Ouachita National Forest in west-central Arkansas and southeast Oklahoma. Some 50,000 acres of shortleaf pine/bluestem open woodland habitat have been restored and are being burned frequently by the U.S. Forest Service. After nearly 15 years of expanding restoration and management, wild quail densities on federal public land are approaching one bird per two acres in the project area, without predator control or supplemental feeding.

This is a successful quail restoration project in anyone’s book. But as large as this national forest habitat project is, it still doesn’t reach a level that I would consider massive. The pine/bluestem project area remains an island amid a landscape dominated by largely unsuitable quail habitat.

Please don’t misunderstand me. Although the habitat task is daunting, and the quest to restore quail to 1980 levels will not happen anytime soon, the task is not too big. I ardently contend that it is theoretically and physically doable. Man already has demonstrated his ability to change vast landscapes. If we’ve done it once in ways that are hostile to quail, then by definition it is physically possible to re-change enough of it in ways that are suitable for quail to return to circa-1980 huntable populations.

The good news in all this discussion is that wildlife conservationists have such a good base of quail research and knowledge that our success will not be limited by a lack of management information. We know how to restore and manage land for quail across the species’ range. The biggest challenge of quail restoration is a challenge of the mind. If society and wildlife conservationists prove capable of mustering the will and resolve and perseverance, then I am confident that quail eventually will be restored by way of landscape-scale habitat improvements.

If society and wildlife conservationists prove incapable, others will be welcome to pursue predator control as a measure of last resort. ♦

South Mountains: One Game Land, Two CUREs

Restoring Quail and Grouse Habitat

Although it got a later start than others, South Mountains Game Land has done something no other public or private CURE land can claim: it has established two separate, species-specific habitat areas.

Across 3,000 acres of valleys and other lower elevations, a carpet of native grasses and weedy-type vegetation has replaced the thick pine and hardwood forests. While across 5,000 acres of mountaintops, ridgelines and coves, the spruce and other high-altitude forest species have given way to a thick cover of saplings and seedlings.

Bobwhite quail and ruffed grouse, respectively, will be the primary beneficiaries of this mountain makeover. These declining game-bird species have not yet rebounded on South Mountains in the numbers we would like to see, but we are encouraged by what we have observed to this point.

CURE, the Cooperative Upland-habitat Restoration and Enhancement program, was begun by the N.C. Wildlife Resources Commission in 2000. It was conceived to reverse the decline of wildlife species that rely on early-succession habitat—the grasses, weeds and scrubby plants that follow logging, agricultural harvest or other disturbance of the land.

Going Great Guns on the Game Lands

South Mountains Game Land is the westernmost of the public and private CURE sites. Its 20,000 acres cover parts of Rutherford, Burke, McDowell and Cleveland counties. Open to the public for outdoor recreation (for schedules and other rules, refer to the *Game Lands Map Book*, available free from the Wildlife Resources Commission, or log onto www.ncwildlife.org), the game land provides scenic wonders and ample wildlife habitat, especially for generalist species (including huntable populations of turkey, deer, bear and especially feral hogs). The game land's next-door

neighbor is 16,600-acre South Mountains State Park. The natural area is a nexus of foothills and mountains, where Piedmont meets the Blue Ridge, and where quail and grouse territories overlap.

A Late Start with a Blank Slate

South Mountains got a slightly later start than other CURE projects. The Wildlife Commission did not acquire the property until 1998. By 2002, after CURE habitat restoration plans had been finalized and a crew hired to put them in place, other public and private CURE areas had a head start. But the South Mountains CURE area had another sort of head start. The previous landowner had clear-cut approximately 2,400 acres, giving us a blank slate on which we could begin to create our two new habitat types.

Starting with the clearcuts and surrounding acreage, we identified the lower-elevation lands that would be suitable for bobwhite quail, and which higher-elevation areas would be suitable for ruffed grouse. What we set out to do in the primarily quail CURE area was to replace the woody vegetation with herbaceous, grassy areas. Grasslands benefit quail and a whole suite of songbirds (meadowlarks, grasshopper sparrows, loggerhead shrikes and many others) that forage, take cover and nest in them.

