

A HISTORY OF FOREST MANAGEMENT IN THE OZARK MOUNTAINS

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Abstract—The origins of modern forest management in the Ozark Mountains go back roughly 500 years. This history has five stages: pre-European conditions (prior to 1750), European settlement (1750–1880), the era of exploitation (1880–1920), forest recovery (1920–1950), and the era of modern forestry (1950–present). The greatest adverse influence on Missouri forests was the era of exploitation, during which virtually all of the presettlement forest of the Ozarks was commercially liquidated. Fire control and the creation of large forest reserves triggered the period of recovery, which includes the establishment of Pioneer Forest in 1951. Highlights of the era of modern forestry include management of forests for productive value and aesthetic appeal, use of voluntary best management practices, and a commitment to forest stewardship. The private owner and professional staff of Missouri’s Pioneer Forest have long embraced and applied these progressive attitudes and practices.

INTRODUCTION

To fully appreciate the past 50 years of management on the Pioneer Forest, one must consider the past 500 years of Missouri history. Throughout that 500-year period, Missouri’s human inhabitants have looked at forests from a series of different perspectives. Five stages of Missouri forest history can be recognized, and each has vastly different implications for its own and subsequent generations.

The accomplishments for which we honor Pioneer Forest in this volume are even more meaningful when one considers the disruptive influences to which Missouri Ozark forests were subjected in the past. The goal of this paper is to briefly recount the history of the Missouri Ozark forests, describing earlier eras of forest disruption as a background for the progressive forest stewardship practiced at Pioneer Forest.

PRE-EUROPEAN CONDITIONS PRIOR TO 1750

As recently as 20,000 years ago, the Ozarks were under the influence of glaciers from the Wisconsin period, and supported boreal flora. Oaks became established in the region about 14,000 years ago. During the past several thousand years, climatic trends have given rise to a forest-dominated landscape with prairie inclusions (Foti and others 1999).

It is estimated that in 1500 forests covered 70 percent of the State of Missouri; that oak savannas covered an estimated 13 million acres, or one-third, of Missouri; and that vast herds of elk and buffalo were common (Palmer 1991). According to early descriptions, forests were previously much more open, ranging from open woodlands to closed forests. These open woodlands and closed forests had grasses and forbs in the understory, and little midstory.

However, forests were under human influence—that of the native American inhabitants in the region. Historical documents note the widespread occurrence of fire, and summary accounts generally conclude that presettlement conditions were much influenced by fire (Nigh 1992). Other evidence supports the notion that native populations set fire to the woodlands,

possibly for territorial defense or hunting purposes, and cleared small areas for subsistence agriculture (Spetich and others 1999). The open understory that would result from this activity can still be seen in photographs from the turn of the century (fig. 1).

Exposure to European explorers was the beginning of the end of these native civilizations, and the decline probably began between 1500 and 1600. DeSoto is known to have explored the Arkansas and Ouachita Rivers, reaching Hot Springs in 1542; French traders came into the region from the north during the 1600s. Native populations are believed to have declined as a result of these and other contacts with Europeans, through exposure to diseases for which the indigenous peoples had little or no immunity (Strausberg and Hough 1997).

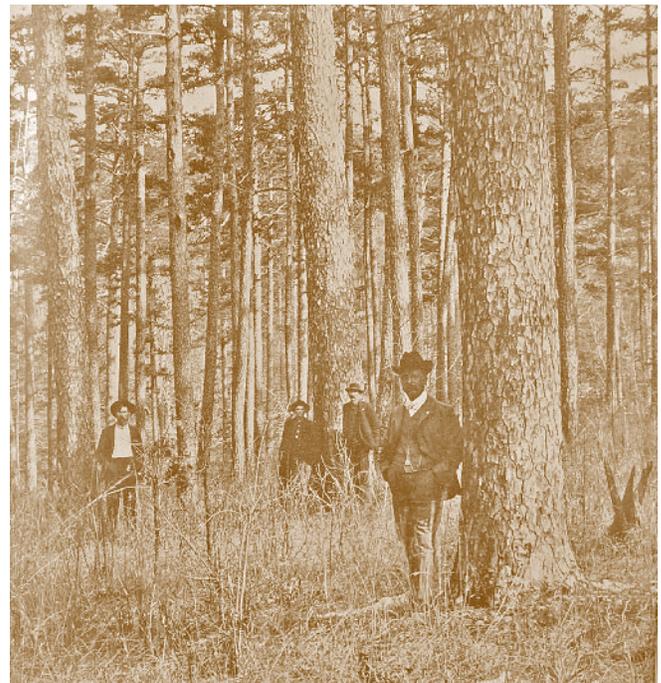


Figure 1—Native shortleaf pine stand, Missouri Ozarks. (Courtesy of American Lumberman)

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The early recorded descriptions of forest vegetation reflect the waning influence of the native American cultures as well as the early influence of European settlement. Schoolcraft (1821) published the best and most accessible of these, based on a journal kept during his journey through the Missouri and Arkansas Ozarks in 1818–1819. His description of the vegetation in the vicinity of the White River in the northern Arkansas Ozarks conveys the general presettlement forest condition:

