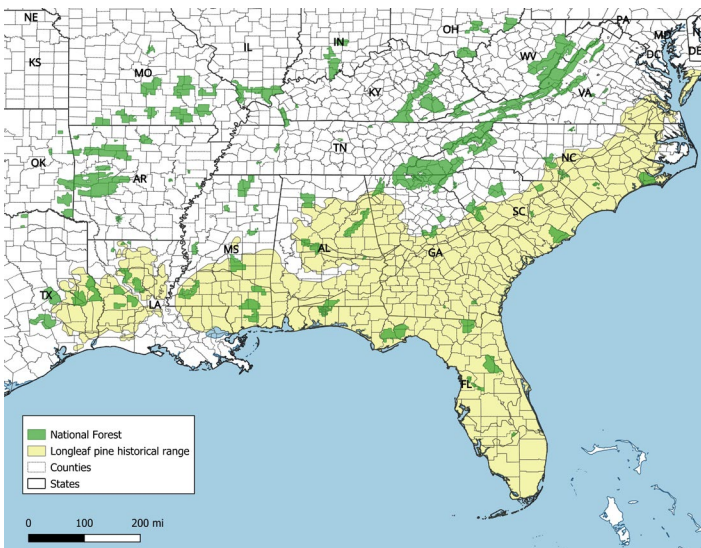


# Longleaf Pine Through Time: How Centuries of Change Shaped a Forest and the Effort to Manage it

## Introduction

Historically, the longleaf pine (*Pinus palustris*) forest extended for approximately 92 million acres across the southeastern United States, from the Piedmont region to the Gulf Coastal Plain, and from Virginia to Texas (**Figure 1**). It was one of the most important species in different ecosystems—such as savannas, woodlands, and forests—supporting a complex web of life and human livelihoods for millennia. The presettlement area covered by longleaf pine could be divided roughly into two major categories: 74 million acres of longleaf-dominant stands and 18 million acres of mixed-species forests containing longleaf pine.



**Figure 1.** Longleaf pine historic and current range.

The primary longleaf pine forest was one of the most expansive and ecologically rich ecosystems in North America. Longleaf pine is a fire climax species, depending on frequent low-intensity fire to maintain its dominance (**Figure 2**). Longleaf pine seedlings evolved to resist flames, thriving in sandy, well-drained soils; without fire, hardwoods and other pine species would quickly outcompete longleaf. Natural disturbances

like hurricanes and lightning were part of the forest's renewal cycle, ensuring continuous canopy cover and regeneration.



**Figure 2.** Longleaf pine seedling during prescribed fire.

Photo by John Maxwell, U.S. Fish and Wildlife Service/Flickr.com

However, less than 4 percent of the original longleaf range remains intact today, due to logging, fire exclusion, and land use change. Very few old-growth longleaf remnants exist only in four of the nine longleaf states (Alabama, Florida, Georgia, and North Carolina), and some ecosystem types, like Piedmont or West Gulf Coastal Plain, have no remaining representatives of

the primary forest. Fortunately, a growing interest in restoring longleaf for wildlife habitat, climate resilience, and cultural heritage is sparking renewed efforts across public and private lands (**Figures 3 and 4**).

This publication aims to track the origins and decline of the longleaf pine ecosystem from a historical and social point of view. By understanding the ecological, cultural, and industrial factors that shaped this landscape, landowners, natural resource professionals, and longleaf pine enthusiasts can make more informed decisions about restoring and sustaining longleaf pine habitats today.



**Figure 3. Longleaf pine at the University of Southern Mississippi's Lake Thoreau Environmental Center in Hattiesburg, Mississippi.**



**Figure 4. Longleaf pine on private forestland in Allen Parish, Louisiana.**

## Stewards of the Fire Forest: Native Americans and the Pre-European Settlement

Prior to European colonization, the longleaf pine thrived as a dynamic, fire-maintained ecosystem characterized by frequent, low-intensity surface fires, ignited by lightning or intentionally set by Indigenous peoples. Fire maintained an open canopy of widely spaced trees above a diverse herbaceous ground layer rich in grasses, legumes, and forbs (**Figures 5 and 6**). It supported some of the highest levels of plant species richness in North America. Species such as gopher tortoise (*Gopherus polyphemus*, **Figure 7**), red-cockaded woodpecker (*Picoides borealis*, **Figure 8**), Bachman's sparrow (*Peucaea aestivalis*), and numerous native plants evolved alongside this fire regime.



