

Where there's Smoke, there's Life: *the Role of Fire on Alabama's Wildlands*

Part One of a Two-Part Series

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At one time, endless herds of bison roamed the Central Plains. In the Midwest, the skies were blackened and trees cracked under the weight of innumerable flocks of passenger pigeons. There are many examples of wild animals that were once so abundant they shaped the land and the people. The same was true in Alabama. However, unlike the bison or the passenger pigeon, the wild creature of Alabama was fire.

At all times of year, fire would come to life in Alabama's wilds, breathe in the air, feed along the grasses and brush, and migrate day and night to cover immense areas. Over the centuries and millennia, plants adapted to its presence by forming unique habitats and cultures. Today, wild roaming fire in Alabama has been tamed. We've largely removed it from the woods, constrained it, and kept it in places like pizza ovens and fireplaces. On rare occasions, foresters will let it loose in the woods, but kept on a tight leash else the fire may try to rediscover its wild roots.

Like the former animals described, as fire has blinked out, our landscapes and cultures have changed. Today's forests in Alabama are primarily comprised of plants and animals ill-suited for frequent fire. Similarly, our culture has evolved from one that largely understood the natural role of fire to one that is alarmed simply by the smell of its smoke.

As the dialogue about the role of fire in our nation's wildlands reaches a fevered pitch, Alabama finds itself in a unique position. With its favorable laws, numerous trained professionals, and abundant rural areas, Alabama could be a national leader in restoring fire to the landscape. This transition can be made, in part, by a better understanding of what exactly has been lost since we removed fire from its natural range.

With the spread of fire largely dictated by changes in weather patterns and occasional swamps, rivers, and valleys, it is difficult to fathom the degree of promiscuity that fire historically carried across Alabama's landscape. If conditions were right, fire could carry in any direction from the point of ignition; day or night. If it hit impediments such as streams or swamps, the flames would feed around said impediment, jump across, or stop altogether. Sometimes, the fire would bed down in the swamps only to re-

emerge weeks or even months later in the drier, upland areas when conditions were once again favorable for its spread. An initial approximation is that Alabama historically contained somewhere between 25-29 million acres of habitat experiencing high fire frequency (one to seven year return interval). To sustain such acreage, 3½ to 4 million acres would have burned, on average, in Alabama annually. Unlike today, in the not-so-distant past, it was more a question of what *wasn't* burning in Alabama than what *was* burning. Most of the state was on fire. Because of this, numerous, unique habitats adapted.

In this two-part series, we'll look at a list of the major forest types that once saw fire with regular occurrence in Alabama. Embedded within these are a number of fire-dependent habitats that, due to subtle differences in soils and hydrology, resulted in slightly different community types and response to fire.

Longleaf Pine Forests

The most well-known fire-adapted forest of Alabama once covered between 10-13 million acres of the state. Most of this forest burned no more than every three years. Fire kept shrubs and other fire-intolerant hardwoods low in stature, giving the forest a park-like appearance. Longleaf pine forests are typically dominated by that species, but they can also be found in areas with other pine species (such as slash and shortleaf) and, in some cases, fire-tolerant deciduous trees such as blackjack oak, post oak, or turkey oak. Longleaf pine forests were found in a variety of landforms from deep sandhills to mountain ridges up to 1,500 feet in elevation. The interest in planting longleaf pine has grown substantially the past 15 years. Even so, the amount of necessary burning to restore all of this forest's attributes is lagging significantly behind.

The term 'pine barrens' is one that has been used so universally that it has lost much of its original meaning. In Alabama, the term was used primarily to describe the longleaf pine forests in our two maritime counties of Baldwin and Mobile, and was meant to describe a longleaf pine forest that from a distance looks so structurally simple that it was deemed devoid of diversity. As noted by Mobile, Alabama botanist Charles Mohr in 1901, "the pine forests are open. The crowns of trees scarcely

touching one another ... the floor of these open pine forests is covered with a carpet of grasses and other herbs, mostly perennials, which, under the mild climate of this zone, retains its verdure for the better part of the year.”

