



the Upland GAZETTE

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Controlling Predators, or Controlling Predation?

WHEN A HAWK FLIES BY WITH A bobwhite quail in its talons or when a biologist finds a tiny radio transmitter hanging 20 feet up in a tree, it is easy to believe that the answer to more bobwhite quail is fewer predators. For the individual animal that loses its life, predation is final. However, the fate of the individual has to be added to that of many more to understand changes in the size and distribution of wildlife populations.

The possible causes of death to quail—including predation, exposure, disease and even destruction by farm equipment—can be countered by the possibilities of health, growth and reproduction. From a quail management perspective, the central issue is how to tip the balance in favor of the quail population. For a huntable resource, the annual recruitment of birds—the total number of birds added to the population during the year—has to replace those lost through all the agents of death, including losses due to hunting over the prior fall and winter. Populations grow when more coveys are produced. For hunting to be excellent, the coveys need to be both abundant and accessible to hunters but difficult for predators to locate.

There are at least three important aspects to understanding the impact of predation on quail populations. First,

how abundant are the predators that can catch and kill quail? Second, does the habitat provide the resources needed for quail to reproduce and grow as well as protection from predator detection and attack? Finally, what role do we play, considering that we too are predators, in providing enough quality habitat for quail? In 1997, a team of wildlife researchers set out to explore these questions in eastern North Carolina and the southern Piedmont of Virginia.

Comparing Habitat Quality and Predation

As these questions indicate, separating predation from habitat quality is not easy. Therefore, we set out to test one against the other during a four-year study. Research by Marc Puckett showed that field borders along drainage ditches in the Alligator River National Wildlife Refuge attracted and produced more quail than farms without field borders (fall 2002 "Upland Gazette"). Thus, we felt confident that field border systems would increase coveys. However, previous research indicates that predation by mammalian predators has a significant impact on populations of waterfowl and other birds in some areas. We felt that it was possible for quail populations to increase if mid-sized mammalian predators (raccoons, opossums,

striped skunks, red and gray foxes, and feral dogs and cats) were removed from farms.

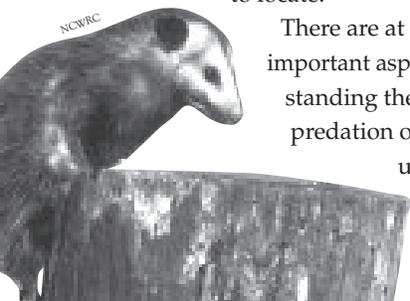
Our approach was to select four experimental areas—one in Va. and three in N. C.—and use four farms in each area for treatments. These experimental farms were between 330 and 938 acres in size. In each experimental area, we would trap and remove predators from one farm, improve borders on one farm, both remove predators *and* improve borders on one farm, and leave one farm untreated. As a result, one farm in each experimental area would have both treatments, and one would have no treatments at all (see Figure 1).

We reasoned that if mid-sized

	PREDATORS TRAPPED	NO TRAPPING
FIELD BORDERS ADDED	3 farms in North Carolina	3 farms in North Carolina
NO FIELD BORDERS	5 farms — 2 in Virginia, 3 in North Carolina	5 farms — 2 in Virginia, 3 in North Carolina

Figure 1. Experimental Treatments

mammalian predators were highly effective at finding and destroying quail nests, then reducing the number of predators would result in increased quail populations in the fall. Similarly, if nesting and



brood habitat (the field borders) were in critically short supply, then farms with field border systems would produce more quail each growing season. Finally, if both predation by mammals and habitat were important, there would be an additive effect, such that farms with both treatments would produce many more quail than either of the other treatments alone.

Field Borders as Habitat Enhancement

The field borders on our experimental area in Va., near Amelia, failed due to drought, so we had no habitat improvement treatments there (see Figure 1). We set up the N.C. experiments in Hyde and Tyrrell counties in the lower Coastal Plain and on the Wilson-Edgecombe county line in the upper Coastal Plain. The Va. experimental area was associated with dairy operations, while the N.C. areas were associated with crops: small grain and corn for the lower Coastal Plain area and cotton, soybeans and tobacco for the upper Coastal Plain area. The Wilson County, N.C., and Va. experimental areas featured a mix of fields and forested lands, but the other experimental areas had more tilled land—separated by drainage ditches at 330-foot intervals with wooded areas on the edge of farming operations.