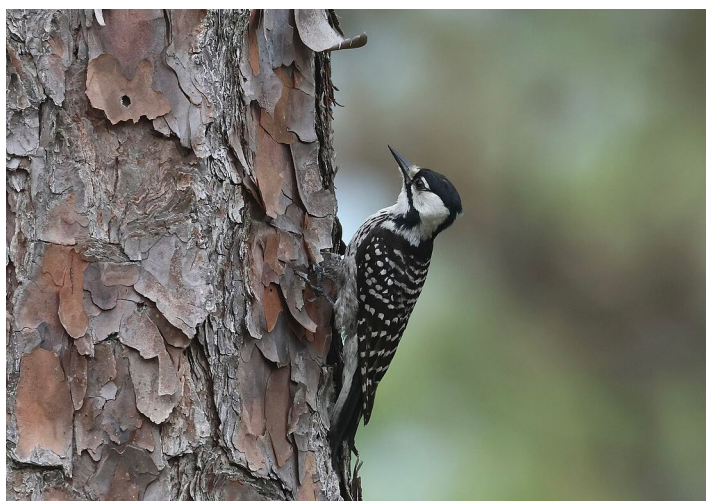
**Figure 5.** A diverse, open, and fire-maintained longleaf pine understory near Picayune, Mississippi. Species like pitcher plants (*Sarracenia* spp.), meadow beauty (*Rexia* spp.), swamp lily (*Hymenocallis occidentalis*), white bog orchid (*Platanthera nivea*), and various grasses and sedges contribute to this colorful and vibrant ecosystem. Photo by Patricia Drackett



**Figure 6.** Pine lily (*Lilium catesbaei*) blooming in a longleaf pine understory near Picayune, Mississippi. Photo by Patricia Drackett



**Figure 7.** Gopher tortoise (*Gopherus polyphemus*). Photo by Tom Friedel/Birdphotos.com



**Figure 8.** Red-cockaded woodpecker (*Picoides borealis*). Photo by er-birds/Inaturalist.org

The longleaf pine forest profoundly shaped the lives of Indigenous peoples in the southeastern United States, though the details of their earliest interactions with the forest are lost to history. Drawing from early European accounts, we know that Native Americans depended on the forest for shelter, fuel, tools, ceremonial materials, and hunting grounds. They used longleaf pine heartwood for fires, pine bark for building structures and paving village paths, and lightwood splinters for illumination. Hunting techniques also revolved around fire. Deer, abundant in the open pine woods, were hunted using strategic fires that drove the animals from dense bottoms into the open where hunters lay in wait. Fire use extended to spiritual and cultural practices as well: soot mixed with bear oil served as ceremonial paint, and longleaf wood played a role in funeral rites. Fire was a critical land management tool, preparing the land for the crops and keeping the understory structure open. It was indeed an important cultural and environmental force.

Although Native Americans harvested resources and made clearings, they did not significantly alter the forest; in fact, their frequent use of fire helped maintain its open structure. When European settlers arrived, they encountered a longleaf ecosystem shaped in part by centuries of Indigenous stewardship. William Bartram, an American naturalist, writer, and explorer, offered one of the most detailed and sympathetic accounts of Southeastern tribes and the longleaf ecosystem. He described the landscape as open, breezy, and beautiful. He observed Indigenous use of fire, agriculture, architecture, and social customs; he documented their diets, tools, and kinship with the land. Welcomed by leaders during his travels, Bartram witnessed a way of life that was rapidly changing due to European influence, including the adoption of metal tools, livestock, and new crops.

Despite these moments of cultural exchange, the trajectory of Native–European relations was overwhelmingly destructive. The longleaf pine belt, once shaped by centuries of Native American stewardship, was left largely in the hands of European settlers. By the early 19th century, only a few Indigenous groups remained in the Southeast; among them were the Choctaw in Mississippi, the Creek in Alabama, the Croatan in North Carolina, and the Seminole in Florida. Yet despite centuries of cultural upheaval, the physical longleaf forest still stood largely intact when settlers took full control.

