

Light Disking to Improve Wildlife Habitat in Grasslands and Old Fields

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In the Southeast, grasslands and old fields provide essential resources for bobwhites, songbirds, cottontails and other grassland species (Figure 1). Forest edge species such as white-tailed deer and elk benefit from the forbs, briars and native grasses produced in these openings. These plant communities sustain the food chain by providing habitat for insects and rodents consumed by wild turkey, black bear, hawks, owls, red and gray fox and other mixed-habitat species.

Native plant communities are characterized by annual grasses, forbs and legumes which live a single growing season following some form of soil disturbance such as agriculture, timber harvest or disking (Figure 2). Annual plant communities include

ragweed, partridge pea, native lespedezas, beggar tick, Illinois bundle flower, woolly croton, foxtail and panic grasses among many others. Annual plant communities benefit wildlife in many ways.

- Annual plants reproduce by prolific seed production, providing seed-eating birds and mammals with abundant food resources.
- Annual plants support an abundant and diverse insect community. These insects provide critical nutrients, including protein for energy, and essential amino acids for growing nestlings and chicks.
- Annual plant communities provide a type of vegetation structure that is needed for nesting and escape



Figure 1. Dickcissels are summer residents in Arkansas inhabiting grassy or weedy fields. (Photo courtesy of Audubon Arkansas.)



Figure 2. Forbs such as this woolly croton are annual leafy plants whose stems, leaves, seeds and flowers benefit a number of wildlife species. (Photo by John Jennings, University of Arkansas.)

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from predators. These plant communities are typically open at ground level with abundant bare ground and little accumulation of leaves and dead grasses. Some plant structures produce an “umbrella” canopy of seed heads and leaves above, hiding chicks from predators and offering protection from the weather.

This combination of invertebrates, seeds, bare ground and herbaceous canopy creates optimal brood-rearing habitat for bobwhites and other ground-nesting birds, simultaneously providing food and cover.

Annual plant communities (Figure 3) are short-lived, lasting only one or two growing seasons. Beyond two growing seasons, annual plants are replaced by perennial forbs, grasses and, eventually, woody plants. As a plant community ages, bare ground declines, leaves and dead grasses accumulate and vegetation density increases. The rate of change in the plant community is related to site fertility, rainfall, local hydrology, temperature and length of the growing season. Periodic disturbance is needed if the annual plant community is to be maintained and benefit wildlife requiring this habitat.



Figure 3. This annual plant community grew after disking. (Photo by Lynn Betts, Natural Resources Conservation Service.)

Disking

Rotational or strip disking (Figure 4) is an efficient and cost-effective vegetation management practice commonly used to create annual plant communities for grassland species such as bobwhites. Disking enhances habitat quality for bobwhite chicks

because it inhibits woody growth, promotes favored seed-producing plants, reduces plant residue, increases bare ground and increases insect abundance. For example, Arkansas Game and Fish Commission biologists successfully use disking to improve bobwhite habitat at the Camp Robinson Special Use Area near Mayflower.



Figure 4. Strip disking is an effective yet simple way to improve wildlife habitat in grasslands and old fields. (Photo courtesy of the Natural Resources Conservation Service.)

Disking can enhance habitat quality in dense stands of broomsedge, abandoned pastures, Conservation Reserve Program (CRP) fields, old fields succeeding to brush and dense cool- or warm-season grass plantings. Disking is recommended where grass has been established for at least three years. Some sites that have not been disturbed by disking, mowing or a prescribed burn for two or three years are good candidates for disking.

- **Broomsedge** – Disking is very effective in broomsedge communities and can enhance habitat quality for several years.
- **Fescue** – Benefits of light disking will be more modest and short-lived (one year) in established stands of fescue. Disking will be most beneficial after fescue has been eradicated with herbicidal treatments.
- **Bermudagrass** – Disking should not be used on bermudagrass sod because disking stimulates growth and the spread of bermudagrass. Disking will be most beneficial after bermudagrass has been eradicated with herbicidal treatments.