Our field border treatments were 10- to 15-foot-wide borders of natural, early-successional vegetation at the edge of all tilled fields within the treatment farms. The field borders were mixtures of grasses, annual plants (goldenrod, dog fennel, beggar's-lice), vines (Japanese honeysuckle, trumpet vine), briars (green briar, blackberry), shrubs (wax myrtle, silverling), regenerating hardwoods (sweet gum, red

maple, cherry, willow) and loblolly pine that separated planted fields from woods, farm roads and drainage ditches.

Trapping Procedures

We set 40 traps on each treatment farm for 17-day periods, monthly from late January through late May each year. Traps were checked each morning, and no animals were killed in the traps. We anesthetized and euthanized the captured animals using standard procedures prescribed by veterinarians. We either returned domestic animals to their owners or took them to the nearest animal shelter.

Measuring Predator Activity

In addition to trapping, we sought to understand the predators' activity on the landscape, on both trapped farms and untrapped farms, by setting out artificial quail nests, with six quail eggs inside and surrounded by a 9-inch-wide band of tracking sand (tinted to match the soil). We placed 20 of these nests at the edges of fields in random locations on each of the four experimental areas, starting before the first trapping session, between each trapping session and after the last session. If the trapping was effective in reducing the probability of a wild quail nest being destroyed, then the predation activity of mid-sized mammalian predators on trapped farms should have been much less than that on untrapped farms.

Measuring Quail Abundance

We surveyed quail on each farm in late September through mid-October by counting covey calls at dawn on days with little or no cloud cover or wind. Observers listened—at least 500 yards apart, two per farm—for covey calls from 45 minutes before sunrise until sunrise. Observers surveyed on two successive mornings, and the numbers of coveys heard were averaged. Further study utilizing radio-tagged coveys indicated that approximately 70 percent of the coveys called each morning,

Results

Predators Removed. Over four years of trapping, we removed a total of 1,643 predators. Predator removal rates for each of the study areas were as follows: 578 (including 67 striped skunks) in Amelia County, Va.; 310 in Hyde County, 377 in Tyrrell County and 378 in Wilson County. The trapping effort was relatively constant over the years, and our field borders also improved in quality. Therefore, we concluded both types of treatment had measurable impacts on the farms and, if these treatments were important to bobwhites, then quail covey abundance measurements should demonstrate the impacts.

Visitation to Artificial Nests. Surveys at the artificial quail nests revealed different levels of predator activity over the years, among the experimental units and within the years. On reference sites (untrapped farms), predator activity increased over the years. On removal sites, there were short-lived peaks of activity by different predators over the trapping seasons and years, whereas on reference sites predator activity was more constant. In each year, removal by trapping dramatically reduced predator activity, as measured by visitation rates to the artificial nests. The presence of field borders did not affect visitation rates of predators to artificial nests.

Quail Counts. On farms with predator control, an average of 3.2 coveys were heard, whereas on farms with neither predator control nor field borders, an average of 3.6 coveys were heard. When field borders were present and where predator control was conducted, an average of 5.6 coveys were heard, whereas on farms with field

New Cost-Share Program Helps Wildlife

LANDOWNERS INTERESTED IN IMPROVING THEIR LAND TO BENEFIT bobwhite quail, wild turkeys, cottontail rabbits, white-tailed deer and other upland wildlife now have a new cost-share assistance program. The Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP) have been replaced by the Forest Land Enhancement Program (FLEP). The program is administered by the N.C. Division of Forest Resources (NCDFR) with additional assistance provided by the N.C. Wildlife Resources Commission, N.C. State Cooperative Extension Service, Natural Resources Conservation Service and other agencies.