## European Arrival in the Longleaf Belt

With the arrival of European settlers, the landscape underwent rapid transformation. Settlers suppressed fire to protect homesteads and livestock, began clearing forests for agriculture, and harvested trees for lumber and naval stores (tar, pitch, turpentine). The first Europeans to enter the longleaf pine forests were Spanish explorers. They were focused more on conquest than colonization; they left much of the Gulf Coast interior largely untouched during their 256-year control from 1565 to 1821, preserving the forests in near-pristine condition.

Other European settlers, such as English, Irish, Scottish, and French Huguenots were fleeing persecution and hardship in search of religious freedom, economic opportunity, and land of their own. They were motivated more by homesteading (and colonization) than conquest. Driven by commercial interests, they aggressively sought to domesticate and use the land, especially along accessible waterways from Virginia to Texas.

Native Americans taught them how to hunt, clear land with fire, identify edible plants, and cultivate corn and other crops suited to the sandy soils. They valued longleaf pine for its straight, dense, and rot-resistant wood. They learned from Native Americans to use fire for managing grazing areas, while helping to maintain the open forest structure. Fire continued to play a role in the homestead economy, used to improve pasture forage quality and to clear the land of nuisances such as snakes, ticks, and chiggers (**Figure 9**).



**Figure 9. Prescribed fire in longleaf pine at the University of Southern Mississippi's Lake Thoreau Environmental Center in Hattiesburg, Mississippi.** *Photo by Butch Bailey*

Though settlers cleared more land than Indigenous peoples, they generally preferred the richer soils of bottomland areas, sparing large tracts of the longleaf uplands. Observers like Bartram and John F. Claiborne recorded the vast, open pine forests of the Southeast, while historian Nollie Hickman described Mississippi's piney woods as a pastoral economy shaped by grasslands and wild game, where livestock and wildlife thrived in harmony with the enduring forest. Communities gradually grew along rivers, which served as primary transportation corridors. Mills, shops, and taverns sprung up to support a thriving backcountry economy based on livestock, naval stores, and timber.

## Pineywoods Cattle

Settlers hunted the native bison, which roamed the longleaf pine forests and grazed the carpet of grasses under the trees, and then replaced them with cattle and other livestock. The cattle brought by Spanish settlers were small and allowed to roam freely in a semi-wild state. They quickly became self-sufficient and hardy, while still retaining their gentle temperament. Their long and curved horns (rakestraw) allowed them to rake through longleaf pine straw to uncover grass, a skill especially useful in winter, when grasses grow beneath the litter for protection from frost.

Among the American cattle breeds, Pineywoods cattle are one of the oldest, descending from Spanish cattle brought to the Southeast in the 1500s. Over centuries, they adapted to the challenging environmental and cultural conditions of Alabama, Mississippi, and Georgia. Hardy, parasite-resistant, and productive on marginal forage, they became deeply entwined with the rural culture of the Deep South—based in growing and producing to provide for families' needs.

Historically, Pineywoods cattle were raised in open-range systems by people who also practiced timberland farming to survive. Logging camps and sawmill towns relied on Pineywoods oxen for transport, while families relied on large herds that grazed across public and private lands. Herding was mostly hands-off, with minimal feeding or veterinary care. Cattle were vital not only for milk, meat, and hides but also as a form of wealth and cultural identity.

The introduction of tractors and “improved” breeds in the 1950s began to displace these traditional systems. Stock laws passed in the 1960s closed open-range grazing, forcing many families to sell off their herds. Despite this, a handful of dedicated breeders preserved distinct strains, such as the Conway, Carter, Broadus, Baylis, and others (**Figure 10**). The Pineywoods Cattle Registry and Breeders Association and other conservation efforts, supported by the American Livestock Breeds Conservancy, are now working to document, promote, and sustain these cattle as vital living remnants of Southern agricultural and cultural heritage.

## Hogs

Introduced by Hernando de Soto in 1539 and later multiplied by English settlers, hogs quickly spread through the region. They reached high densities and inflicted sustained ecological damage, particularly by



**Figure 10. Pineywoods cattle near Poplarville, Mississippi.**  
*Courtesy of Jess Brown, Cowpen Creek Farm.*

consuming seeds and destroying seedlings. Census and anecdotal data suggest that by the mid-18th century, hog densities had reached carrying capacity in many areas, with the animals completely depending on wild forage, including the starchy roots of longleaf seedlings. These seedlings, highly visible and palatable in the grass stage, were consumed in large numbers, leaving few chances for forest recovery.

