



**ARKANSAS**  
**EMERGING FOREST**  
**THREATS**  
**Management Options for**  
**Healthy Forests**

**WHY DOES IT MATTER TO ME ?**

**It is important for private forest landowners to prepare for the likelihood of increasing threats to their forest lands. Private forests make up the largest holdings of forest lands in the Southeastern U.S. These properties collectively will be crucial in protecting the overall health of our landscape. Management that uses the most current forest science will better enable landowners to protect their land and resources, and to contribute positively to the conservation and productivity of Arkansas forest lands.**



The mission of the Southeast Climate Hub is to develop and deliver science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access to assistance to implement those decisions. This is in alignment with the USDA mission to provide leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on sound public policy, the best available science, and efficient management.

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# EMERGING THREATS & HEALTHY FOREST MANAGEMENT

## Arkansas Forests

Arkansas is covered by 19 million acres of productive forest land, which accounts for approximately 56% of the state's total land area. About 69%—13.1 million acres—of these forests are privately owned. Hardwood species such as white oak, sweetgum, post oak, and black oak make up 57% of forest area, while softwoods such as loblolly and shortleaf pine make up 33%. Mixed forests compose the remaining 10% of forest cover. The forest lands of Arkansas are a crucial asset to the state for both their annual economic contribution and the vast array of ecological services they provide. Annually, forest lands contribute \$6.4 billion to the Arkansas economy, which is a larger percentage contribution than any other Southeastern state. However, threats from extreme weather, invasive species, wildfire, and disease have increased in severity due to climate change, consequently reducing forest productivity and economic returns. Fortunately, there are adaptation practices that landowners can use to reduce or eliminate these threats, while increasing their forest's value.



## Threats to Our Forests

**Threats from Drought** — Droughts may significantly reduce forest productivity, causing tree roots to dry out and lose their ability to move water and soil nutrients into and through their stems. This also leaves them vulnerable to pests and diseases, potentially causing an outbreak. When drought conditions are coupled with extreme heat, wildfires have an increased potential to spread and cause extensive destruction. These factors are responsible for severe damage to forest stands and ecosystems each year in Arkansas by reducing productivity, water quantity/quality, and biodiversity. Heat and water stress can leave stands more vulnerable, resulting in minor to substantial die-back. Drought conditions can also lead to accelerated organic matter decomposition and changes in vegetation. Monitoring for signs of stress (i.e., branch/foilage die-back and insect/disease outbreak) will allow for early intervention.

**Threats from Flooding** — With climate change, extreme rainfall events (more than 2.5" in a day), occur more frequently within the Southeastern U.S. During floods, tree roots may be uncovered by erosion or "drown" from overexposure to water, causing anaerobic (non-oxygenated) conditions. These problematic conditions affect trees' physiological processes, leaving them susceptible to pests and disease. Reductions in stream



water quality, aquatic habitat, the aesthetic value of recreational areas, and soil productivity can all occur after floods. Management practices to mitigate damage include planting flood-tolerant tree species, monitoring susceptible trees for disease outbreaks or fungal growth, and installing appropriate erosion control structures such as culverts and drainage ditches where needed.

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**Threats from Wildfire** — Increased fuel loads and more frequent droughts could increase wildfire frequency and intensity within the Southeast. Salvage logging after extreme weather events reduces fuel loads and the risk of wildfire, pest, and disease outbreaks. Incorporating fire-resistant species such as shortleaf pine may also mitigate wildfire risks.



**Threats from Forest Density Levels** — The loss of paper and wood product markets coupled with historical fire suppression tactics has produced unhealthy forest stand conditions where trees are growing at a rate surpassing their removal. According to recent forest inventory data, pine forests are annually growing 11 million more tons than are being removed, and hardwood forests are growing 9.6 million more tons than are being removed, on an annual average. This situation creates **1.** minimal understory growth and biodiversity, **2.** high fuel loads for wildfires, and **3.** increased pest and disease outbreaks.