Like the former programs, FLEP helps Nonindustrial Private Forest (NIPF) landowners manage their property for wildlife, timber, soil and water quality, aesthetics and recreation by providing cost-share assistance of up to \$10,000 per landowner for various management practices. Technical assistance is available to anyone free of charge; however, to qualify for FLEP cost-share, one must be a NIPF landowner and own a minimum of 10 acres of forestland or land suitable for growing trees. Exceptions are landowners principally engaged in the processing of wood products (including Christmas tree farms and orchards) or fee hunting operations. These types of properties are ineligible for cost-share.

To enter into FLEP, a management plan is required. The landowner, his or her designee, or a resource professional can prepare the plan. Resource professionals are available to offer this service free of charge. All management plans must be approved by the state forester or his designee to be eligible for cost-share assistance.

Many of the practices that are cost-shared through FLEP will help landowners improve the habitat for upland wildlife. Good examples of practices authorized for cost-share that will enhance

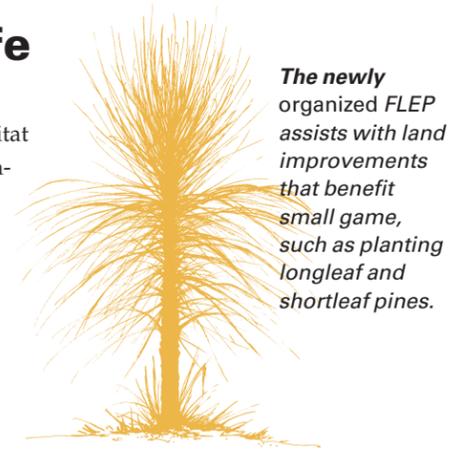
early-successional habitat are precommercial thinning, prescribed burning and mechanical management. Each of these practices can improve habitat for upland wildlife by producing more forage and browse and creating cover.

Other cost-shared practices, such as afforestation, reforestation and timber-stand improvements that promote healthy forests and timber, will also improve wildlife habitat. FLEP participants can plant hardwoods, longleaf pine and shortleaf pine or loblolly pine at low-density planting rates and without intensive site preparation to encourage mixed pine-hardwood stands. Precommercial thinning, crop tree release and selected tree removal will open the canopy to stimulate new growth in the understory. These practices also allow the canopy of the remaining trees to spread, resulting in more vigorous tree growth and increased mast production.

Since closing and stabilization of old logging roads are eligible practices, landowners can take advantage at that time to plant native warm-season grasses and legumes that benefit upland wildlife. ♦

—Joe Folta, Forest Stewardship Biologist
N.C. Division of Forest Resources

For more information about FLEP, contact your local county ranger or visit the NCDFR website at www.dfr.state.nc.us.



The newly organized FLEP assists with land improvements that benefit small game, such as planting longleaf and shortleaf pines.

borders alone an average of 4.6 coveys were heard (see Figure 2).

Discussion

In eastern N.C. the results clearly indicated that providing nesting and brood-rearing cover was the reason for the increase in quail. Only when the habitat was improved did trapping mid-sized mammalian predators have a statistically significant impact. Even though predator trapping resulted in dramatically reduced predator activity at the artificial nests across all areas, predator control alone did not increase quail abundance in the fall. From an economic feasibility standpoint, money spent on providing early-successional habitat suitable for quail to nest and rear their young, especially in the early growing season, will return more quail than funds spent on trapping.

The results of our experiments help answer the question of whether wildlife managers should control predators or predation. When early-successional cover was added to the farming landscape, what benefits accrued to the quail? Did the quail have more food for their chicks? Yes, as Bill Palmer found out using imprinted quail chicks: Fallow or early-successional lands provide optimal foraging habitat for chicks (fall 2002 "Upland Gazette").