The destructive impact of hogs on longleaf pine regeneration went largely unnoticed until after the Civil War, when large-scale steam logging rapidly removed the virgin forest and revealed the failure of natural regeneration. For centuries, the dense overstory had masked the ecological damage caused by open-range hogs, which had long roamed freely across the South. The sudden loss of forest cover exposed the widespread absence of seedling recovery, prompting a reevaluation of land use and fencing practices.

Historically, crops were fenced to protect them from roaming livestock, but the post-war timber shortage made this practice increasingly impractical. In response, many southern states began passing stock laws in the 1870s, reversing the fencing burden and now requiring livestock owners to confine their animals. These laws marked a turning point in forest and agricultural management, gradually reducing hog pressure on regenerating woodlands. Though implementation was uneven and slow across the region, this shift laid the groundwork for improved longleaf pine recovery by curbing one of its most persistent threats.



**Figure 11. Feral hogs at Grand Bay National Estuarine Research Reserve in Moss Point, Mississippi.**

*Photo by Jonathan Pitchford*

Fencing hogs out of regeneration plots dramatically improved seedling survival, while unfenced areas consistently showed near-total failure of longleaf regeneration, as demonstrated by later research in the 20th century. Other livestock like sheep and goats caused damage, too, but they did not come close to the destructiveness of hogs. In contrast to earlier misconceptions that blamed fire for regeneration failure, this evidence shifts attention to feral swine as the most lethal obstacle. Their consistent rooting of longleaf seedlings, especially during key establishment years, likely played a crucial role in the species' historical range contraction (**Figure 11**).

### Naval Stores

During the 17th century, longleaf pine forests were a primary source of naval stores, products including tar, raw turpentine, and their derivatives (spirits of turpentine, rosin, and pitch) supplied to the British Royal Navy to waterproof vessels. Contrary to claims that the industry began in North Carolina, Virginia was producing tar and pitch from longleaf pine as early as 1608, exporting barrels from Jamestown Colony (**Figure 12**).

Tar was produced by burning branches and logs in slow-burning kilns, while pitch was obtained by boiling tar. Spirits of turpentine and rosin were distilled from raw turpentine, the resin secreted by pines when scarified, or cut. To collect the resin from longleaf pine trees, workers cut a cavity (called a box) into the base of the tree. Above the box, they made narrow, V-shaped streaks



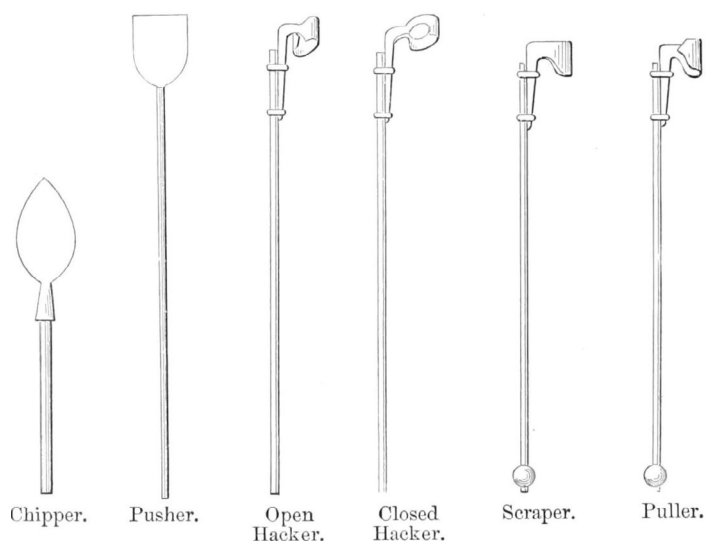
**Figure 12. The turpentine industry in North Carolina. Appeared in *Harper's Weekly* (April 9, 1887). From Original Prints, Audio Visual Materials, Special Collections, State Archives of North Carolina/Flickr.com**

across the tree's face using a hook-bladed tool known as a hack (**Figure 13**). These cuts stimulated the flow of resin, which was collected in the box. Each week during the growing season, new streaks were added to maintain the flow. Once the box was full, the resin was scooped into pails and transferred into barrels for transport to the distillation still.