**1.** With forests at unhealthy densities, tree canopies can grow too close together, creating a condition known as canopy closure. A closed canopy can cut off sunlight to the forest floor, decreasing growth of the understory, which is where many wildlife species find their forage. This can also reduce crucial seedling banks for future regeneration of trees.

**2.** Since fire suppression tactics have been used, our forests have developed higher fuel loads that can result in devastating wildfires.

**3.** Overstocked forest conditions create stress on forests as the trees compete for the same limited resources, causing many of them to become more susceptible to pests and disease, which in turn can accelerate outbreaks, rather than individual mortalities.

**Loss of Native Habitats to Invasive Species/Fire Suppression/Silviculture Practices** — Invasive species, insects, and disease can impact forest productivity, recreation, and wildlife. Increasing air temperatures associated with climate change can extend the growing season for trees, but also extend the outbreak season. Invasive species are particularly prevalent in the Southeast due to the region's mild winters that fail to kill invasive insect and plant species. Species such as Chinese privet (the most prevalent invasive species in Arkansas), tree of heaven, Chinese tallow, cogongrass, and Callery pear may outcompete native plant species for needed resources such as nutrients and sunlight. Since many invasive species do not have natural predators or herbivores, they often grow unchecked, reducing native habitats that are home to our native wildlife and game species, including deer, quail, and squirrels. Invasive species also may lead to the loss of aesthetic value in recreational areas. Fire suppression tactics of the past have also resulted in the loss of native, fire-adapted habitats such as our pine savannahs that are home to quail and the glades of the Ozarks and Ouachita Mountains that are home to many endemic plant species such as the Ouachita indigo bush and the Arkansas twist flower. There is also a loss of our native shortleaf pines to the silviculture practice of planting loblolly pine ecosystems as a faster growing alternative. Management practices to control invasive species' spread include properly timed pesticide applications and decreasing the mode of spread. Early detection is critical to finding outbreak areas before the problem can multiply and spread.

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## Management Strategies to Address Threats

**Silvicultural practices such as 1. thinning, a) mechanical or b) chemical, 2. prescribed burns, and 3. tree plantings** are some of the mitigation tools that foresters use. These tools are important in the development of healthy, vigorous forests that have a stronger chance of surviving natural and human-caused changes to the environment.

**1a. Mechanical thinnings** are usually used as a pulpwood harvesting method to remove smaller diameter trees. This reduces the density of the forest, allowing the remaining trees to grow with more vigor. However, there are other methods such as mulching that can be used to reduce the number of trees as well.

**1b. Chemical thinnings** are used to removed undesirable tree species, both invasive species and less desirable tree species that may not provide as much food for wildlife or are of lesser timber value. Both mechanical and chemical thinnings are used to reduce stress on the forest by reducing stocking densities.

**2. Prescribed burns** are used to reduce fuel loads that can cause wildfires to become catastrophic events, especially during times of drought. Prescribed burns are also instrumental in returning overgrown areas to their native, fire-dependent habitats, such as the glades and pine savannas that were once prevalent in our state.

**3. Afforestation and regeneration** are increasingly important. Tree seedlings can be used to build forest buffers along rivers and streams vulnerable to flooding. These buffers help reduce sediment and nutrient loss, keep banks from eroding, and shade waterways to keep them cooler and reduce the occurrence of dangerous algae blooms. Afforestation can also be used to revert agricultural and pasture lands back to forests.



**Summary** — Many threats impact the economic and ecosystem value of forest land in Arkansas. Threats such as wildfire, flooding, droughts, and insect and invasive species outbreaks have always existed, but are now being amplified by warming temperatures and changes in rainfall frequency and amounts. The adaptation and mitigation methods listed in this factsheet are just a few of the available options that help improve resilience and reduce risk on forest land. Consult your local Cooperative Extension agent or a County Forester for more information about threats and corrective measures appropriate for your forest.



FOR MORE INFORMATION ON  
MANAGEMENT OPTIONS FOR YOUR WOODLANDS:

Contact the Arkansas Department of Agriculture's Forestry Division office at

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<https://www.agriculture.arkansas.gov/forestry/>