

Ecology and Management Of Squirrels in Mississippi

Squirrels have long been important game species in Mississippi. Although squirrel hunting is still very popular in Mississippi, squirrel hunter and harvest numbers have decreased over the last twenty years. This is probably because of increased big game hunting opportunities and less interest in hunting in general. Squirrel hunting is a great way to introduce new hunters to hunting, especially young people. Where squirrel numbers are high, squirrel hunting is a relatively easy, low-cost, and exciting sport. Hunttable squirrel populations are found throughout Mississippi, but there are still ways to enhance squirrel habitat and hunting opportunities. Understanding the life history and ecology of squirrels is critical when managing their populations.

Life History and Ecology

General Characteristics

Two game species of squirrels live in Mississippi: the eastern gray squirrel and the eastern fox squirrel. Both species are fairly common to all regions of the state, but gray squirrels are more common. Fox squirrel populations have declined greatly in many areas because of changes in land use and management.

You can tell the difference between gray and fox squirrels using some obvious features. Adult fox squirrels are a good bit larger than adult gray squirrels. An average adult gray squirrel is about 8 to 10 inches long from head to hind end, with a 7- to 10-inch tail. It weighs just over 1 pound. An average adult fox squirrel is about 10 to 15 inches long from head to

hind end. It has a 9- to 14-inch tail and weighs 1½ to 2½ pounds. Gray squirrels have pink paw soles, and fox squirrels have black paw soles.

As the name implies, the fur of gray squirrels is mostly grayish but grizzled with red, black, and white hair. You may rarely find a black or albino (no skin or hair color) gray squirrel. Two subspecies of fox squirrels are in Mississippi. The “hill country” fox squirrel is the more common fox squirrel subspecies in open upland areas throughout the state. Its body is a combination of black, brown, and orange, with a black mask and white on the nose, ears, and paws. Individual squirrels often have slight variations in mask and white colorations on the nose, ears, and paws. The Delta fox squirrel is limited mainly to the Delta region. It has both a black and rusty red color phase. It does not have the mask and white colorations of the upland subspecies.

Habitat Requirements

Gray squirrels generally occupy mature forests. Mature, hardwood and mixed pine-hardwood forests will support more gray squirrels than typical loblolly pine forests. However, longleaf pine forests probably support more squirrels than loblolly and other pine forests because longleaf pines produce lots of large seeds, and the more open nature of longleaf pine forests produces good upland fox squirrel habitat.

In the past, fire-maintained upland hardwood forests supported good numbers of upland fox squirrels and gray squirrels. This type of habitat is now rare in Mississippi. Delta fox squirrels live



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mostly in mature hardwood forests or woodlots in their range. Squirrels depend on forest habitats, but all species of squirrels will go into residential areas, pecan and fruit orchards, agricultural fields, and other non-forest areas to take advantage of available food and cover.

Both species of squirrels use leaf nests and cavity dens. Squirrels build nests of leaves and twigs, usually 25 feet or more from the ground. They also use hollow trees and tree cavities for dens. Squirrels use leaf nests and dens to rest, hide, warm up or cool down, and rear young.

Food Habits

Both gray and fox squirrels eat different kinds of plant, fungi, and animal foods. Squirrels will eat mast (acorns, nuts, seeds, and fruits) from many different trees and shrubs. Oak, hickory, beech, pecan, and black walnut mast are very good squirrel foods. Pine seed (especially longleaf pine) is also an important squirrel food, especially when oak and hickory mast is scarce. Fruits of black and tupelo gums, dogwood, black cherry, wild plums, mulberry, viburnum, and paw-paw are also preferred foods. Squirrels eat mushrooms and other fungi, insects, grubs and other invertebrates, and eggs. During spring, squirrels eat tender young leaves and buds. In some areas, squirrels can actually damage agricultural or orchard crops like corn and pecans.

Breeding

Both gray and fox squirrels have two major breeding periods in Mississippi. They also breed some throughout the year. The winter breeding period results in young born January to March. The summer breeding period results in young born June to August. The summer breeding period is usually more productive.

Gray squirrels have more than one mate, whereas fox squirrels generally have one mate. Adult females (2 years and older) often have two litters per year, but young females generally have one litter per year. Both species average three young per litter. Pregnancy lasts about 44 to 45 days for both species.