Naval stores workers, primarily people of African descent, lived in company-run camps where they obtained food, clothing, and supplies from commissaries. Within this labor system, workers developed specialized roles. The most respected were the chippers, who skillfully cut the resin-producing streaks on trees. Lower-status tasks, often assigned to women and children, included dipping and hauling the resin. White supervisors, known as woods riders, managed the crews and were paid a daily wage. Labor recruitment was competitive and contentious; operators fiercely guarded their workforce, and attempts to lure workers from rival camps ended violently.

Tar was also used as a lubricant, rust protectant, wood preservative, and antiseptic. Turpentine was used as a solvent, external rub, laxative, and insect repellent; it was also used to waterproof leather and cloth. Rosin was used in papermaking, as an ingredient for soap, as a floor covering, and as paving material. North Carolina had become the principal supplier

of naval stores to England during the colonial period, with significant turpentine activity along the Tar River and throughout the Coastal Plain. Introduction of the copper still in 1834 revolutionized the industry, enabling efficient distillation of spirits of turpentine and extending commercial exploitation across the South. By 1840, North Carolina dominated U.S. naval stores production, supplying nearly 96 percent of the nation's turpentine and rosin (**Figure 14**). During the colonial period, American naval stores had already become England's main source. By 1850, North and South Carolina together produced 95 percent of all American naval stores.



**Figure 13. Tools used in the turpentine industry in 1896.**  
*Photo by Popular Science Monthly (1896)/Archive.org*



**Figure 14. A turpentine still in North Carolina.** *Photo by Littleton View Co. from The New York Public Library*

By the 1850s, naval stores were still North Carolina's leading commercial product, but intensive harvesting had devastated the state's longleaf pine forests. Longleaf forests were heavily damaged by boxing, which weakened trees and made them vulnerable to fire and wind. Producers pushed south into Georgia and Florida, and by the late 1800s, naval stores operations expanded westward into Alabama, Mississippi, and Louisiana. However, the industry declined as it moved west, facing competition from the growing lumber sector. After the Civil War, southern public lands were once again opened for homesteading and sale, accelerating forest exploitation.

## 1700–1900: The Agricultural and Industrial Conversion

European settlement gradually expanded inland from the Atlantic Coast beginning in the 1730s, reaching the Appalachian foothills by the late 1700s. Between 1750 and 1850, most fertile longleaf pine uplands were cleared for farming or pasture, especially in the Piedmont and Black Belt regions. While the coastal areas and uplands of Alabama, Mississippi, and east Texas remained largely untouched into the early 1800s, land cessions and U.S. expansion after 1821 rapidly opened these areas to cotton plantation agriculture. By 1900, nearly a third of the original longleaf pine uplands had been converted to farmland, marking a major shift in land use and the beginning of longleaf pine's large-scale decline.

The invention of the cotton gin in 1793 sparked another wave of transformation. Cotton cultivation expanded rapidly, and many longleaf forests were cleared for plantations. From the early 1600s to the mid-1700s, logging had limited impact on longleaf pine forests due to its primitive labor-intensive nature. Logs were moved with animal power and only in proximity to waterways. Water-powered sawmills, introduced in the early 1700s, expanded lumber production, but mills still relied on slow, reciprocating (back-and-forth) blades and seasonal water flow. Logging remained local and small-scale, with plantation sawmills primarily serving nearby needs.