- **Sericea lespedeza** – Once considered valuable for wildlife, research and practical experience indicate otherwise. *Sericea lespedeza* provides low-quality food and cover for bobwhites, plus its invasive characteristics reduce plant diversity. To control *sericea lespedeza*, mow to the ground late in the growing season (e.g., July) and follow with a herbicide treatment. Mow again in the fall (e.g., October) and lightly disk. Repeat again the next year if needed. Optionally, burn in early spring to remove growing *sericea* and to encourage *sericea* seed germination; then mow and treat with herbicide in July.
- **Native grasses** – Disking should not be used on sites where sensitive, remnant native ground cover exists, such as native tallgrass prairie. However, diskings may be appropriate in dense native warm-season grass plantings where more bare ground is needed.

When plant growth is thick, it may be necessary to burn or mow areas before diskings so the disk blades will cut effectively. Check with your local Extension office for the latest approved herbicides and other controls.

When to Disk

The best time to disk is between October 1 and March 15. In the fall, wait until October or later to disk after the end of the nesting and brooding season for resident birds. Spring diskings should be completed by mid-March before the reproduction season for most wildlife species begins.

The seasonal timing of diskings influences which plant species will grow. Fall diskings tend to promote hard-seeded forbs and legumes (e.g., ragweed, partridge pea, native *lespedeza*), whereas spring diskings promote annual grasses (e.g., foxtail, millets). Fall diskings may be more effective in stimulating important food plants for bobwhites. On sites with an agricultural history, spring diskings may promote agricultural pest species such as sicklepod, johnsongrass and rattlebox. For the best diversity of plants, timing of diskings can be varied, with some diskings being conducted during each season.

To maintain annual plant communities, fields should be disked on a one- to three-year rotation, depending on the rate of plant growth, plant species present in the seedbed and wildlife management objectives. In pine/grassland areas where small fields provide the only annual plant communities, annual diskings may be desirable. Strips should be 30 to 50 feet wide and separated by undisked strips of 60 to 100 feet.

Typically, diskings are conducted on a two- to three-year rotation, with half to one-third of each field being disked each year in a strip pattern. Strip diskings create a mosaic of one-, two- and three-year-old plant communities. This will create a situation in which multiple vegetation types are present within each field, maximizing wildlife benefits. For bobwhites and cottontails, disked strips should be within 50 feet of dense shrub cover.

Examples of Rotational Disking

Two-Year Rotation (Figure 5) – In the fall or spring of the first year, disk a 50-foot strip of land and leave the second strip undisked. In the fall or spring of the second year, disk the second strip. Leave the first strip undisked. In the fall or spring of the third year, disk the first strip disked during Year 1, leaving the strip disked in Year 2 undisked. Continue this rotation treatment, diskings strips every other year.

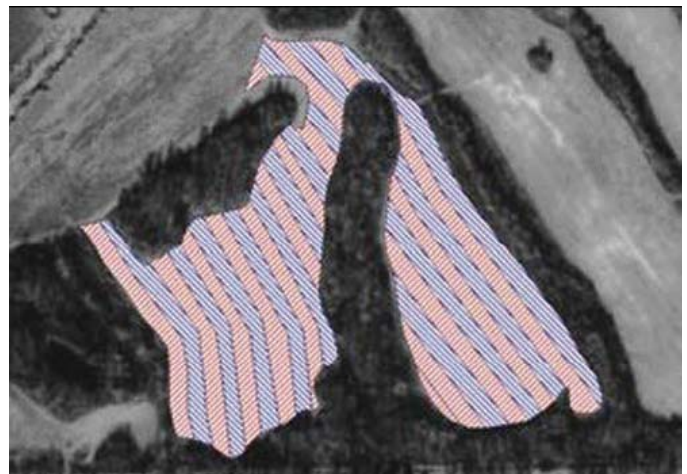


Figure 5. Example of a two-year rotation for diskings to establish annual plants benefiting wildlife. Pink areas are strip disked in Year 1, and purple areas are disked in Year 2. (Figure courtesy of Dr. L. Wes Burger, Department of Wildlife and Fisheries, Mississippi State University.)