On the lands, with an elevation of 2,000 feet or more, where the climate is somewhat cooler and preferable to grouse, we wanted to provide mostly woody growth instead of grasses and forbs. Grouse need a high-stem density—upwards of 8,000 to 10,000 seedlings and young saplings per acre. The contrast between grassy quail habitat and grouse habitat of dense, short woody growth isn't perfect. Grouse also need some high-elevation openings, particularly in the summer when they are raising chicks and are nesting and foraging for insects and other invertebrates.

Fire: A Hot Tool

Many tools are employed in the constant manipulation of these CURE lands, and fire is the most useful.

Today's prescribed burning practices take great care to ensure containment. And here in the mountains, burning carries inherent risks and considerations that are less applicable to other areas, requiring us to be extra careful. Sudden wind shifts or updrafts, for example, can blow embers across

a fireline, forcing us to use larger burn crews to watch the firebreaks for jumps.

Rain can also create problems for mountain burning, particularly on north-facing slopes.

That said, South Mountains Game Land crews are now burning 1,000 acres annually. That figure will only rise as previously burned lands are burned again in two- to three-year burn regimes.

Other Tools

Also useful in maintaining a state of early succession are timber harvests, which total about 100 acres annually on South Mountains Game Land. Some thickets of trees, however, are not commercially viable, even as pulp. In such cases, we employ heavy machinery. A bulldozer followed by a roller-chopper can quickly reduce a thicket of Virginia pine into fuel for fire, which is exactly what we do next.

Once leveled and blackened, the land is either replanted with native grasses, or we sit back and let Mother Nature take its course. Frequently, there are native grasses, legumes and forbs in the soil's seedbank that just need opportunity and some sunlight.

We also use herbicides to control unwanted vegetation. Some are so precise that they kill woody vegetation while allowing weeds and grasses to flourish. Thus far, herbicides have been especially useful in daylighting access roads, trails and firebreaks, as well as along the borders of wildlife food plots that we have planted throughout the game land.

Bringing Back Quail and Grouse

We are confident our efforts will one day produce huntable populations of bobwhite quail and ruffed grouse at South Mountains. CURE has been in place on the game land only four years, providing little time to get a good, measurable effect. Anecdotally, however, our crews seem to be hearing more quail whistles while they've been at work.

Restoring those species will not be easy. The general trend throughout the Southeast over the past several decades has been decline. It will be a challenge to turn that around, even on a site-specific basis. But we've been encouraged by what we've seen. We are setting the table for quail and grouse. The vegetation will be there when they return. ♦

—Dean Simon,

NCWRC Western Region Wildlife Forester



Established 1996

Published twice a year by the N.C. Wildlife Resources Commission, Division of Wildlife Management. Designed by the Division of Conservation Education. To become a subscriber, please send your name and address to the following address: *The Upland Gazette*, Division of Wildlife Management, N.C. Wildlife Resources Commission, 1722 Mail Service Center, Raleigh, N.C. 27699-1722. Comments and suggestions are welcome. Send them to the above address.

Name That (Bird) Tune

Call surveys measure CURE effects on songbirds

The gray June dawn sings with birds. A cacophony of calls tweet and chirp from all directions. The gumbo of birdsong seems indistinguishable—which is why Ryan Myers is here.

The N.C. Wildlife Resources Commission biologist will identify the birds by their songs, taking careful notes about species detected and where. The point is to determine what effects the CURE program is having on songbird populations.

CURE, the Cooperative Upland-habitat Restoration and Enhancement program, was created by the Wildlife Commission to reverse the long decline of bobwhite quail and other species, such as songbirds and small game, that rely on grassy, scrubby habitat. Development and modern agricultural practices have wiped out much early-succession habitat—so called because grasses and weeds are the first plants to succeed a harvest, clearcut or other land disturbance.

The CURE program recruits farmers and other large landowners to create habitat for early-succession species. Here at a Murphy-Brown hog operation in Bladen County, the CURE practices are evident. Buffers of native grasses surround the fields of feed corn and line the irrigation ditches. Less evident, and what the bird-call data will help determine, is what effects the habitat improvements are having on songbirds.