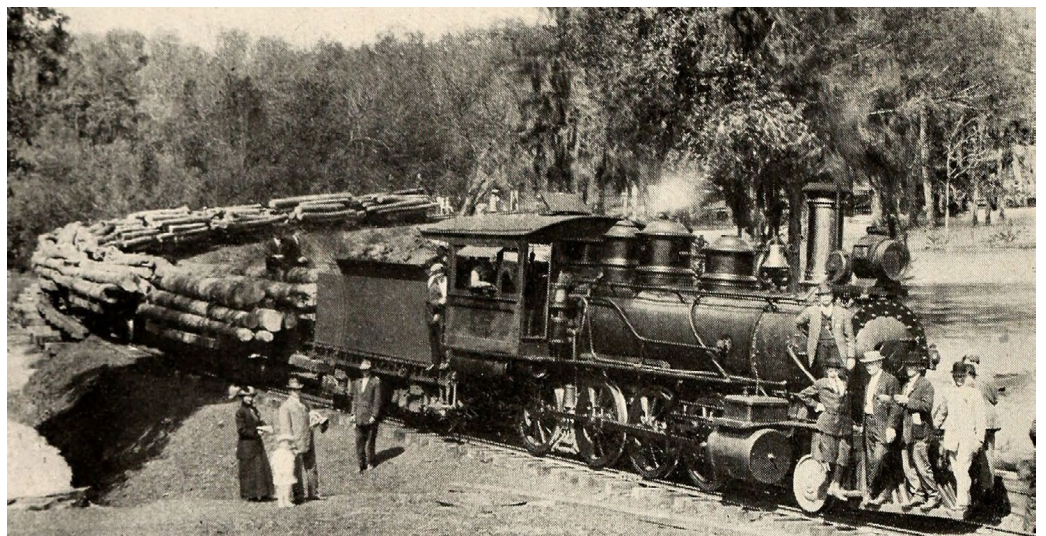
When the Civil War erupted, most Southern settlers in longleaf country sided with the Confederacy. After the war, the region lay devastated: plantations destroyed, forests cut, and economies shattered. Some landowners struggled to rebuild by selling off forested land to speculators and logging companies. Other settlers moved west to start fresh, living simply off the land with livestock, gardens, hunting, and fishing.

After the Civil War, aggressive logging of longleaf pine emerged as a major economic driver in the South. Early timber operations depended on rivers for transportation and mill power. Trees were felled with axes and floated

downstream to water-powered, and later steam-driven, sawmills. These mills, often owned by better-financed operators, advanced supplies to loggers in exchange for timber deliveries. This created a dependent labor system. Oxen teams and hand-dug ditches extended the reach of logging into nearby forests, though the range was still limited to areas close to navigable waterways. Despite its challenges, this river-based logging era had a relatively modest environmental footprint, leaving interior forests largely untouched.

This changed dramatically with the rise of railroad logging at the turn of the 20th century. Spur lines and mechanized equipment allowed clearcutting of vast tracts of longleaf pine. By the early 1900s, most of the region's old-growth stands had been harvested, and with little planning for regeneration, these areas were often left as barren "stumpscapes." The combination of industrial-scale harvesting and the absence of sustainable forestry practices led to the near-complete loss of the once-dominant longleaf pine ecosystem across much of its native range.

By the end of the 19th century, industrial logging had emerged as a dominant force in the South, marking a dramatic shift in the longleaf pine ecosystem. Spurred by the depletion of northern forests and a booming demand for yellow pine lumber, railroads, steam-powered skidders, and mechanized mills replaced earlier, more localized and selective logging practices (**Figure 15**). This new era brought rapid clearcutting across millions of acres, fundamentally altering the landscape and pushing the longleaf pine forest toward near collapse.



**Figure 15. Transporting pine logs from Louisiana to Texas by the Sabine Tram Company.**  
*Photo by C. E. Walden from the Book of Texas (1916)/Flickr.com*

## World Wars, Industrial Logging, and the Struggle to Restore the Longleaf Pine Ecosystem

Lumber towns sprang up to support the operations of massive sawmills, some becoming permanent communities, others vanishing as the forests disappeared. Meanwhile, naval stores production evolved with the introduction of the cup-and-gutter system, which replaced the destructive boxing method and gained wide use after 1910. Fires were set to protect valuable turpentine faces, which were V-shaped cuts made in the bark of pine trees to collect sap for turpentine production. However, these burns often destroyed newly germinated longleaf seedlings unless timed to coincide with good seed crops. World War I brought new urgency and demand. Southern lumber fueled the construction of army barracks, railcars, and even wooden ships.

Despite setbacks like labor shortages and timber scarcity, many ships were built until steel construction took over. In the rush to meet demand, most loggers gave little thought to forest regeneration. Encouraged by tax policies and profit motives, the industry largely adopted a “cut out and get out” approach. However, a few pioneering foresters, such as Austin Cary, Henry Hardtner, and Herman Chapman, advocated for sustainable practices. Despite isolated efforts, the vast longleaf pine forest was nearly gone by 1930. Railroad loggers moved west to harvest Douglas fir and redwood, leaving behind exhausted land and abandoned mills. In just four decades, the longleaf pine’s reign as the South’s dominant forest type had come to a dramatic and devastating end.