Three-Year Rotation (Figure 6) – In the fall or spring of the first year, disk a 30-foot strip of land and leave the second and third strips undisked. In the fall or spring of the second year, disk the second strip and leave the first (disked during previous year) and third strips undisked. In the fall or spring of the third year, disk the third strip and leave the first (disked during Year 1) and second (disked during Year 2) strips undisked. In the fall or spring of the fourth year, disk the first strip (disked in Year 1) and leave the second (disked during Year 2) and third (disked during Year 3) strips undisked. Continue this rotation treatment, disked strips every third year.

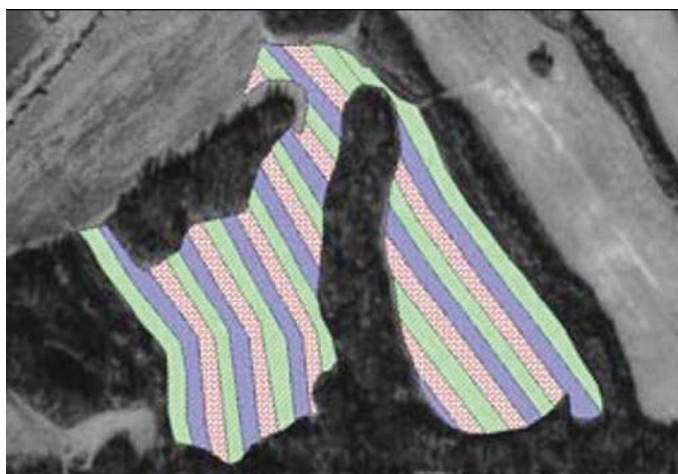


Figure 6. Example of a three-year rotation for disking to establish annual plants benefiting wildlife. Pink areas are disked in Year 1, purple areas in Year 2 and green areas in Year 3. (Figure courtesy of Dr. L. Wes Burger, Department of Wildlife and Fisheries, Mississippi State University.)

Where and How to Disk

Disked strips should be as long as possible and follow the contour of the field. Strips should be separated by undisturbed vegetation twice as wide as the disked strips to prevent erosion. The disked areas will provide brood-rearing cover for bobwhites and other wildlife. The undisked areas will provide nesting cover.

Studies about disking and bobwhites indicate brood-rearing habitat can be improved with increased disking intensity. Disking intensity can be altered by adjusting the depth of the disk and/or the number of passes. Creating an annual plant community does not require intensive seedbed preparation as in an agricultural field or wildlife food plot. Light disking of one to two passes 3 to 5 inches deep can effectively stimulate germination of an annual plant community.

In general, the more intensively the site is disked, the less residual perennial grass and greater annual plant component occurs. Sites with dense stands of perennial grass or sod-forming grasses like fescue will require greater disking intensity. Sites dominated by fescue, bermudagrass, bahiagrass and sericea lespedeza may require herbicidal treatment before disking can be effective in establishing and maintaining an annual plant community.

Strip disking on highly erodible lands requires special precautions. Research in Mississippi and Missouri has demonstrated that strip disking along the contour created minimal erosion (0.01 to 0.17 ton/acre) at the field level with observed erosion rates well below soil loss tolerance levels. Contact your local Natural Resources Conservation Service for specific guidelines for strip disking on highly erodible lands or CRP lands.