Myers follows a nine-mile route that meanders throughout the immense Murphy-Brown property, a mosaic of fields, sandy roads, hoghouse clusters, old blueberry orchards and pine forest. At 21 predetermined stops, he steps down from the truck and listens for precisely three minutes.

As a pink sun peeks over hazy pines, a log truck rumbles and hisses along the highway. A faint breeze susses through the tasseled cornrows. A whistled *bobwhite* cuts through the auditory jumble. An easy one, even to a clueless observer tagging along today. A rooster crows—even easier.

“But is it a Rhode Island red or Plymouth rock?” Myers jokes.

He explains that an ear for bird songs is not developed just through rote memorization—several tapes and CDs are on the market—but also by grouping the calls with similar characteristics. There are mimickers, sing-songsters, simple callers and complex vocalizers, to name a few. Even then, differentiation can be tricky.

“A lot of sparrows sound alike, but the Bachman’s sparrow—hear it?” He’s asking someone who wouldn’t know a Bachman’s sparrow from Bachman-Turner Overdrive. But Myers is patient. “It always starts with a strong high note—there,” he says as a sharp, high-pitched *seeeeeee!* rings from the nearby pines, “and it follows with a trill.” *Sssslip-ssslip-ssslip*. The Bachman’s sparrow is suddenly a soloist above the bird chorus. Knowing what to listen for makes a difference.

Knowing what to expect also helps. “It’s a matter of elimination,” Myers says. “You come up with a list in your head, what you expect to hear based on where you are, the type of habitat, the time of year. For example, right here I wouldn’t expect to hear a wood thrush,” which prefers hardwood forests. “But I hear a lot of kingbirds,” he says, pointing in the direction of an argumentative *kit-kit-kit-kit-kitter*. “I wouldn’t expect to hear them here in the winter. In the winter, you’ll hear a lot of sparrows. All the warblers are here now.”

He stands nearly motionless. “I try not to move around a lot, just listen,” he says. “One time, I had a hummingbird fly right up to me.” His head swivels to take in a distant call, and his hand jots what he’s heard.

His notes also record time of day, prominent vegetation, land characteristics and weather conditions. They’re all factors that can explain the prevalence, or not, of the various songbirds that the CURE program has tried to benefit since its launch in 2000.

The bird call surveys have indicated mixed results, said Jeff Marcus, a Wildlife Commission faunal diversity biologist. Species that prefer shrubland habitat appear to be the big winners—in particular the indigo bunting and the field sparrow. Meadowlarks, grasshopper sparrows and other grassland birds haven’t shown any detectable changes, either positive or negative. Nor has there been a change in the birds that nest in other habitat types but forage in the grasslands—phoebes, kingbirds, flycatchers and bluebirds.

“One of the lessons from the program in general is that not all bird habitats are the same,” Marcus said. “That may sound like an obvious statement, but there’s a tendency to lump quail and songbirds together, as far as grassland habitat needs. But there is a much wider range of habitat conditions. What’s suitable for quail may



Ryan Myers, CURE survey biologist, decodes songbird tunes on the Ammon CURE Co-operative.

not be for all others. You have to make decisions on what you can do.”

The morning advances like sorghum, becoming sticky with the heat. A distant buzzing of crickets, it turns out, is actually a grasshopper sparrow in a nearby pasture. A staccato *chuk!*, like gravel scraping, comes from an iridescent bird perched on a power line—a grackle. A piped *drink-your-tea* (and yes, it does sound like that) is the hospitable call of the towhee.

On the back side of the farm, an unexpected cornfield inhabitant excites Myers. It’s a dickcissel, a bird more commonly found in the Midwest. What does its call sound like? “Listen,” Myers says. The calling chaos gradually orders itself. Quail in distant cover whistle *bob-white, bob-white*. From the direction of an equipment shed, a catbird mews like a lost kitten. A yellowthroat like a virtuoso emits a rapid-fire *witchity-witchity-witchity*. And there it is, unmistakable and onomatopoeic—*dick-ciss-ciss*, pause, *dick-ciss-ciss*.