During the Great Depression, the longleaf pine region suffered deeply: mills closed, towns emptied, and cutover lands lay barren. Desperate residents and forest workers survived on abandoned lands with little support, making a living through small garden plots and subsistence livestock. The Civilian Conservation Corps (CCC), launched in 1933, brought relief by employing young men to plant trees, fight wildfires, and build infrastructure. Their labor helped create national forests like De Soto in Mississippi and Kisatchie in Louisiana (**Figure 16**), laying the groundwork for restoration.

During the 1930s, a fierce debate erupted in the South over the role of fire in forest management, particularly in the longleaf pine ecosystem. For generations, cattlemen, naval store workers, hunters, and farmers had used fire as a routine land management tool to improve forage,

ease travel, drive game, and manage pests. Fire was essential to maintaining the open, grassy structure of longleaf forests. But northern-trained foresters launched a vigorous campaign to eliminate fire, viewing it as universally destructive, based on the catastrophic crown fires frequent in other regions. Early forestry institutions and state laws began criminalizing woods burning, while fire prevention programs, lookouts, and propaganda efforts tried to sway public opinion.

A group of Southern ecologists and pioneering foresters, including Chapman, Cary, Herbert Stoddard, and “Cap” Eldredge demonstrated that prescribed fire was essential for longleaf regeneration, disease control, and habitat management. By the mid-1930s, studies by the Southern Forest Experiment Station confirmed the benefits of prescribed fire for disease control, seedbed preparation, and ecological health. A turning point came with the 1935 Society of American Foresters meeting, which endorsed careful prescribed burning. This paved the way for its cautious adoption on national forests and marked a major shift in U.S. forestry—a recognition that fire was not merely a threat but a vital ecological and silvicultural tool in the longleaf pine ecosystem. Prescribed burning gained momentum, culminating in broader U.S. Forest Service approval by 1943. The acceptance of fire as a management tool became a turning point in longleaf pine restoration. Rather than viewing fire solely as a threat, foresters increasingly recognized its critical role



**Figure 16. Longleaf pine at the Palustris Experimental Forest within the Kisatchie National Forest in Rapides Parish, Louisiana.** Photo by Preston Keres, U.S. Forest Service Photography/Flickr.com

in regenerating the longleaf ecosystem, a legacy that continues to shape management today.

A second-growth longleaf pine forest slowly emerged from the previous devastation, though it covered only a fraction of the original range and was often poorly stocked. In many cases, regeneration occurred accidentally, helped by unplanned events like hurricanes, favorable seed years, and the occasional absence of disturbance factors like hogs. Foresters like “Red” Bateman helped protect advance regeneration, but vast tracts of former longleaf land were lost permanently to agriculture, hardwood encroachment, or conversion to other pine species.

The industrial infrastructure of the first forest was replaced by a more localized, mobile timber economy based on rubber-tired trucks, small skidders, and portable sawmills. Though less grand in scale, the second-growth timber economy still supported thousands of rural Southerners, many of whom were part-time farmers. Naval stores persisted for a time but eventually shifted to slash pine regions. The last economic yields from the virgin longleaf came in the form of stump harvesting for rosin and turpentine. Open-range grazing also declined, becoming more regulated and better integrated with forest management. Despite fragmentation and lower productivity, this second forest marked a critical transitional phase in the longleaf pine story, one shaped by both ecological chance and human adaptation.

During World War II, fire control was critical due to threats posed to military installations and local communities. With limited equipment, crews relied on steel lookout towers, hand tools, and coordinated backfires to manage wildfires. Forest product output was targeted toward military needs like ammunition boxes and crating. New technologies, such as chain saws, boosted the mills’ efficiency and productivity, and new infrastructure provided access to remote timber resources. These wartime forestry efforts kept the longleaf pine region vital to the national defense.

## Postwar and the New Millennium: Decline and Revival of Longleaf Pine

Despite research efforts focused on secondary forest management, ecological complexity, fire dependence, advanced prescribed fire, and regeneration techniques, many foresters decided to abandon longleaf pine. Fueled by widespread regeneration failures, millions of acres of secondary longleaf pine were lost to conversion to loblolly and slash pine.

By 1900, pine plantations were virtually nonexistent in the South, with only a few small farmer-led plantings. The U.S. Forest Service’s first large-scale attempt in 1911 (900 acres on Choctawhatchee and Ocala National Forests) largely failed, and by 1919, only 500 acres were known to be successfully established. However, as planting techniques improved, the scale of plantations began to grow. By 1931, more than 20 lumber and paper companies had taken up pine planting, accounting for most early commercial plantations.