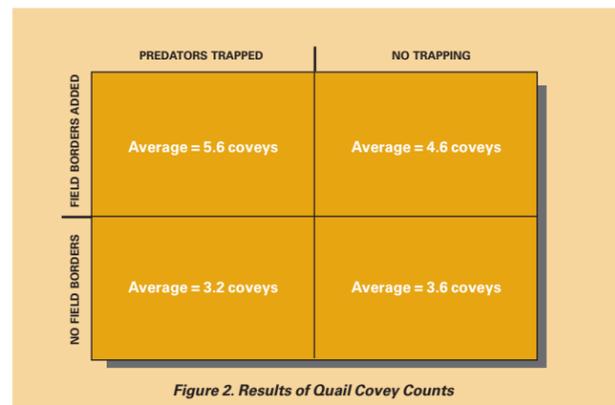
Did field border vegetation provide screening cover for hens and chicks, making it difficult for predators to detect and catch them? I think the answer is "yes." When we began our research, Bill Palmer surveyed the early spring landscape on the farmlands around Wilson County. He determined that less than 3 percent of the area provided adequate nesting or brood-rearing cover. By putting in the field borders, the proportion of the farmed area

suitable for quail reproduction increased five-fold! Therefore, the predators would have to search five times harder to find a quail nest than they would have had to without field borders. Early-successional cover, with its mixture of bare ground, dead vegetation and standing vegetation provides a visual screen, making quail at their most vulnerable stage in life hard to see. When the wildlife manager spreads early-successional cover throughout the farming landscape, nesting and brood-rearing quail have both protection from detection and excellent food resources. What this boils down to is that providing habitat controls predation, albeit indirectly. ♦

—Peter T. Bromley, Professor Emeritus
Fisheries and Wildlife
Sciences Program
N. C. State University
pbromley@sprintmail.com

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Songbirds Favoring Early-successional Habitat

LET'S FACE IT—MANY PEOPLE JUST DON'T find an overgrown, brushy field or clear cut very attractive. While small-game hunters know these spots can be a treasure trove for quail, rabbits and other game, many see them as low-quality habitat or an eyesore. However, there is more than one diamond lurking in the rough. It may be the rich flash of yellow from a golden-winged warbler, a burst of enigmatic squawking song from a yellow-breasted chat or the flutter of wings from a foraging flock of song sparrows. Many colorful yet secretive songbirds depend upon the same shrubland habitat we provide for small game, and some can serve as good indicator species. In this issue of the "Upland Gazette," we highlight three songbirds you may find in early-successional habitat.

Yellow-breasted Chat

The yellow-breasted chat is a large yellow warbler that migrates to North Carolina from its wintering grounds in Mexico and Central America. The males show up by early May and begin advertising their territories with a loud, persistent song that is an odd assortment of squawks, whistles and rattles. The song is more reminiscent of a mockingbird or catbird than a warbler. Like the mockingbird, the chat also sings at night.

The female is secretive, staying in the dense thickets and brambles where she builds a nest containing three to four eggs close to the ground. It takes 11 days for the eggs to hatch, and another eight days for the chicks to become large enough to leave the nest. Primarily insectivores, chats will also consume berries, therefore a black-berry bramble makes great chat habitat for both nesting and foraging.

The chat tends to inhabit older clear cuts and areas with thicker shrubs, and prefers to be close to a deciduous woodland. Chats seek out larger thickets (20 or more acres) and will sometimes nest in loose colonies. They will leave brushland once the tree canopy closes. Thus, once the chats are gone, you know that your habitat is likely no longer suitable for quail or other early-successional species.

Golden-winged Warbler

Another Neotropical migrant, the golden-winged warbler, is found during summers in the North Carolina mountains, normally in elevations over 3,000 feet. The golden-winged warbler prefers patchy shrubland, with some openings containing grasses and forbs, and typically establishes a territory with mature woods or a windrow bordering it. Some areas of grouse habitat are also home to this migratory warbler.

The male's song is a distinctive *bee-buzz-bezz-bezz*. The female builds a nest low in shrubs among grasses and stiff forbs, such as goldenrods. The four to five eggs will hatch in 10 days, and then the young are fed insects for nine to 10 days until they leave the nest. The adults have a unique feeding strategy of prying open dried, curled leaves with their bills to find insects hiding inside.

The golden-winged warbler has suffered from loss of habitat, nest parasitism from brown-headed cowbirds, and competition and hybridization from closely related blue-winged warblers. If you live in the mountains, managing for a minimum of 5 acres of patchy thicket next to mature woods will greatly benefit this species.

