

Cooperators:  
Delta Wildlife, Inc.

Forest and Wildlife Research Center,  
Mississippi State University

Mississippi Department of Wildlife,  
Fisheries and Parks

Mississippi Forestry Commission

USDA, Natural Resources Conservation  
Service

USDA, Farm Service Agency

U.S. Fish and Wildlife Service

Wildlife Mississippi



# Pine Forestland Habitat Management for Wildlife

Mississippi State University complies with all applicable laws regarding affirmative action and equal opportunity in all its activities and programs and does not discriminate against anyone protected by law because of age, color, disability, national origin, race, religion, sex, handicap, or status as a veteran or disabled veteran.

# Introduction

With forethought and planning, forest landowners can increase wildlife populations in their forests. But creation and maintenance of high quality habitat requires active management. There are a number of management practices that forest owners can use to increase and improve forestland wildlife habitat. Habitat management practices, such as thinning, that benefit quail, deer, turkey,

and songbirds can also improve timber stand quality. Forest management is absolutely essential for maintaining populations of wildlife species like quail and rabbits that depend on early successional habitats. These species are not highly mobile, and forest-dominated properties that lack grassy habitats will not support species that require a diversity of native grasses and forbs.



## **Closed-canopy pine plantation**

Notice the absence of grasses and forbs in the understory to provide food or cover resources for quail and other grassland wildlife. These stands are also devoid of high quality foods for other wildlife like deer or turkey.

# Established Stands

Reducing tree density is the first step in developing the grass and forb ground cover so valuable to quail and other grassland species. Thinning reduces stem density and opens the forest canopy, allowing more sunlight to reach the ground and stimulating growth of ground-layer vegetation. In Mississippi, most species of pines can be commercially thinned for the first time at 13-18 years of age, depending on the site. Typical timber thins reduce basal area to about 70 ft<sup>2</sup>/acre, but thinning stands to a basal area of 60 ft<sup>2</sup>/acre or less produces better grassland wildlife habitat. If grassland wildlife habitat is a greater priority than

timber production, a basal area as low as 30 ft<sup>2</sup>/acre will produce optimal habitat. It may be desirable to thin less heavily during the first thinning, as trees may be more vulnerable to ice or wind damage. Subsequent thins can then be used to reduce basal area to 60 ft<sup>2</sup>/acre or less. Periodic thins will be necessary to maintain lower basal areas as trees continue to grow after each thinning. Individual landowner objectives will vary, so consultation with a registered forester and a wildlife biologist can help you find the best balance that meets both your wildlife and timber objectives.



Pine plantation thinned along every fifth row. Notice the increased sunlight that is visible along the thinned row.

# Established Stands

Just as thinning stimulates growth of grasses and forbs, it also releases understory hardwood brush and trees that will shade out desirable grasses and forbs if left unmanaged. Some form of periodic disturbance will be necessary to control brush invasion. Prescribed fire and disking are two disturbance tools. When fuel conditions are appropriate for burning, thinned pine stands should be prescribe-burned during winter to early-spring. Prescribed burning should always be conducted by a certified prescribed burn manager, who will develop a written burn plan and obtain appropriate permits before burning. Check with your county Mississippi Forestry Commission office for more information about prescribed burning regulations. If prescribed fire is not an option, light disking between thinned trees during fall or winter is an alternative for relatively clean sites. Always be especially cautious when disking in woodlands to avoid damaging tree trunks and roots and to avoid personal injury or equipment damage. Soil disturbance, such as prescribed fire or disking, enhances habitat quality for quail and other grassland birds because it inhibits woody brush growth, promotes favored seed producing plants, reduces plant residue, increases bare ground, and increases insect abundance. The plant communities that develop following fire or disking also provide highly nutritious forage for deer, rabbits, turkeys, and