Myers tromps through the snaky growth toward the middle of the field, hoping to glimpse the visitor. But the *dick-ciss-ciss* has ended. Frozen, as in a game of musical chairs, he waits for the song to resume. It doesn’t. Myers shrugs his shoulders and turns back for the truck. Somewhere to the east, under a sun still gauzy white in the haze, *rink-roma, wheet-wheet* twangs clearly.

“Brown thrasher,” he announces. “Its call is in pairs.” ♦

—Brad Deen

Managing Forest Lands for Ruffed Grouse

Regeneration methods vary, depending on land and goal

Editor's Note: The following article has been adapted from "Managing Habitats for Ruffed Grouse in the central and southern Appalachians," a chapter of an in-progress book based on findings of the Appalachian Cooperative Grouse Research Project. The ambitious multiagency study of ruffed grouse involved dozens of researchers from the Southeast to New England. Authors are Craig A. Harper and Benjamin C. Jones from the University of Tennessee, and Darroch M. Whitaker and Gary W. Norman from Virginia Tech.

Appalachian ruffed grouse (*Bonasa umbellus*) require a variety of forested habitats as well as openings within the forest. Lack of nutritious foods and suitable cover are often cited as limiting factors for Appalachian grouse populations. However, habitat manipulation that improves food availability and escape cover can promote population growth. Land managers who want to improve conditions for ruffed grouse must provide needed habitats in sufficient amount and in an arrangement that makes the area favorable for grouse.

Managing forests—including forest roads and openings—typically involves some combination of timber stand improvement practices, such as thinning to provide more sunlight and nutrients, and allowing the forest to regenerate in a variety of ways. However, not all regeneration methods are suited for all forest types and situations. Careful consideration is in order before applying any of the following regeneration techniques.

Clearcut

Clear-cutting removes all trees from the site, creating an even-aged stand. More sunlight reaches the forest floor than with other regeneration methods, resulting in vigorous competition among shade-intolerant trees (e.g., yellow poplar, black locust, black cherry, pin cherry and basswood) and other species that sprout and grow rapidly after cutting (e.g., red maple, white ash and birches). Less aggressive species (including oaks) that are intermediate in shade-tolerance are often under-represented in clearcut-regenerated stands, especially on higher-quality sites.

Several tree species (birch, cherry and serviceberry) produce buds that are an important winter food for grouse. Other

foods, such as blackberries and blueberries, as well as herbaceous forage, are often abundant following clear-cutting. On drier sites, where oak-hickory forests are more prominent, hard mast (especially acorns) is an important winter food for grouse. Clear-cutting an oak-hickory stand creates high-stem densities desirable for escape cover; however, mast production is eliminated for approximately 40 years.

Despite shortcomings of clear-cutting for regenerating oaks, clearcut stands provide excellent habitat for ruffed grouse, especially five to 20 years after harvest. Grouse may use clearcut stands for escape cover, foraging, nesting, drumming and brood-rearing during this period. Beyond 20 years, habitat quality decreases as the canopy closes and grows taller, causing decreases in woody stem density, herbaceous ground cover and soft-mast production.

Many private landowners feel clear-cutting is too invasive and look for other regeneration methods as aesthetic alternatives to clear-cutting. Some alternative methods have real value in promoting regeneration of some important hardwood species.

Shelterwood

The shelterwood regeneration method has been used more in recent years for increasing the development of advance oak regeneration. This should be a major consideration for land managers in the central and southern Appalachians who are interested in ruffed grouse, as well as many other wildlife species.

Shelterwood harvests occur in two or more stages and produce an even-aged stand. The initial shelterwood harvest removes a predetermined amount of the forest canopy, enabling partial sunlight onto the forest floor. This enables existing seedlings of moderate shade tolerance, especially oaks, to compete better with shade-intolerant species and produce advance regeneration. Advance regeneration then is released by subsequent harvest(s) that removes residual overstory—usually six to eight years after initial harvest.

Initial shelterwood harvests may leave as little as 10 to 30 percent of the original canopy cover. This results in regenerating stem densities and species composition similar to that following a clearcut. Regardless of the amount of residual overstory left standing, it is critical that quality

mast-producing trees (especially oaks) are retained instead of other species with less value to ruffed grouse. A good mixture of oaks from both white and red oak groups should be retained to offset interspecific variation in mast production.