Squirrels birth and rear their young in either leaf nests or dens. Young squirrels are born blind, deaf, and mostly hairless. By 5 weeks of age, young have a full coat of fur. By 10 to 12 weeks, squirrels are fully weaned and no longer depend on their mother.

Survival and Mortality

Squirrels have fairly high death rates, but squirrel numbers stay steady when enough quality habitat is available. In the wild, squirrels live about 18 months. Food availability probably affects survival more than any other factor. The amount of food changes from year to year depending on weather and other factors, and squirrel populations often change in response.

Squirrels die because of predators (including hunters), bad weather, car accidents, and disease. Domestic cats, hawks, owls, bobcats, foxes, and snakes commonly prey upon squirrels. Botfly larvae, also called wolves, are their most noticeable parasite but do not negatively affect squirrels very often. Mange, or scabies, is a disease caused by certain type of mite. Mange irritates skin and causes hair loss and is most common in squirrels during late winter and early spring. Ticks, fleas, and other parasites are also common.

Common Habitat Management Practices

The following sections describe some ways you can improve squirrel habitat. In some cases, cost-share programs may help pay for these practices. Several cost-share programs are described later in this publication.

Forest Management

Timber stand improvement is a way to improve timber quality and wildlife habitat in forest stands. Timber stand improvement usually means removing some trees by cutting or using herbicides. By removing less desirable trees, you make more room for desirable trees. See Mississippi State University Extension Service Publication 1281, "Timber Stand Improvement," for information about timber stand improvement practices or ask a registered forester for more information. Keep in mind that timber stand improvements that increase timber profit may not make the best squirrel habitat. For example, many den trees, hickories, and soft mast producing trees may be removed in a timber stand improvement done just for increasing timber value. Thus, it is a good idea to involve both a registered forester and wildlife biologist in forest management planning to balance timber and wildlife management objectives.

Although squirrels are often associated with hardwood forests, pine and mixed pine-hardwood stands also produce some squirrel habitat. In upland forest stands, thinning and prescribed fire will not negatively affect squirrel populations. These treatments actually improve upland fox squirrel habitat and may help ground layer plants produce more food. They also make hunting easier by reducing underbrush. See Mississippi State University, Forest and Wildlife Research Center Brochure, "Pine Forestland Management for Wildlife" (<http://www.fwrc.msstate.edu/pubs/forestland.pdf>) for more information about managing pine forests to improve wildlife habitat. You can also get a copy of this brochure from the Mississippi Department of Wildlife, Fisheries, and Parks.

On appropriate sites, bottomland hardwood and longleaf pine forest restoration can improve squirrel and other wildlife habitats for the future. The long-term benefits of restoration may take years but can serve future generations.

Herbicide Treatments

For squirrel management, herbicides are used mostly in timber stand improvement. However, you may also use selective herbicides to control non-native, invasive plants like privet, tropical soda apple, cogongrass, and others that decrease the habitat quality of native forests. No single herbicide treatment will be right for every problem. You often must use several herbicide combinations or treatments to control invasive vegetation. Ask a wildlife biologist, registered forester, or other experienced professional for advice about herbicide treatments.

Prescribed Burning

Prescribed burning is not often associated with gray squirrel management, but burning open woodlands improves habitat for upland fox squirrels. Burning upland woodlands can also make hunting easier by reducing brush in the ground layer. Divide upland forest stands into 5- to 20-acre blocks with bare soil firebreaks. Burn alternate blocks on a rotation every 3 to 4 years. Burning only every other block allows you to keep some ground cover, and smaller blocks can be more safely burned. Work with a wildlife biologist, a registered forester, or both to plan prescribed burns for your wildlife or forestry goals.

To gain liability protection provided by the Mississippi Prescribed Burn Act, a certified prescribed burn manager must carry out or supervise any prescribed burn. To be afforded this liability protection, the burn manager must write and strictly follow a burn plan and obtain a permit before burning. Check with your Mississippi Forestry Commission county office for prescribed burning regulations. Also see Mississippi State University Extension Service Publication 2283, "Prescribed Burning in Southern Pine Forests: Fire Ecology, Techniques, and Uses for Wildlife Management."

Artificial Dens

If mature trees with natural cavities are scarce, you can build artificial dens for squirrels. They often use leaf nests, but tree cavities or artificial dens are usually more secure and sheltered from bad weather. Cavities and artificial dens are more important in colder areas. For more information about building artificial dens or nest boxes, see Mississippi State University Extension Service Publication 884, "Building Homes for Squirrels."