Prescribed fire in pine



Thinned pine stand with grass/forb understory after prescribed fire

other wildlife. In the absence of soil disturbance, the plant community composition changes over several years, and annual plants are replaced by perennial forbs and grasses and eventually, woody plants. This change in plant communities is called succession. By planning soil disturbances on a 2- to 3-year rotation, you can manage succession and develop a complex of different habitats that meet the seasonal habitat requirements of a number of wildlife species. For example, first-year burn areas typically produce good quail brood cover, whereas second- and third-year burn areas provide better nesting cover. A rotational burning plan can be developed by creating 60-acre or smaller burn units and burning half to a third of these units one year, another half to a third the next year, and so on. Thus, a given unit is only burned every 2-3 years, but some portion of the property is burned each year. A rotational disking plan can be developed similarly. Disk a half to a third of suitable area each year in a rotational fashion so that all suitable areas are disked every 2-3 years.

# Established Stands



Pine stand invaded by hardwood brush (left) compared to a pine stand treated with selective herbicide (right). Notice the grass/forb understory present in the herbicide treated stand.

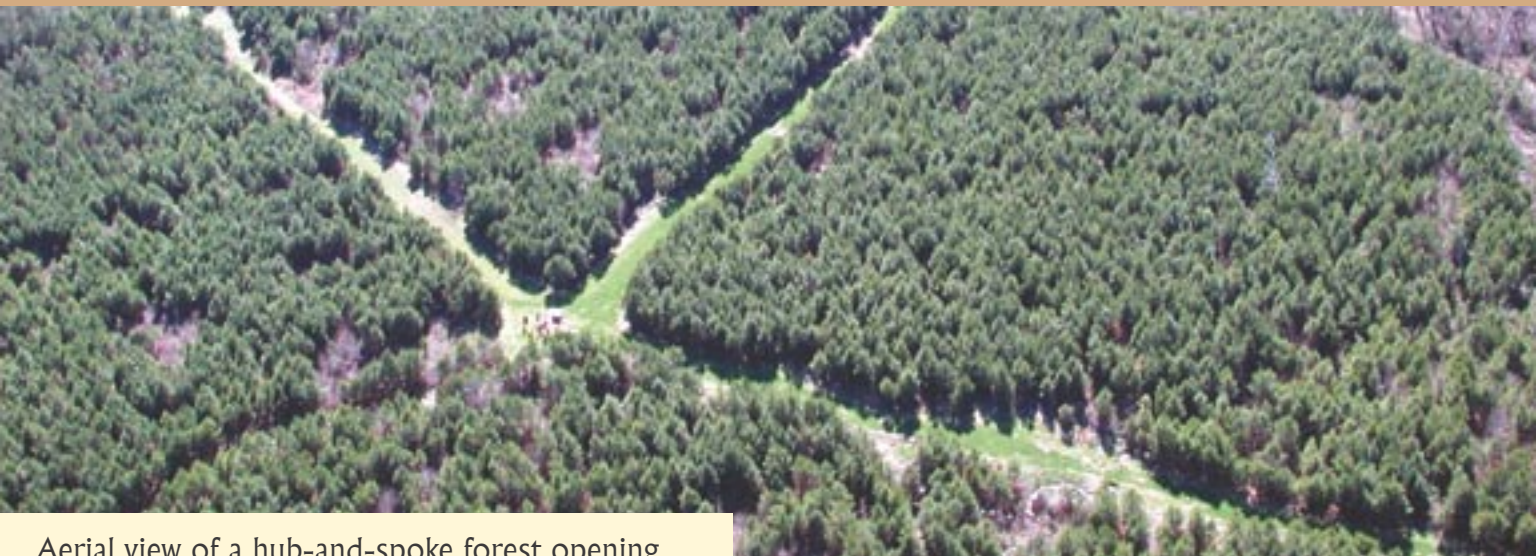
Often, fire has been excluded from pine stands for so long that invasive hardwood species can no longer be controlled by low-intensity prescribed fires or disking. After thinning, if hardwood sprouts are abundant in the understory or midstory, it may be necessary to treat these stands with a selective herbicide such as imazapyr (e.g. Arsenal AC®). Chemical control of invasive hardwoods is enhanced when prescribed fire is used during the dormant season following herbicide application (wait at least 6 months after application before burning to maximize herbicide effectiveness). Once these hardwood species are controlled with herbicide, future fire or disking treatments on a 2- to 3-year rotation should provide better control of hardwood invasions. With

