

# WILDLIFE MISSISSIPPI

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# GROWING A BOUNTIFUL WILDLIFE HABITAT IN PINE STANDS

BY BOBBY WATKINS, JEANNE JONES AND WES BURGER

*Prescribed fire and Arsenal herbicide Applicators Concentrate work together to improve wildlife and plant communities in Mississippi's forests.*

In the southeastern United States, pine, pine-hardwood and hardwood forests cover more than 200 million acres, or almost half of all available land. Much of this land is for commercial purposes and nearly a third contains pines that require active management through prescribed fire, herbicide treatments and thinning to optimize timber production and wildlife habitat quality.

Before the Europeans settled the Southeast more than 200 years ago, fire shaped the composition and structure of Mississippi's forestland. Native Americans, early settlers and natural events, such as lightning strikes, would start fires that burned off the thick underbrush, releasing plant species that thrive following fire. These wildfires left open pine stands with scattered shrubs and a diverse herbaceous ground cover providing high-quality, savanna-like habitat for a variety of plant and animal communities.

But as the area became settled, the environment gradually changed. Societal demands eliminated fire from the landscape. Today, after more than a century of fire suppression, many southeastern pine systems have dense undergrowth and scarcely resemble the open, park-like savannas noted by early explorers.

Fire is a natural and important process in southern pine forests and many species of plants and wildlife depend on periodic fire. In the absence of fire, upland pine forests have become dominated by a dense mid-story of shrubs and hardwood trees. Over time, this developing mid-story shades out plants that are important to many species



*Fire is a natural and important process in southern pine forests that many species of plants and wildlife depend on. Photo by the Mississippi Fish and Wildlife Foundation.*

of wildlife.

Grasses, forbs and legumes, which produce abundant flowers that benefit many species of insects, face an uphill battle to survive in fire-excluded forests. Species such as Bachman's sparrows and Northern bobwhite quail that nest and forage in grass and shrub communities depend on this habitat and associated insect food sources to survive. As a result of fire exclusion, their numbers may decline and eventually disappear.

## Technology Springs Hope

To recapture pine stands and allow valuable food plants on the forest floor to flourish, forest landowners first need to control hardwood brush and tree competition. By doing that, they also

can increase pine tree growth, maximize revenues and enhance forest aesthetics and accessibility.

To control competition for nutrients, moisture and sunlight in pine stands, forest landowners have long relied on prescribed burning. However, fire alone can no longer eliminate the dense mid-story growth common in many of the Southeast's pine forests. The size, well-established root systems and stem density of the mid-story make fire alone an ineffective tool.

Instead, forest landowners have developed a comprehensive approach to increase the nutrients, moisture and sunlight available to their pine stand by using Arsenal herbicide Applicators Concentrate (AC) before using a

prescribed burn. This management approach has multiple benefits. In addition to enhancing the growth of their pines, landowners enhance habitat for species, such as Northern bobwhite quail and many non-game birds. By improving the abundance of wildlife on their lands, landowners can also supplement their income through hunting and wildlife-watching fee-access agreements.

### Evaluating Wildlife Impact

Several recent wildlife habitat studies report the positive effects of selective herbicides and fire on preferred wildlife food plants. For example, a Mississippi State University (MSU) study on privately owned forestland near Macon, Mississippi evaluated plant and bird response to the combined use of Arsenal and prescribed fire. The study took place on 1,800 acres composed of 92 percent pine and mixed pine-hardwood stands, as well as diverse plant communities.

In October 1998, MSU researchers sprayed approximately 100 acres of mature pine forests with Arsenal AC at a rate of 16 ounces/acre using a skidder-mounted sprayer. A prescribed burn followed the sprayed areas in March 1999. Adjacent forestland was not treated with Arsenal AC and fire.

Between July and August 2001, the MSU researchers surveyed a total of four treated and four untreated pine stands to measure coverage of herbaceous plants on the forest floor and the number of species of plants less than 3 feet high. To evaluate breeding bird response, they established 18 permanent point count stations, with half located in treated pine stands and the other in untreated. During May and June 2001, observers recorded all birds observed or heard at the stations during four 10-minute point-counts.

### Nature Flourishes

Pine stands treated with Arsenal AC in the fall and then burned in March exhibited much higher wildlife food and cover plant abundance than untreated stands. The study recorded more than 90 different species of native plants in the treated pine stands - 75 percent of which consisted of preferred food sources for



*Along with fire, a herbicide treatment(s) can be important in maintaining a healthy forest. Photo by the Mississippi Fish and Wildlife Foundation.*

upland game birds, non-game birds, rabbits and white-tailed deer. In addition, browse, seed and fruit-producing plants such as panic grasses, wild grape, blackberry, beauty berry, common ragweed, beggarlice, partridge pea and lespedezas comprised more than 50 percent of the ground cover. Shade-intolerant grasses, forbs and legumes increased approximately eight-fold in two growing seasons.