The benefits of shelterwood harvests over clear-cutting are the retention of mature, mast-producing oak while advance regeneration is developing; provision for oak in the future stand; and retention of mature trees for aesthetic purposes. Acorns are a nutritious food that can influence survival and recruitment of Appalachian ruffed grouse. Therefore, stands that intersperse mature oaks with woody sapling cover will benefit grouse in the region. In North Carolina, our radio-tagged grouse began using stands harvested by the shelterwood method three years after initial harvest, prior to removal of residual canopy trees.

Another advantage of the shelterwood method is that loggers have to come back into the stand one or more times over several years after the initial harvest and remove the residual overstory. Although this is less efficient than clear-cutting in terms of harvesting timber, it is beneficial to grouse because another flush of herbaceous cover and soft-mast production can be expected after each harvest.

Two-aged system

A two-aged system represents a planned sequence of treatments designed to regenerate a stand while maintaining two age classes of trees. Select "reserve" trees are retained after the initial harvest so they can continue to provide benefits not related to regenerating the stand. For example, mature trees are left to provide acorns, nest sites, or foraging areas for songbirds.

A shelterwood with reserves (or irregular shelterwood) produces a stand of two distinct age classes—a residual mature overstory with developing regeneration below. Trees retained in an irregular shelterwood are chosen based on their capacity to produce seed and increase in value until the regenerating stand is harvested. When few oak seedlings are present, a thinning from below following a good mast crop can be used to help stimulate and increase oak regeneration before harvest.

Another two-aged regeneration method is a clearcut with reserves. This method is similar to an irregular shelterwood except

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Raleigh, NC 27699-1722



(Note: Hunters who participated in last season's Avid Quail and Grouse Hunter Survey will automatically be included in further mailings and need not reply.)

Name _____
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City _____ State _____ Zip _____

Name _____
Address _____
City _____ State _____ Zip _____



there is far less basal area after harvest, and there is no plan to harvest the over-story until the end of the rotation of the regenerating stand.

Regeneration methods that produce two-aged stands show great promise in creating optimal habitat for Appalachian grouse; however, it is imperative that oaks with good growth form and mast production potential are retained as residuals. Two-age stands provide both food and cover, allowing grouse to forage on acorns and other foods without increasing risk of predation.

Group selection

The group selection method mimics small-scale canopy gaps created by natural disturbance events. Small groups of trees within a stand are harvested over time, creating a mosaic of even-aged patches within an uneven-aged stand. A percentage of early-successional habitat can be maintained across the stand while avoiding visual impacts of larger even-aged harvests. The size of group selection harvests ranges from a small area occupied by a few trees to nearly two acres.

Size of group selection cuts may influence stand composition and structure. Larger group harvest units (greater than one acre) are more likely to result in shade-intolerant species such as yellow poplar and basswood. Shade-tolerant (sugar maple and beech) and intermediate species (oaks and birches) may be more prevalent in smaller group harvests. In North Carolina, yellow poplar, sweet birch and red maple sprouts dominated regeneration within small group openings (less than 0.2 acre) on mesic sites, while oak regeneration was plentiful as a result of diffuse

sunlight on the forest floor around the periphery of each patch. As with even-aged methods, the presence of advance-oak regeneration is an important consideration before implementing group selection harvests in oak-hickory stands.

Although not documented or demonstrated, concern has been expressed that the group selection method creates isolated pockets of habitat. To relieve this concern, thinning between groups would soften edge effects, increase understory stem density and improve groundcover conditions and connectivity between groups. Regardless, group cuts should be well interspersed to increase cover and foraging opportunities for ruffed grouse in mature stands. Groups themselves also may serve as stepping stones and thus act as travel corridors. The group selection method should not be viewed as a substitute for even-aged management, but rather as a complement, serving to connect young forest stands and improve conditions for grouse over a broader area.