Song Sparrow

The song sparrow is a secretive, brown occupant of early-successional habitat. At some point in the year all North Carolinians have a chance to see this sparrow: It breeds in the western half of the state then winters in the eastern half. In the summer, the song sparrow nests in thickets, field borders, along watercourses and may even show up in your hedge in the back yard. The male has an energetic and highly variable song for a sparrow—typically several repeated notes followed by a rich warble. The female broods three to four eggs for 12 to 14 days, followed by nine to 12 days of

feeding nestlings, and finally an additional 21 to 30 days of care before the young fly off on their own.

In winter, song sparrows join mixed-species flocks that depend upon thickets and field edges for food and cover. After crops have been harvested and ditches and fence lines have been mowed in the fall, little cover remains on many farms for wintering sparrows. Waiting until spring to disk and mow can greatly benefit these birds, as can creating brush piles.

Learning to identify these and other shrubland species will provide you with greater enjoyment of your "ugly" thicket and will provide you with a good indicator that you are managing your habitat well. ♦

—Jeff Marcus, CURE Biologist
N.C. Wildlife Resources Commission



Some Other "Indicator Species" for Shrubland

- Indigo bunting
- Blue grosbeak
- Field sparrow
- Prairie warbler
- White-eyed vireo
- American goldfinch
- Swamp sparrow
- White-throated sparrow
- Orange-crowned warbler
- Eastern towhee
- Winter wren
- Common yellowthroat
- Grey catbird
- Ruby-crowned kinglet

Pass It Along...

We are working to expand our mailing list to include other interested landowners and sportsmen. Please pass along your copy to friends who may be interested. Send names of others who may find the information useful to

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

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Turnersburg C·U·R·E Team Honored

The Wildlife Commission personnel working on the Turnersburg Cooperative in the CURE Program—Don Hayes, David Sawyer, Dowd Bruton, Michael Greene and Jim Keeper—were honored both statewide and regionally in 2002 for their accomplishments in the CURE Program. The Wildlife Commission honored the team with its Team of the Year Award, a statewide intra-agency award presented by the Division of Wildlife Management. On a regional scale, the Southeastern Section of the Wildlife Society awarded the Turnersburg Cooperative team its annual Wildlife Management Excellence award. The Wildlife Society is an international society founded in 1937 to enhance wildlife stewardship. Its Southeastern Section includes members in 15 states and the Virgin Islands. Both awards recognize the hard work, dedication and extra effort needed to make the Turnersburg Cooperative a success and a model for creating small-game habitat in a working agricultural landscape.

A MODEL FOR
CREATING
SMALL-GAME
HABITAT IN AN
AGRICULTURAL
LANDSCAPE

Small game natural history facts:

The ruffed grouse (*Bonasa umbellus*) is a year-round resident of the North Carolina mountains. The male advertises its territory by "drumming"—beating its chest with its wings. This low-frequency sound carries farther in the forest than a high-pitched song would. Only the male has a pronounced ruff—tufts of black feathers on either side of its neck that it can erect to impress females.



LEONARD LEE RUE III

CURE at Suggs Mill Pond Game Land



Spotlight on C.U.R.E.

S LIGHTLY BEFORE DAWN ON JUNE 19, 2002, we rolled into position to begin the first of two days of spring quail-call counts at Suggs Mill Pond Game Land. As my coworkers prepared to survey two routes that would wind through the game lands, I was ready to take on the control survey, located outside of the game land in an area that is not being managed for quail. At sunrise, I stopped beside the flagging tape that marked my first survey

point, turned off the ignition and listened intently outside of the truck for the familiar *bobwhite* call. With the sun appearing on the horizon, the air was still somewhat cool. Birds were in singing mode, and the sounds of occasional traffic passed behind me, but no quail were to be heard at this stop. I traveled on to the next stop and continued the survey until I had listened for quail at all 16 points. I only heard six quail on my route that morning but soon learned that my

LAWRENCE S. EARLEY



Habitat improvements on 587 acres mean more nesting and brood-rearing habitat for quail.

coworkers had heard 11 on one of the game land routes and 18 on the other!