In contrast, leaf litter and downed logs populated the forest floor in the untreated stands. In fact, less than 10 percent of the forest floor featured plant cover. The stands featured only 38 different plant species, mostly young hardwood trees, such as oak, hickory and maple, as well as shrubs, such as blueberry. Why the difference in ground cover vegetation? The difference, in part, can be attributed to the shading effects of the mid-story woody plants. Treated stands exhibited less than 10 percent mid-story, while untreated stands exhibited more than 60 percent mid-story plant coverage.

Researchers observed a total of 51 species of birds on the study site during the 2001 survey period. Twenty-five species found haven in the treated stands versus 23 in the untreated stands. The MSU study showed that changes in vegetation structure and composition

affect bird communities. Species of birds, such as Bachman's sparrow, common yellowthroat, downy woodpecker and indigo bunting, flocked to the treated pine stands. Other species, such as blue jays, Eastern towhees, white-eyed vireos and wood thrushes, preferred the untreated pine stands.

The birds that congregated in the study's treated pine stands typically feed and nest in open pine forests with abundant forest floor plant cover. Birds that prefer nesting and foraging in a dense forest mid-story tend to be more common in the untreated stands.

### Forest Management Makes Sense

Forest management practices that restore pine ecosystems can enhance local and regional bird diversity. This is especially important since many species of birds associated with these communities are declining in population regionally. In fact, proper pine forest management can contribute to bird conservation by providing habitat conditions that support regionally declining species like Bachman's sparrows and Northern bobwhite quail.

The forest management approach landowners select for bird habitat depends on the types of birds they want. But, it is important that landowners maintain a diversity of habitats and bird



Wildlife food and cover plants flourish in a well-maintained forest. Photo by BASF

communities for the overall health of the forest ecosystem. For example, a landowner could create several forest types by allowing fire-excluded hardwood and hardwood-pine forests to thrive in drainages and streamside management zones while actively managing upland pine forests through prescribed burning and Arsenal AC.

Properly managing pine forests creates healthier habitats for wildlife and restores nature to a more natural

condition. However, landowners should keep in mind that a complete forestland management plan, along with advice from professionals, is essential to accomplish this goal.

*This article was written by Bobby Watkins, a technical specialist with BASF, Jeanne Jones and Wes Burger, both of the Department of Wildlife and Fisheries at Mississippi State University. □*

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## FRONT COVER

The beautiful cover was photographed by Michael Kelly. Michael is an avid hunter and a part-time, professional wildlife photographer. Some of his work can be seen at [www.wildexposures.net](http://www.wildexposures.net). He can also be reached at 662.820.7702



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*Carolyn and Richard McRae*

Carolyn and Richard McRae, Jr., recently donated \$5,000 to the Mississippi Fish and Wildlife Foundation. According to Dr. Jeff Clark, President of the Foundation, "This is a very significant contribution and will result in significant benefits for not only fish and wildlife enthusiasts, but our valuable natural resources throughout Mississippi."

"Carolyn and Richard are true friends of conservation and they are well known for their dedication to the community and the environment," continued Clark.

"The efforts of Wildlife Mississippi will benefit Mississippi for years to come," said Carolyn McRae, an avid conservationist.

"Wildlife Mississippi's efforts to restore land to bottomland hardwoods and protect land along the Mississippi River compliment our family's conservation philosophy," said Richard McRae, a member of the Foundation's Theodore Roosevelt Society.

The McRaes own 4,000 acres along the Mississippi River in Issaquena County. They make their home in Jackson.

*BASF Corporation*

BASF Corporation of Research Triangle Park, North Carolina has donated \$15,000 in Arsenal to the Mississippi Fish and Wildlife Foundation for use in controlling cogongrass in South Mississippi and restoring native prairie in Northeast Mississippi.

"This is a very significant contribution BASF Corporation has made to Wildlife Mississippi and will result in lasting benefits for Mississippi," stated Leila Wynn, Past-President of the Foundation. "They have been an outstanding community citizen and are well known for their dedication to agriculture, forest industry and the environment," continued the Wildlife Mississippi Past-President.

The efforts of this partnership between Wildlife Mississippi and BASF Corporation will benefit Mississippians for years to come. They work hard to protect, restore and enhance the environment. The Foundation's partnership with BASF Corporation will provide a better quality of life for those who live and work in the State.



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