some planning, you can protect some mast/fruit producing hardwoods and shrubs from prescribed fire and herbicide treatments. These scattered hard and soft mast producing trees and shrubs can provide food and cover resources for a diversity of wildlife. Invasive, non-native vegetation (e.g. kudzu, cogongrass) should also be controlled by herbicide treatment. Cogongrass, especially, is extremely invasive and seriously detrimental to native plants and wildlife habitat. Herbicidal control of all types of invasive vegetation will be more economical and effective if invasive species are treated when they first appear. Contact a forester or wildlife biologist to develop a plan for controlling invasive vegetation.

# Established Stands

A good way to produce more grassland wildlife habitat in forestland is to create forest openings. For quail, 10% or more of forested acreage should be maintained in openings. These can be created in established woodlands by clear cutting 1– to 5–acre patches throughout forest stands. Openings can easily be created during commercial thinning of pine stands. Plan ahead and have your forester mark out forest openings when marking timber for thinning. For mid-rotation pine plantations, a better approach to developing openings is to create interconnected forest openings in a hub-and-spoke design. The hub-and-spoke opening consists of a central opening (hub) from which open lanes (spokes) radiate through the pine stand as if simulating a wagon wheel. Hub-and-spoke openings can be created by removing several adjacent rows of trees

during thinning of a pine plantation. Hub-and-spoke lanes should be at least 30 feet wide to maintain grassy cover, and the maximum width of lanes will depend on how much timber acreage you are willing to remove from production (generally, the wider the lanes, the better). Hub-and-spokes can also be used as fire breaks for prescribed burning of mid-rotation pine stands. Forest openings can also be developed by widening or heavily thinning woodland roadsides and maintaining log-decks or skid trails used during timber harvests. Forest openings may also be used for permanent or rotational food plots planted to appropriate supplemental food crops and log-decks during timber harvests. Prescribed fire or disking on a 2- to 3-year rotation (described above) should be used to manage forest openings.



Aerial view of a hub-and-spoke forest opening.

# Regeneration

Clearcuts, and the subsequent plant communities that colonize a clearcut, typically provide good grassland wildlife habitat for 3-5 years after harvest.

Replanting will typically be preceded by some form of site preparation. Use of prescribed fire and mechanical site preparation methods will stimulate a suite of annual weeds, legumes, and grasses that will benefit quail and other early successional wildlife species.

Increasingly, herbicides are an important component of site preparation. Selective hardwood herbicides, like imazapyr, can increase pine growth and survival and inhibit development of a dense brush layer, thereby increasing the window of grass/forb plant communities early in the rotation. Use of herbicides for herbaceous control after planting should be restricted to banded applications along the tree rows. When regenerating a harvested stand with loblolly, slash, or longleaf pine seedlings, replant trees on an 8- by 10-foot spacing if quail and other grassland wildlife habitat is your objective. Planting trees on a wider spacing allows maintenance of grassland habitat for a greater period of time before canopy closure of plantations. Rotational disking between planted rows in relatively clean sites can be utilized during the first few years after planting to maintain grassland habitat structure. Always be especially cautious when disking in



Clearcut and early successional habitat.

regeneration sites to avoid damaging trees and to avoid personal injury or equipment damage. Where appropriate for the site, longleaf pine is much more conducive to grassland wildlife habitat management than other pines because longleaf can be burned at a younger age. Also, limb and leaf characteristics of longleaf pines generally allow more sunlight to reach the ground, thereby creating a more favorable environment for grasses and forbs. Longleaf pine seedlings can be prescribed-burned the year after establishment, but do not burn once seedlings begin height growth. After trees are greater than 6 feet in height, prescribed burning may be resumed (in well managed longleaf stands, these heights have been documented by the end of the third or fourth growing season). Consultation with a registered forester is recommended before burning young longleaf pine stands. As with other pine species, rotational disking between planted rows may be utilized to maintain grassland habitat structure when prescribed fire is not feasible.