This survey is just one of the tools used to determine the effectiveness of our management efforts for small game. The N.C. Wildlife Resources Commission has been working with landowners on private lands over the past two years

to improve habitat for bobwhite quail and other wildlife that depend upon early-successional habitat through the Cooperative Upland-habitat Restoration and Enhancement (CURE) Program. Not only is work being implemented on private lands, but intensive management efforts to increase early-successional species are underway on four state-owned game lands. Suggs Mill Pond Game Land is one of these game lands.

Between August 1, 2001 and July 30, 2002, habitat improvements for small game were implemented on a total of 587 acres of the Suggs Mill Pond tract. To promote beneficial understory development in pine stands, we used precommercial thinning to improve 70 acres of timber and prescribed-burned 423 acres. Additionally, we opened 73 acres by widening existing roads and trails to 60 feet in areas that are closed to vehicles. Not only will these areas provide critical foraging, nesting and brood-rearing habitat for quail, but these linear openings will also serve as fire breaks and hunter trails, and they will benefit other species such as wild turkeys.

Management plans for the future include further timber-stand improvement, increased prescribed burning to conduct burns on a one- to two-year rotation and additional development of acreage in openings in an effort to maintain 15 percent of our suitable habitat in early-succession plant communities. Plans are also underway to re-establish native understory plants in recently thinned stands where thick tree canopies previously obscured the available sunlight needed to maintain these communities. Openings will be planted with noninvasive species such as partridge pea, Florida beggarlice, Kobe lespedeza and native warm-season grasses. Because plant succession can reduce the value of these grass-and-forb communities in two to three years, openings will be maintained with light disking, herbicides and fire on a three-year rotation.

So, how do we know if our efforts benefit wildlife? We plan to use several surveys to measure the effects of habitat improvements here at Suggs Mill Pond. In addition to our June quail-call counts, we also count fall coveys to see how quail are responding to CURE management. Additionally, commission personnel conduct a breeding-bird survey every spring to detect changes in songbird composition. Prior to the implementation of regular prescribed burning, we established vegetation points to collect photographic data in different burn areas to visually compare habitat changes as a result of burning. We also began collecting vegetation data last summer to measure the occurrence of beneficial plant species used by quail and to determine the structural quality of plant communities as cover for quail.

Our hope is that, through cooperative efforts with private landowners and others, we might make a difference in restoring habitat to support small-game populations at a level that can be enjoyed by many generations to come. Everyone should have the opportunity to hear that old familiar *bobwhite* call. ♦

—Marilyn Knight
Wildlife Technician II

N.C. Wildlife Resources Commission

Suggs Mill Pond Game Land

- located in Bladen and Cumberland Counties
- 7,800 acres
- purchased in 1998
- funded by the Clean Water Management Trust Fund and the Natural Heritage Trust Fund
- four habitat types: pine uplands, hardwood drains, Carolina bays and one lake
- 2,789 acres of habitat suitable for small-game management

Holding Back the Trees



Land Managers' TOOLBOX

MANAGE FOR THICKETS YOU SAY? WHY WOULD ANYONE WANT TO DO THAT?

Some folks would even consider “management” and “thicket” to be a contradiction of terms. They may also question the sanity of anyone who would veer off a perfectly good path behind a dog to stumble and crawl through a tangle of briars, saplings and vines and come out scratched and bleeding, but

with a big smile, on the other side. Those of you who hunt for grouse, woodcock, quail or rabbits will understand, but the wildlife benefits of thickets extend beyond habitat for our popular small-game species. Thickets are also important for some birds of regional significance such as the painted bunting on the coast and golden-winged warblers in the mountains. In general, wildlife that depend upon thickets—both game animals and songbirds—have declined in recent years as more efficient land management practices have eliminated thickets.

Different thicket types attract different wildlife species. Woodcock, for example, seek out damp, fertile thickets with high worm populations while grouse key in on hardwood sapling thickets with a high stem density to deter predation by raptors. You will find a greater diversity of wildlife in large thickets than in small ones. The surrounding landscape also influences the inhabitants as in rabbits' preference for dense thickets in a cropland landscape.

If you own land and enjoy wildlife, you may want to try out one or some combination of the following tools to create valuable thicket habitat on your land.