Application of Habitat Management Practices for Gray Squirrels

You can manage upland pine, hardwood, and mixed pine-hardwood forests for squirrels. To manage for squirrels, focus on natural foods and den sites. If gray squirrel habitat is a priority, keep some hardwood stands intact. If you harvest timber by clear-cutting, do not cut 100 to 200 feet on either side of stream channels (200 to 400 feet total). Leaving these areas intact protects water quality and provides habitat for squirrels and other wildlife.

On bottomland sites that lack desirable tree species, hardwood forest restoration is a good way to increase future habitat for gray squirrels. It may take 30 years or more to grow hardwood stands from seedlings that provide good squirrel habitat. Ask a registered forester experienced in hardwood regeneration to plan hardwood timber harvests to increase the chance of regenerating desirable trees. For more information about bottomland hardwood management, see Mississippi State University Extension Service Publication 2004, "Bottomland Hardwood Management: Species/Site Relationships."

Pine and mixed pine-hardwood stands managed for timber provide some squirrel habitat because pine seeds and any hardwood mast that is available provide food. To increase food for squirrels, keep some mast-producing hardwood trees and shrubs in pine stands. Save den trees or build and install artificial dens in all forest types to maximize secure den sites. Develop an integrated forest and wildlife management plan with a registered forester and wildlife biologist to achieve your timber and wildlife management objectives.

Application of Habitat Management Practices for Fox Squirrels

To manage for upland fox squirrels, upland forest stands must be thinned and managed with prescribed fire to maintain an open stand. In both pine and upland hardwood stands, reduce canopy cover to about 60 percent or less. Keep desirable mast-producing trees. Oaks such as post, southern red, blackjack, scarlet, and burr oak can survive prescribed fires. You may want to thin smaller woodlots by hand cutting and applying herbicide using cut-stem treatments or the "hack-and-squirt" technique (see Mississippi State University Extension Service Information Sheet 1573, "Tree Injection with Reduced Labor Requirements").

Apply prescribed fire every 3 to 5 years to keep these stands open. Burning in upland hardwood stands must be done very carefully. To minimize injury to upland hardwoods, use low-intensity, cool-

season fires. Always consult a registered forester or wildlife biologist first. Upland hardwood stands maintained by fire will not typically be high-value timber stands, but they will provide more suitable habitat for fox squirrels and many other game and non-game species.

You can manage longleaf pine stands for upland fox squirrels with prescribed fire every 2 to 3 years. On appropriate sites, longleaf pine forest restoration can increase future habitat for both fox and gray squirrels. Longleaf pines can be burned safely in the year after establishment, but do not burn longleaf pine seedlings after they start height growth (emergence of a "candle"). You can burn in late fall or winter once they are 6 feet tall. Thin older longleaf pine stands when necessary. Use prescribed fire to maintain good fox squirrel, deer, turkey, quail, and rabbit habitat. For more information, get "Restoring and Managing Longleaf Pine: A Handbook for Mississippi Landowners" from the conservation organization Wildlife Mississippi. Save some mast-producing hardwood trees (fire-tolerant species like blackjack, bluejack, post, southern red, and turkey oak) and shrubs in longleaf pine stands for squirrel food.

In the Delta, use bottomland hardwood forest conservation and restoration to increase future habitat for both Delta fox and gray squirrels. Review the section on gray squirrel management to find out how to plan for timber harvests in bottomland hardwoods. Consult both a registered forester and wildlife biologist to balance your forest and wildlife management goals.

As with gray squirrels, keep some den trees for fox squirrels. If den trees are lacking, building and installing artificial dens throughout forest stands may increase availability of secure den sites.

Conservation Programs for Private Landowners

Conservation programs can help you with start-up costs of some farm and forest wildlife management practices. Several conservation programs may support the same management practice, but there are different requirements and rewards for each program. You can apply only one conservation program to a plot of land.

You may be able to use a combination of conservation programs on different plots in the same property. If you plan ahead, you can use several programs and practices to help meet your management goals in a way that makes financial sense. Wildlife biologists from the Mississippi Department of Wildlife, Fisheries, and Parks' Private Lands Habitat Program and Small Game Program or USDA-Natural Resources Conservation Service (NRCS) can help you plan for wildlife management and choose conservation programs.

See the tables on the following pages for more information about available programs.