There are many other practices a landowner in the central and southern Appalachians can enact to provide habitat for ruffed grouse—from maintaining old-field forest openings and promoting grapevines, an important grouse food source, to eradicating non-native, perennial cool-season grasses (e.g., orchardgrass, tall fescue, bromegrasses, timothy and bluegrass). Because Appalachian ruffed grouse are often under severe nutritional stress during winter, prior to breeding, it is essential to provide quality winter foods within a stand that also provides quality cover. This is possible through the shelterwood, irregular shelterwood, and clearcut with reserves methods. ♦

Last Big Push for Upland Bird Habitat Buffers

The fall and winter of 2006–2007 may be the last opportunity, under the current Farm Bill to enroll field buffers into the Upland Bird-Habitat Buffer Practice of the Conservation Reserve Program. The current Farm Bill is authorized through the fall of 2007. Those in the know are predicting that the next version of the Farm Bill may be a leaner version than our current one, due to concerns about mounting national debt.

North Carolina got off to a good start and used about half of our allotted 11,300 acres during the first year. However, despite continued promotion of the program to farmers and landowners in the upper Coastal Plain, signup remained stagnant during fall and winter of 2005–2006.

Field research has consistently shown that wooded field edges produce less crops, and their lower yields often do not justify the expense of seed, herbicide, fertilizer and equipment time. Upland Bird Habitat Buffers can convert farm field edge acreage to a net positive to the bottom line, while benefiting bobwhites and a host of other wildlife species.

To be eligible, the buffers must be on row-crop land with active cropping history for four of the six years—from 1996 to 2001—and must measure between 30 and 120 feet wide. Annual rental payments are based on soil fertility and local established rental rates. Compensation includes a one-time signing bonus of about \$100 per acre enrolled, an annual maintenance payment of \$4 per acre and a management payment of up to \$100 per acre over the 10-year lifetime of the agreement.

Interested landowners can sign up until the state allotment is used or until the end of the current Farm Bill. Contact a Farm Service Agency office and ask for enrollment applications for practice CP33, Upland Bird Habitat Buffers. ♦

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RETURN SERVICE REQUESTED

Mowing Alternatives to Benefit Wildlife



Land Managers' TOOLBOX

wildlife-friendly techniques to maintain openings. Take a look at the list below. It offers alternatives that guide landowners who manage fallow fields and openings and wish to increase wildlife populations.

Alternative 1 (For Quail Management)

If the landowner is interested in quail management the best maintenance practice is to harrow or disk one-third to one-half of the area every year. Landowners should alternate disked sites from one year to the next and expose only about 50 percent of the soil.

Oftentimes, we become creatures of habit and forget to question the way we do things. Today's technology offers more effective ways to control woody vegetation, and there are certainly more

This practice helps control woody vegetation, such as tree sprouts, from overtaking the field and stimulates the growth of annuals for the following spring. I recommend the month of March to harrow because it is just before spring and protects the needed cover used by wildlife for a longer period.

Landowners who have continuous problems with woody vegetation may need to use a spot-applied herbicide or occasional heavy disking to control saplings.

Alternative 2 (Also for Quail Management)

Landowners with the capability to burn old fields can use fire to maintain the fields and top-kill woody sprouts. Late winter or spring burns on a one-to-three-year rotation can keep ground cover in a condition that is suitable for quail and other wildlife and help control sprouts.

Alternative 3

In fields where quail management is not a high priority, landowners, instead of disking, can use spot-applied herbicides

to control woody vegetation and to maintain successional age of weedy growth.

Alternative 4

If woody vegetation is not a problem, landowners can mow fields on a rotational basis every three years during the last two weeks of March. This date is recommended because it's just before the nesting season and allows the vegetation to grow back rapidly to a height that offers cover for many wildlife species.

If landowners explore alternatives to their current mowing times and methodology, they will often find options that will benefit many early-succession wildlife species.

When I see someone mowing a "wildlife haven," I always wonder if they have considered the impacts on wildlife. I also wonder if the mowing is really being done to reach a necessary management goal, or to fulfill some deep psychological need. The aesthetic goal of having everything clean and sterile has gone too far. ♦

—Patrick Farrell,
NCWRC Technical Assistance Biologist