Timber Harvest

Timber harvest provides the ideal start for thicket habitat. In fact, a majority of thickets occurring across the state today began after timber harvests. But the nature of commercial timber harvest limits habitat potential. First, harvests typically occur on a 20- to 80-year cycle. Therefore the thicket habitat will remain for only a few years after harvest. Second, it is often not economically feasible to create small thickets with timber sales. One alternative, however, is to plan firewood harvest for sale or use by you and your neighbors. Concentrate your efforts on adjacent blocks of forested land through several years so thickets of varying age will be in close proximity.

Herbicide Control

Herbicides are a versatile tool that can be used to create openings where low-value trees or accessibility limits the removal of forest products. You can use herbicides to selectively remove low-quality overstory trees, create islands of early-succession habitat or remove taller-growing tree species before they shade low-growing species. Small jobs work best with selective pesticides applied to individual stems. Larger jobs may call for broadcast application of selective herbicides by ground or aerial equipment. Always use herbicides according to label directions and under the supervision of a certified pesticide applicator.

Prescribed Fire

You can use periodic prescribed fire alone or to complement tree felling or selective herbicide use. Thicket maintenance calls for less frequent and higher intensity fires than those commonly prescribed to maintain grassy or herbaceous groundcover in forested stands. The goal of this fire is to kill the aboveground portion of the woody species in the thicket. Fire should be used when the thicket habitat has grown too old and is shading out ground-level species. Some follow-up with a chain saw or herbicides may be necessary to remove trees that survive the fire. As with herbicides, you'll need assistance from an experienced land manager to safely conduct prescribed burns.

Mechanical Management

It may be practical in some instances to use your bulldozer to create thickets. Dozers fitted with a kg or shearing blade and a roller chopper can be used to fell or thin young timber stands. Create transition zones of thicket habitat around agricultural fields and by pushing back encroaching trees. Stumps and woody debris should be windrowed and allowed to develop into thickets when you clear openings. You can manage windrows piled in field centers more easily with fire and equipment than those on field edges and thus provide access to the field center by wildlife that need thicket cover.

Farm tractors have an application in managing thickets, but one must avoid the temptation to bush-hog a thicket just when it is reaching a productive stage. Generally, the 5- to 10-year cycle required to maintain thickets for grouse or woodcock is too long for most small farm tractors to handle. However, you can manage the low-growing tangles used by bobwhites and cottontails with judicious mowing. Timing is important, as maintenance scheduled in late winter will allow quick recovery during the spring green-up whereas fall mowing means six months of bare ground before green-up. Some landowners effectively use larger tractors with side mounted or boom mowers to periodically remove small overtopping trees from roadside, ditchbank and field-side hedgerow thickets at a height of 3 to 4 feet above the ground.

Where to Start

Almost every tract of land has some unproductive areas that could become high-quality thicket habitat with minimal impact on the primary land use. Consider transition zones between maintained yards and adjacent woodlands, around low or swampy edges, or adjacent to access roads. Most often, the candidate area was a high-quality thicket just a few years before, and overstory trees have grown to the point that the landscape has opened up at ground level. The best measure of when your thicket needs maintenance is when you can cross through it without loosing blood from briars or getting tangled in vines. When maintenance is necessary, treat the overstory with some combination of the methods discussed above and wait a year or two for the plant community to respond.

You don't really have to fight your way through a grape tangle behind a grouse dog to appreciate the wildlife that depends upon a thicket. No, the rewards of successful thicket management are

Continued on page 8

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varied: catching a rabbit in a box trap on a frosty morning, listening to the twittering and prents of the evening courtship flight of the woodcock, the flash of a flock of brightly colored migrant warblers filtering through the shrubs. Maybe the icing on the cake is actually cobbler made from your own berries. You don't have to enjoy charging into a briar patch to head off a rabbit to appreciate a thicket, but it sure doesn't hurt! ♦

—Terry Sharpe
Agricultural Liaison Biologist
N.C. Wildlife Resources Commission

For technical assistance in managing your land for wildlife contact, the Division of Wildlife Management at (919) 733-7291.

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