Nongovernmental Organizations

Delta Wildlife provides technical assistance and cost-share for habitat development, such as bottomland hardwood restoration, to landowners in the Delta region. Wildlife Mississippi has hardwood and longleaf pine restoration programs available to eligible landowners. Contact these organizations for information about their habitat restoration programs.

Conservation Programs for Private Landowners

Name of Conservation Program	What It Does	Who Qualifies	Who Administers It	Additional Notes
<p>Conservation Reserve Program (CRP)</p>	<ul style="list-style-type: none"> provides technical and financial assistance to address soil, water, and related natural resource concerns on their lands encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage, such as marginal pastureland, to vegetative cover such as native grasses, wildlife plantings, trees, filter strips, or riparian buffers. provides an annual rental payment for the term of the multi-year contract provides cost sharing to establish and manage vegetative cover practices 	<ul style="list-style-type: none"> eligible farmers and ranchers 	<ul style="list-style-type: none"> USDA-Farm Service Agency USDA-Natural Resources Conservation Service (NRCS) provides technical assistance, conservation planning, and practice implementation. 	<ul style="list-style-type: none"> For landowners who have acreage enrolled in existing CRP forest conservation covers (such as CP11), mid-contract management cost-shares are available for prescribed burning and herbicide application. To be eligible for cost-shares, mid-contract management practices must be incorporated into the CRP contract and management plan before any management is implemented. If mid-contract management practices are not already required by the contract, contract holders must modify their Conservation Plan of Operation to reflect the timing, frequency, and extent of approved mid-contract management practices. For more information, see Mississippi State University, Forest and Wildlife Research Center Brochure, "Conservation Reserve Program Mid-Contract Management: Practices for Wildlife Habitat Improvement in Mississippi" available at http://www.fwrc.msstate.edu/pubs/midcontract.pdf. Copies may also be obtained from the Mississippi Department of Wildlife, Fisheries, and Parks.
<p>Conservation Security Program (CSP)</p>	<ul style="list-style-type: none"> supports ongoing stewardship of private agricultural lands by providing payments for maintaining and enhancing natural resources gives financial and technical help to protect and improve soil, water, air, energy, plant and animal life encourages conservation on working lands (cropland, pasture, grassland) and forested land that is part of a farm 	<ul style="list-style-type: none"> limited to producers in specific watersheds different priority watersheds are chosen for CSP every year 	<ul style="list-style-type: none"> NRCS 	
<p>Environmental Quality Incentives Program (EQIP)</p>	<ul style="list-style-type: none"> addressing specific resource concerns that will improve air and water quality, reduce soil erosion, improve riparian, aquatic, and forestland habitats, and address wildlife issues 	<ul style="list-style-type: none"> agricultural producers who face threats to soil, water, air, and related natural resources on their land management practices available through EQIP depend on the county where a property is located because each county has specific natural resource concern priorities. 	<ul style="list-style-type: none"> NRCS 	<ul style="list-style-type: none"> Some counties have wildlife habitat management practices available through EQIP, and/or practices that are not specifically designated for wildlife but may be used to enhance wildlife habitat. Landowners managing forests are advised to contact their local NRCS office for specific eligibility requirements as well as local county resource concern priorities.

Conservation Programs for Private Landowners

Name of Conservation Program	What It Does	Who Qualifies	Who Administers It	Additional Notes
Forest Resource Development Program (FRDP)	<ul style="list-style-type: none"> provides cost-shares for forest management practices such as herbicidal control of invasive vegetation and forest regeneration 	<ul style="list-style-type: none"> available to any non-industrial private forest landowner 	<ul style="list-style-type: none"> Mississippi Forestry Commission 	
Healthy Forests Reserve Program (HFRP)	<ul style="list-style-type: none"> voluntary program established for the purpose of restoring or enhancing forest ecosystems, such as longleaf pine, to 1) promote the recovery of threatened and endangered species, 2) improve biodiversity, and 3) enhance carbon sequestration provides financial incentives, through conservation easements and/or 10-year restoration agreements, for appropriate forest management practices that will meet program management objectives 	<ul style="list-style-type: none"> contact your NRCS office for more information 	<ul style="list-style-type: none"> NRCS 	
Wetlands Reserve Program (WRP)	<ul style="list-style-type: none"> provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns provides financial incentives, through conservation easements and/or 10-year restoration agreements, to restore, protect, and enhance wetlands, including bottomland hardwood forests, while retiring marginal land from agriculture 	<ul style="list-style-type: none"> contact your NRCS office for more information 	<ul style="list-style-type: none"> NRCS 	
Wildlife Habitat Incentives Program (WHIP)	<ul style="list-style-type: none"> encourages the creation of high quality wildlife habitats that support wildlife populations of national, state, and local significance offers technical and financial assistance to develop or improve upland, wetland, riparian, and grassland habitat in both open lands and non-industrial private forestlands offers cost-shared practices for prescribed fire; herbicidal control of invasive vegetation; establishment of buffers, transition zones, and hedgerows; native vegetation establishment; and wetland management 	<ul style="list-style-type: none"> available to any private landowners and others 	<ul style="list-style-type: none"> NRCS 	