CRP Lands

Over 100,000 acres of land are enrolled in CRP in Arkansas, much of which was established in perennial grasses. The quality of the grassland for bobwhites and other wildlife will decline as CRP grasslands age, but disking or other planned disturbances can enhance and maintain habitat quality for these species. However, concerns about soil erosion may be present. Check with USDA Farm Service Agency and Natural Resources Conservation Service personnel before implementing any practice which changes the plant community on CRP or other Farm Bill lands. Disking and other disturbance regimes will be accepted by these agencies only if the practices can enhance wildlife habitat quality without compromising the erosion-controlling benefits of the established ground cover. On most existing CRP contracts, a 50 percent cost share is available from the Farm Service Agency for strip disking, prescribed burning and mowing if needed.

Disking and Prescribed Fire

Strip disking can be used in combination with prescribed fire (Figure 7) to create an even greater diversity of desirable plants. Disked strips can be used as fire breaks. Within a given year, half of the undisked areas between strips can be burned to

create a mosaic of annual and perennial, burned and unburned plant communities. Fertilizer may be applied to disked areas to improve production of legumes. Legumes or other wildlife food plants can be seeded on disked areas to provide early ground cover and additional food resources. (See FSA5009, *Why We Burn: Prescribed Burning as a Management Tool*, and FSA5016, *Clean Air Act and Prescribed Fire: What It Means for Arkansas*.)



Figure 7. Strip disking when used in combination with prescribed fire promotes native plants which benefit wildlife. (Photo by Jeff Vanuga, Natural Resources Conservation Service.)

Bobwhite Habitat

For the past several decades, bobwhite numbers have been declining in Arkansas and the Southeast. Bobwhite thrive in complex landscapes that resemble a patchwork of small crop fields, old fields, grasslands and brush. Other wildlife species such as cottontails and songbirds benefit from this habitat mix as well. A covey of bobwhites can live on as little as 20 to 40 acres of ideal habitat, though more land and coveys are needed in the vicinity to sustain a population.

To sustain a bobwhite population, a patchwork of habitat types well interspersed in large tracts is needed. This interspersed, including the presence of annual plant communities, increases the proportion of the landscape bobwhites can use. Small patches of various habitat types, such as brushy fence rows and ditch banks, should be left within cropland or old fields. Small woodlots should be bordered by transition zones of brushy cover that gradually fade into an

opening or field. Brush piles or windrows can be placed in large fields to break them into smaller units and increase habitat diversity.

A statewide effort has been underway since 2001 to reverse declining bobwhite populations in Arkansas. The Arkansas Bobwhite Habitat Restoration Team, also called Arkansas Quail Committee, is comprised of numerous state and non-government wildlife conservation organizations and has identified three focal areas of 7,000 plus acres each to demonstrate quail management techniques to landowners. These focal areas are located in Fulton County, Searcy County and the Damascus area where Faulkner, Conway and Van Buren counties meet.

Landowners who own property and desire to manage for quail may contact a private lands biologist with the Arkansas Game and Fish Commission for technical assistance. The private lands biologist will perform a habitat assessment and work with the landowner to develop a management plan for quail and other wildlife for their properties. The plan may include practices such as light disking, prescribed burning, forest stand thinning, native grass planting and exotic species eradication.



Figure 8. Bobwhite quail rely on annual plant communities which respond to disking. (Photo by Dr. Rebecca McPeake.)

For More Information

Contact a regional private lands biologist with the Arkansas Game and Fish Commission (800-364-4263; www.agfc.com) for additional information about

disking and other practices for establishing native plants in your area and about designing a wildlife plan for your property.

Contact your local county Extension office (www.uaex.uada.edu) for information about soil testing and herbicide treatments for establishing an annual plant community.

The Arkansas Acres for Wildlife (http://www.arnatural.org/wildlife/acres_for_wildlife/) program promotes the preservation and improvement of existing wildlife habitat or the creation of new wildlife habitat by encouraging land managers to set aside at least one acre for the benefit of wildlife. For more information about this program, contact your local county Extension agent or Arkansas Game and Fish Commission regional office.

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