By the 1960s, a new wave of industrial logging targeted the second-growth forests. Clearcutting, windrowing, and mechanical site preparation often led to type conversion. Longleaf was replaced with loblolly or slash pine, making longleaf pine the unpopular choice. The expansion of fire-excluded areas made loblolly and slash pine plantations increasingly viable. As development pushed timber operations into more marginal lands, intensive plantation management for pulpwood and sawtimber became widespread.

As the U.S. Forest Service and private landowners adopted Smokey Bear-era fire suppression strategies, fire-dependent species and ground layers disappeared. Invasive hardwoods took over, and fuel loads built up to dangerous levels. The species’ decline continued as many foresters lacked knowledge of its management potential, and regeneration failures reinforced the perception that longleaf was too risky to invest in.

However, between the mid-1960s and early 1980s, longleaf pine research in Brewton, Alabama, led by a team of dedicated foresters and scientists, emerged as a central force in the species’ recovery. Brewton launched a major regional shelterwood study across the longleaf belt, from North Carolina to Louisiana, testing regeneration techniques and documenting the ecological responses. These tests, supported by national forests, state agencies, and private industry, generated crucial insights into seedling survival, fire management, site preparation, and regeneration strategies.

The Brewton team also engaged directly with practitioners through workshops, guiding national forest prescriptions, and collaborating with industry partners. Their results helped shift attitudes toward longleaf pine, which had become unfavorable due to regeneration failures and competition from faster-growing species. Innovations in site preparation, planting techniques, seedling grading, and technologies improved survival rates dramatically. Despite setbacks such as drought and poor stock handling, the research highlighted that

longleaf could be reliably regenerated with proper methods. By the early 1980s, this persistent, science-based outreach had reversed longleaf pine's decline and laid the groundwork for a broad-scale restoration movement.

## The Contemporary Era of Longleaf Pine: Restoration, Research, and Resilience

By 1990, the historical longleaf pine region had been dramatically altered, with only an estimated 2.9 million acres of longleaf remaining, and approximately 15.3 million acres of pine plantations dominated by loblolly and slash pine. The longleaf pine, once dismissed as too difficult and slow to regenerate, was gradually regaining favor due to growing awareness of its ecological and economic potential (**Figure 17**).



**Figure 17. Prescribed fire in longleaf pine at the University of Southern Mississippi's Lake Thoreau Environmental Center in Hattiesburg, Mississippi.** *Photo by Butch Bailey*

Despite being overshadowed for decades by faster-growing plantation species, longleaf pine began to attract renewed interest among private landowners, conservation organizations, and public agencies. This shift was driven in part by a deeper understanding of its ecological significance and its compatibility with low-input, long-rotation forestry systems. Longleaf's resilience to fire, hurricanes, pests, and drought—especially important in an era of increasing climate variability—positioned it as a species well-suited to sustainable land management.

Substantial advances in silvicultural techniques enabled more reliable longleaf regeneration. Improved containerized seedling technology, better genetic selection, mechanized planting tools, and refined site preparation techniques significantly boosted survival rates. Public-private initiatives like the Longleaf Alliance, the U.S. Department of Agriculture's Longleaf Pine Initiative, and partnerships with several agencies, such

as the Department of Defense and the National Fish and Wildlife Foundation, fueled restoration efforts and encouraged longleaf planting on both working lands and conservation properties.

Longleaf's timber qualities (dense, straight grain and natural rot resistance) remained preferred for poles and high-grade lumber, while its open, grassy understory supported rich biodiversity, attracting wildlife and hunting enthusiasts. In addition, its cultural symbolism and aesthetic appeal made it a favored landscape for recreational properties, heritage sites, and agroforestry systems (**Figure 18**).



**Figure 18. Crafting longleaf pine needle baskets.** *Photo by USDA National Agroforestry Center*

By the early 21st century, longleaf pine was no longer seen solely as a relic of the past but as a viable and valuable species for the future. Restoration efforts have expanded across the South, with growing recognition of the role of longleaf pine in achieving climate resilience, fire-adapted landscapes, and integrated working lands strategies. Ongoing research and education continue to drive interest in longleaf pine as both a functional forest type and a symbol of Southern conservation.

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