Technical Assistance for Private Landowners

The following agencies can give wildlife and/or forest management planning or technical assistance to private landowners:

Delta Wildlife, Inc.

Website: <http://www.deltawildlife.org/> Phone: 662.686.3370

Mississippi Department of Wildlife, Fisheries, and Parks

Website: <http://www.mdwfp.com/> Phone: 601.432.2199

Mississippi Forestry Commission

(Registered foresters available to assist landowners with forest management planning)

Website: <http://www.mfc.state.ms.us/>
Phone: 601.359.1386

Mississippi State University, Forest and Wildlife Research Center

Website: <http://www.cfr.msstate.edu/fwrc/> Phone: 662.325.2952

Mississippi State University, Wildlife and Fisheries Extension

Website: <http://msucares.com/> Phone: 662.325.3174

USDA-Farm Service Agency

(Administers the Conservation Reserve Program)

Website: <http://www.fsa.usda.gov/>
Phone: 601.965.4300

USDA-Natural Resources Conservation Service

(Wildlife biologists and registered foresters provide landowner technical assistance)

Website: <http://www.ms.nrcs.usda.gov/>
Phone: 601.965.4339

Wildlife Mississippi

Website: <http://www.wildlifemiss.org/> Phone: 662.686.3375

More Information

Publications and information sheets produced by the Mississippi State University Extension Service and mentioned in the text are available at <http://msucares.com> or through county Extension offices.

Hunting and Harvest Management

Compared to other small game species, such as rabbits and quail, squirrel numbers have remained high. Squirrel hunting is good in many areas of Mississippi. Squirrel meat is also tasty and healthy when properly prepared. Remove guts from harvested squirrels within a few hours of harvest, and keep them cool. The hide can be removed later. Take rubber gloves and hand sanitizer for dressing squirrels in the field. Do not waste; if you enjoy hunting squirrels but not eating them, give the meat to someone who will use it. Always dress game promptly and properly before giving it to others.

The squirrel hunting season in Mississippi is divided into three zones. There are also special youth seasons open before the regular season on private lands and some Wildlife Management Areas within each zone. The regular season is open from October through February. Some public lands may have specific dates when squirrel hunting is open. Check hunting regulations to find exact hunting season dates and daily bag limits. You can find hunting season dates on the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) website (<http://www.mdwfp.com/>), at MDWFP offices, and most stores where hunting licenses are sold.

Squirrel hunting with dogs was once a popular way to hunt squirrels in Mississippi and is now becoming popular again. Hunting squirrels with treeing dogs is easiest during the late season when more squirrels are feeding on the ground and trees are bare. Still hunting or slowly walking through the woods alone or in a group is an effective and popular way to hunt squirrels. You will often find good squirrel hunting when squirrel populations are high and hickory nuts or acorns are abundant.

Safety is important on any hunting trip. Know where other hunters, dogs, buildings, and roads are. If you hunt with a rifle, remember that bullets from small-caliber, rimfire rifles can easily travel up to a mile.

In areas with plenty of good habitat, legal squirrel hunting does not negatively affect squirrel populations. The amount of available food and habitat influences squirrel populations more than hunter harvest.

Summary

Gray and fox squirrels are fairly common throughout Mississippi. Except for upland fox squirrels in many areas of the state, squirrel populations have remained abundant for the past twenty years. With good management, you can increase local squirrel numbers for better hunting. Several habitat management practices improve squirrel habitat quality and

accessibility for hunting, including timber stand improvement, making artificial dens, and forest restoration. Conservation programs may be available to help private landowners with habitat management. Wildlife biologists from state and federal natural resource management agencies can also help private landowners plan for wildlife management and choose appropriate conservation programs.

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