# Regeneration

Longleaf (left) and loblolly (right) pines planted at the same time and same seedling density (about 600 trees per acre). Notice how much more open the longleaf pine canopy is than the loblolly pine canopy.



As in established stands, a good way to produce grassland wildlife habitat in regenerated forest stands is to create forest openings. You can create forest openings by simply leaving some well distributed 1– to 5–acre unplanted patches of land when regenerating with planted seedlings. A better approach to developing openings in pine plantations is to create interconnected openings in a hub-and-spoke design. With the hub and spoke design, grassland habitat

corridors can be maintained throughout the stand after the forest canopy closes. Without interconnecting forest openings, grassy openings within young pine plantations will become isolated and generally unusable for quail as the pine canopy closes. Hub-and-spoke openings can also serve as fire breaks to protect young plantations from wild fire and for prescribed burning in later years. These openings are also useful for log-decks during future timber harvests.



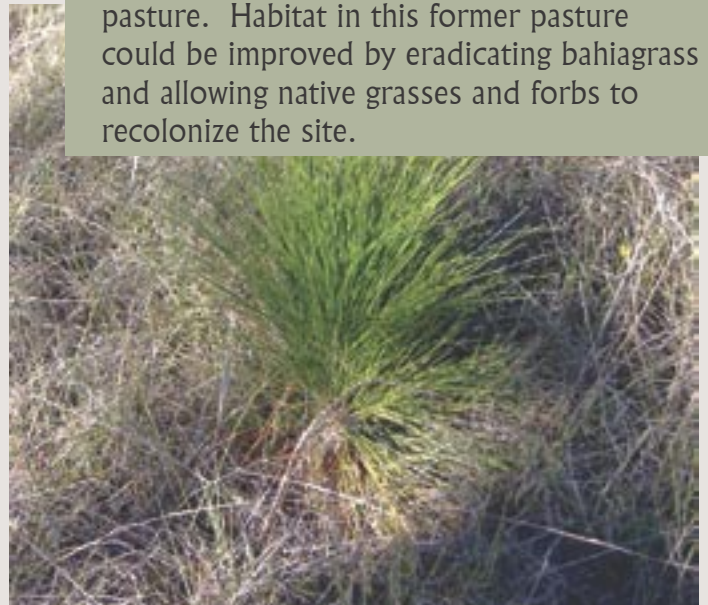
# Agricultural Sites

Converting former agricultural fields or pastures to pine forestland and managing for grassland wildlife habitat is accomplished in the same general way as regeneration of recently harvested forests. However, pine plantings at these sites should be preceded by site preparation to control herbaceous competition. This is especially true when sod-forming, non-native grasses are present at the planting site. The most common of these invasive, non-native grasses include fescue, bahiagrass, bermudagrass, johnsongrass, and cogongrass. Both cogongrass and bermudagrass are extremely invasive and seriously detrimental to native plants and wildlife habitat. These non-native grasses provide poor wildlife habitat and compete with growing seedling trees. Longleaf pine seedlings are especially

sensitive to competition with invasive, non-native grasses. Eradication of these grasses will significantly improve longleaf seedling survival. Non-native grasses should be eradicated with an appropriate herbicide treatment, but the appropriate treatment differs depending on which non-native grass or grasses are present. Consult with your forester to develop an appropriate herbicide prescription for pine establishment in former agricultural fields. Once invasive grasses are controlled, these sites can be managed as recommended for forest regeneration sites. Wildlife habitat in these old field pine plantings may be further enhanced by planting native grasses and forbs between seedling rows after non-native grasses have been eliminated.



Longleaf pine planted in an old field



Longleaf pine seedling in an old bahiagrass pasture. Habitat in this former pasture could be improved by eradicating bahiagrass and allowing native grasses and forbs to recolonize the site.

# Landowner Assistance

Developing an integrated forest-wildlife management plan with a wildlife biologist and a registered forester can provide valuable assistance in the implementation of these practices for both wildlife habitat and timber management. A number of cost-share programs exist that can help with implementation costs associated with forest management practices. In order to successfully achieve management goals, clearly established objectives (forest-wildlife management plan) should be in place before consulting with agencies that administer cost-share programs. By planning ahead, programs and practices that accomplish management objectives and are financially sound may be selected.