The conditions described by Mohr are as much of a grassy savanna as they are a forest. Regardless of nomenclature, fire swept through these pine barrens with low intensity, but high occurrence. The result was a forested savanna that upon closer examination was not barren at all, but rather one of the most diverse understory plant communities in the entire country. Related to this groundcover is the ‘Wiregrass Region’ of southeast Alabama. Although this area takes on more of a cultural reference today, it was originally named for its once plentiful fire-dependent, grassy ground cover. Without fire, there would have been no wiregrass for which to name this region.

Historically, one of the more noteworthy longleaf pine forests was an isolated stand in the Cumberland Plateau of Walker County, Alabama. This stand was said to be approximately one township in size (about 23,000 acres). Its uniqueness attracted many, including a Dr. Carl Schenck that visited on behalf of Gifford Pinchot [first Chief of the U.S. Forest Service]. Though this well-stocked longleaf pine forest had many features of stands found further south, it also possessed unusual prairie attributes such as the presence of prairie plants such as *Helianthus mollis*, commonly called ashy sunflower. Though scientists have no explanation for the presence of this isolated forest in the Cumberland, it would have needed fire on a regular basis to maintain itself. Unfortunately, no features of this forest can be found today.

Another interesting longleaf pine site were those collectively and locally known as the ‘Salamander Hills’ outside of Tuscaloosa near Lock 14 on the Warrior River, where an intrepid population of pocket gophers was discovered. Unlike the pocket gophers seen in the sandy soils of the longleaf pine forests of south Alabama, these could be found on the gravelly ridges where longleaf pine and several fire-tolerant oak species grew. In 1912, Roland Harper [staff botanist for the Geological Survey of Alabama] declaimed the “interesting relations between salamanders and forest fires” in *Science* magazine. This area today is owned by a timber company and bears no resemblance to the forest described 100 years ago by Harper. Pocket gophers have been undetected in this area for decades, likely due in large part

to changes in land use facilitating a multi-generational exclusion of fire.

Loblolly Pine Forests

Loblolly pine is the most widespread pine species in Alabama today. Piecing together the extent of loblolly pine in Alabama’s historically fire-dominated landscape, however, is more challenging. At young age classes, loblolly pine is susceptible to fire. Similarly, older loblolly is much more susceptible to heat in the forest crown than longleaf, slash, and shortleaf pine.

Quoting botanist Charles Mohr again from 1901, he stated that loblolly pine was “confined to the narrow bottoms along the banks of streams.” By this, he suggested loblolly was more or less restrained to nature’s firebreaks. For the large part, Mohr

was correct; fires burning into streamside edges, swamps, sheltered hill slopes, mires, and such were sporadic which allowed loblolly to become established in said areas. However, loblolly pine is tenacious and possesses many qualities of invasive, aggressive plants. Besides growing rapidly, it produces large quantities of seed annually. For this reason, loblolly pine was frequently found as a minor component in other forest types. This is particularly true in shortleaf pine forests. In some cases, loblolly pine could be found in upwards of 20 percent of the forest cover in shortleaf pine forests.

One exception was an approximately 215,000-acre area found in portions of Limestone and



Madison counties described as a ‘loblolly pine and hardwood forest’ in a 1936 U.S. Forest Service survey. However, the Forest Service further qualified this classification with “the aggregate volume of pine in this area is not great; however, as most of the land is cultivated, the pine trees appear usually as scattered individuals.” In this situation, it is possible the fragmented landscape was sufficient enough to act as fire breaks that allowed loblolly pine (commonly known as ‘old field pine’) to become established in higher abundance. In many situations today, reintroducing fire to loblolly plantations can be destructive and is often not applied until well after the first thinning. This same mentality is currently applied (falsely) to longleaf pine plantations.