Following is a brief summary of financial assistance programs available for private landowners.

The Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), and Conservation Security Program (CSP) are available for landowners with eligible production agriculture land. CRP provides conservation practices for field-level management, whereas EQIP and CSP are more oriented toward whole-farm management. While many of the same goals can be accomplished with each program, there are differences in eligibility and financial incentives under



# Landowner Assistance



each program. If acreage is enrolled in an existing CRP pine woodland conservation cover, mid-contract management cost-shares are available for prescribed fire, herbicide application, and disking. Contact the county U.S.D.A. Farm Service Agency office for more information regarding CRP. If a whole-farm management program is applicable to the property, contact the county U.S.D.A. Natural Resources Conservation Service (NRCS) office for more information on EQIP or CSP. Forest management practices available through EQIP will depend on the county in which the property is located. Depending on land uses, multiple farm programs may be applied to optimize conservation and financial benefits.

The Wildlife Habitat Incentives Program (WHIP), Forest Land Enhancement

Program (FLEP), and Forest Resource Development Program (FRDP) are available to any non-industrial private forestland owners. When fully funded, the Healthy Forests Reserve Program (HFRP) will assist private landowners in restoring rare forest ecosystems (e.g. longleaf pine) through active management and stewardship. Contact the county NRCS office about WHIP and HFRP or the county Mississippi Forestry Commission office for more information about FLEP and FRDP. These four programs provide cost-shares for forest management practices such as prescribed fire, herbicidal control of invasive vegetation, and forest regeneration. Wildlife Mississippi has a longleaf pine restoration program available. Contact Wildlife Mississippi for more information about their longleaf restoration program.

# Landowner Assistance

The following agencies are available to provide wildlife and forest management planning or technical assistance for private landowners in Mississippi.

## Mississippi Department of Wildlife, Fisheries and Parks

[www.mdwfp.com](http://www.mdwfp.com)

Dave Godwin, 662.325.5119

State Office, 601.432.2400

## Mississippi State University

[www.cfr.msstate.edu](http://www.cfr.msstate.edu)

Wes Burger, 662.325.8782

Rick Hamrick, 662.325.5470

## Mississippi State University Extension Office

[msucares.com](http://msucares.com)

[www.naturalresources.msstate.edu](http://www.naturalresources.msstate.edu)

662.325.3176

## Delta Wildlife, Inc.

[www.deltawildlife.org](http://www.deltawildlife.org)

Trey Cooke, 662.686.3372

Gayden Pollen, 662.686.3370

## Wildlife Mississippi

[www.wildlifemiss.org](http://www.wildlifemiss.org)

Daniel Coggin, 662.256.4486 (Northeast Miss.)

Randy Browning, 601.264.6010 (South Miss.)

## Mississippi Forestry Commission

[www.mfc.state.ms.us](http://www.mfc.state.ms.us)

601.359.1386

## Natural Resources Conservation Service

[www.ms.nrcs.usda.gov](http://www.ms.nrcs.usda.gov)

Area 1 (Northeast Mississippi)

Biologist: John DeFazio, 662.534.7651

Forester: Lynn Ellison, 662.844.2341

Area 2 (Central Mississippi)

Biologist: Jeffrey Lee, 601.965.4559

Forester: Ramsey Russell, 601.965.4559

Area 3 (South Mississippi)

Biologist: Barry Pessoney, 601.296.1173

Forester: James Barnes, 601.296.1173

Area 4 (Delta)

Biologist: Kevin Nelms, 662.453.2762

Forester: Mike Oliver, 662.453.2762

State Office

Biologist: Glynda Clardy, 601.965.4339

Forester: Alan Holditch, 601.965.4339

Photographs courtesy

of:

Randy Browning

Wes Burger

Jim Cox

Scott Edwards

Andy Ezell

Rick Hamrick

Bobby Watkins

Shane Wellendorf