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Slash Pine Forests

Through afforestation over the past several decades, the range of slash pine has greatly expanded in Alabama. Historically, slash forests were largely restricted to wet pine flatwoods in Alabama's two coastal counties covering perhaps 1.5 million acres. Frequent fires approximately every four to five years allow slash pine to flourish in pure stands or to mix with longleaf pine. The groundcover was usually a mix of grasses and forbs. Many waxy-leaved shrubs were present; however, frequent fires relegated them to low stature. In some cases, slash pine forests' tree density can be very low (less than 10 trees per acre) and grade more into a (wet) prairie system. In other areas, the slash pine forest can have a high density of pines. In the absence of fire, waxy-leaved shrubs will dominate the midstory and present a significant concern for large conflagrations.

Shortleaf Pine/Fire-Dependent Hardwood Forests

The extent of shortleaf pine forests in Alabama is just beginning to come to light. Covering about the same amount of Alabama as longleaf pine once did, these forests were found

This forest type is most abundant north of the Fall Line with one significant exception: the area around the Union Springs area known as the Chunnenuge Ridge. Ironically enough, although historically this area around Union Springs was a relatively small forest outlier, today it hosts some of the best-managed shortleaf/hardwood forests remaining in Alabama.

Another notable location is an area of the nine northernmost counties of Alabama, where upwards of 50 percent of the landscape was described as shortleaf pine forest. For example, the area known colloquially as the Red Valley Lands (or simply 'Red Land') was found across several northern Alabama counties and is thought to have covered approximately 1.56 million acres. As its name implies, these forests were largely found in the broad (non-riparian) areas of North Alabama between mountain peaks. Shortleaf pine was the dominant tree species, though loblolly pine could also be found within the stand. Fire-tolerant hardwoods including various hickory species, red oak, black oak, white oak, blackjack oak, and post oak composed the balance of the stand's species diversity. The extent to which this forest subtly transitioned to our current oak-hickory forests can only be speculated, but it most certainly did occur. A frequent, low-intensity fire cycle moved across this landscape every five to seven years. Only with more recent fire exclusion has this region transitioned into mesophytic (less fire-tolerant) forest structure dominated with trees species such as red maple, American beech, sweetgum, etc.

Fire-Tolerant Hardwood Forests

As the appreciation of fire in hardwood forests continues to blossom, so too does the recognition of this unique forest type historically found in the Tennessee Valley and Coal Region of Alabama. The role of regular fire in this region has received scant attention within Alabama, despite that we know approximately 40 percent of Alabama's northern nine counties were once fire-tolerant hardwood forests. What little we do know about fire effects in this region has been gathered from studies in Tennessee and elsewhere in the Appalachians.

We know within certain, shaded ravines, coves, and stream terraces that fire played a smaller role due to less-frequent return intervals and subsequently long-standing exclusion. This allowed less fire-tolerant trees such as American beech, basswood, ash, and red maple to dominate. In those areas, many fire-sensitive plants species thrived. Fire was irregular in these areas and oftentimes catastrophic when it occurred. With that said, conversely there were large areas where fire was a regular occurrence that resulted in a hardwood forest comprised primarily of fire-tolerant tree species.

At least three, large regions in this area of Alabama contained hardwood forests with an active fire cycle (burning every several years) at a regular frequency. These frequent fires resulted in a forest of approximately 50 percent fire-tolerant oaks and another 25 percent fire-tolerant hickories. Trees that marginally tolerated fire such as tulip-poplar, sweetgum, and loblolly pine balanced this stand's composition. One glaring exception was the occasional notation of American chestnut by Alabama's early naturalists. Like other members of the beech family, the thin bark of American chestnut meant the tree was fire-sensitive. Paradoxically, American chestnut quickly re-sprouted following fire, a feature shared with many fire-tolerant tree species. Today,



across 10 million acres in an array of various landforms. Comparatively less fire-tolerant at smaller sizes than longleaf pine, the average fire return interval in this forest type was likely five to seven years. Though these forests could be found in pure stands of shortleaf pine, it was most often found amongst other deciduous trees such as post oak, white oak, scarlet oak, and various hickories that were tolerant of frequent fire.

we can only conclude that the interaction between fire and American chestnut was one of complexity.

The Barrens (known colloquially as the High Plain) was a historic region of Madison, Limestone, and Lauderdale counties that covered approximately 582,000 acres. Described as a curious combination of prairie and forest, this area was likely akin to areas currently found in the Midwest known as oak savannas. Its open canopy (approximately 50 percent coverage) contained fire-tolerant hardwoods such as post, southern red, scarlet, and (occasionally) blackjack oak as well as various hickory species including mockernut and pignut. The fire ecology of these hardwood 'barrens' is under-studied in Alabama. However, it can be presumed that fire likely carried every five to seven years along the groundcover dominated by a carpet of 'coarse grass' such as big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Shrubs capable of producing soft mast following fires are also found in abundance including blackberry (*Rubus* spp.) and huckleberry (*Gaylussacia* spp.). Additionally, gooseberry (*Ribes* spp.) was observed by early naturalists, but its role in the fire landscape is still uncertain.

Another noteworthy fire-influenced hardwood forested area was known as the Little Mountain region. This region largely rests on Hartselle sandstone and it was not uncommon to see 'prairies' (glades) embedded within the forest. This forest extended from Morgan to Lawrence and Colbert counties covering roughly 345,600 acres. Many of the same fire-melded forest structures found in the oak-hickory forest type were found in this region. It is important to note, however, that for reasons not entirely explained by soil, shortleaf pine forests were also integrated in the Little Mountain Region with one, large section historically found on Little Mountain in Lawrence County.

One of the more enigmatic forest regions in Alabama was known as the Coosa Flatwoods. Found in the valley regions predominantly stretching from the Gaylesville to Gadsden area (up to 350,000 acres), the original forest structure has been largely eliminated by fire suppression, timbering, agriculture, urban development, etc. Ecologists have speculated the Coosa Flatwoods forest was the historic home to one of Alabama's currently most endangered plants: the Alabama leatherflower (*Clematis socialis*). Moderate disturbance, predominately fire, is

necessary to abate herbaceous competition that otherwise overtakes the leatherflower. With this in mind (along with some of the other fire-dependent micro-habitats described in this area such as bogs, Coosa Prairie, and cedar glades), it seems improbable that these historic flatwoods were predominated by less fire-tolerant red and silver maples and fire-intolerant oaks such as shumard, cherrybark, and willow oak as oftentimes purported by ecologists today. Instead, the forest was likely that as described by State Geologist Eugene Smith in 1884 as post oak, shortleaf pine, red oaks (southern red and scarlet), and blackjack oak. The type of forest described by Smith had a fire cycle of approximately every five to seven years.

It has only been through multi-generational fire suppression, that mesophytic (less fire-tolerant) tree species have invaded these historic fire-dependent oak-hickory forests vastly changing the overall structure of these forests. It was largely conditions just like these that fueled the catastrophic 2016 wildfires in Gatlinburg, Tennessee.

Today, Alabama annually sees about 820,000 of its acres burned annually by wildfire and prescribed burning cumulatively. In other words, only a mere 20 percent of what historically burned in Alabama is burned today. This figure could be discounted if Alabama had lost approximately 80 percent of its historic forests and prairies to agriculture and development; however, Alabama still retains approximately 23 million acres of timberland, which suggests that no such level of forest cover loss has occurred. Those numbers imply that significant advances can be made to restore fire-dependent biodiversity within the state. Much like restoring the Great Plains, success can only be achieved when the community's keystone animal has also been restored. In Alabama, that keystone animal is fire. Despite this, a dangerous folly is to assume that without actively restoring fire to those 23 million acres of timberland, they will not burn otherwise. This is simply not our reality.

Multi-generational exclusion of fire throughout Alabama has only created favorable conditions for catastrophic fires to occur. Now is the time for Alabama to emerge as a national leader and to reignite the flame that historically bound our state's exceptionally diverse habitats. 🌲