“ . . . One of the most conspicuous objects among the trees and vegetables which skirt the banks of the river, is the sycamore, (*Platanus occidentalis*) rearing its lofty branches into the air, and distinguished from other forest-trees by its white bark and enormous size . . . Another vegetable, scarcely less conspicuous, and occupying a similar soil and situation, in the latitude in which it grows, is the reed, called cane in this region, and which I take to be the *Cinna arundinacea* of botanists. This plant is common to all the streams of the valley of the Mississippi below the 38 deg. of north latitude . . . The other forest-trees and plants noticed at this place, and which may be set down as composing, the forests of White River generally, are the following: Cotton-wood (*Populus angulata*); white elm (*Ulmus Americana*); red elm (*Ulmus fulva*); buckeye (*Aesculus hippocastanum*); black walnut (*Juglans nigra*); white walnut (*Juglans tomentosa*); white ash (*Fraxinus acuminata*); swamp-ash (*Fraxinus juglandifolia*); white oak (*Quercus alba*); red oak (*Quercus rubra*); sugar maple (*Acer saccharinum*); mulberry (*Callicarpa Americana*); dogwood (*Cornus florida*); sassafras (*Taurus sassafras*); persimmon (*Diospyros virginiana*).

To these the valleys will add spice-wood, papaw, wild cherry, hemlock, several species of grapes, the wild pea, etc.; and the bluffs and high-lands, white and yellow pine, mountain-ash, post-oak, and cedar. The wild hop is also indigenous to the river alluvion, and the crab-apple, red plumb, and black haw, upon the plains. Many others might be added, but these are the most conspicuous on passing through a White River forest, and such as would readily attract the eye.”²

EUROPEAN SETTLEMENT, 1750–1880

The first Europeans to tour the territory that would become Missouri found a rich land with few human inhabitants. Settlers arrived by the rivers and cut wood for houses, for fuel, and to sell. Timber was cut and floated downstream to mills in larger settlements, where it might be used for lumber or as cordwood to fuel the boilers of steam-powered riverboats.

About the time that Missouri became a State (1821), settlers began trickling in from the South. Subsistence farms were established in the river valleys and larger hollows. Timber cutting was largely limited to forest stands that were readily accessible to homesteads, farms, and towns; and domestic

livestock was allowed to roam the forest freely. Tree cutting and stump removal created agricultural fields and improved pasture; selective cutting of selected tree species in the woods met local needs for lumber, for related wood products (such as oak baskets), and for fuel. The aboriginal use of fire was continued by early Missouri settlers, probably both to promote grasses and to control ticks and chiggers.

Regarding the abundance of pestiferous insect fauna, the best record comes from Thomas Nuttall (Lottinville 1999), the botanist, who explored the southern Ozarks during a journey up the Arkansas River during 1819:

“ . . . Returning from my rambles today. . . . I picked off my skin and clothes more than 50 ticks, which are here more abundant and troublesome than any part of America in which I have yet been . . . ”

The seeds of the demise of buffalo and elk populations were no doubt sown in the early 1800s, as European settlement slowly expanded. Schoolcraft noted that:

“The Indian considers the forest his own, and is careful in using and preserving every thing which it affords. He never kills more meat than he has occasion for. The white hunter destroys all before him, and cannot resist the opportunity of killing game, although he neither wants the meat, nor can carry the skins . . . this is one of the causes of the enmity existing between the white and the red hunters of Missouri.”³

As early as 1816, sawmills were established along the Big Piney River in Texas County to manufacture lumber from shortleaf pine (*Pinus echinata*). By 1860 logging was one of the dominant industries of the region. With the coming of the railroad, the making and shipment of railroad ties became an important industry.

In 1860 the population of Missouri was about 1.2 million people (U.S. Census Office 1864), about 21 percent of the 5.595 million people tallied in the State’s 2000 census. Estimates of forested area in Missouri in 1860 are difficult to obtain, but the available data suggest that < 20 percent of the arable land in Missouri’s forested counties was farmed at that time (Maizel and others 1998). Conversion of forests to pastures and harvest of trees used to meet specific needs were no doubt locally important, but the impact of subsistence farming and the beginnings of industrial activity was probably not widespread. The activities of early settlers probably had a greater immediate impact on the State’s fauna, and especially on game species. Nevertheless, it probably did not take long for some settlers to realize that a rich timber resource covered the region and awaited exploitation.

ERA OF EXPLOITATION, 1880–1920

The Ozark lumber industry boomed from 1880 to 1920 (Cunningham and Hauser 1992). Lumbermen bought vast acreages of forest land, sometimes for a few cents an acre, and

² Henry R. Schoolcraft, 15 January 1819.

³ Henry R. Schoolcraft, 30 December 1818.

cut, graded, and trestled hundreds of miles of narrow-gauge railroad track into the steep hills and hollows (fig. 2). Logs were carried to mills by train and by rivers and streams. Any tree that had value was cut (Palmer 1991).

At its peak in 1899, production from Missouri sawmills exceeded 724 million board feet of lumber annually (Cunningham and Hauser 1992), a level of production not seen since that time.

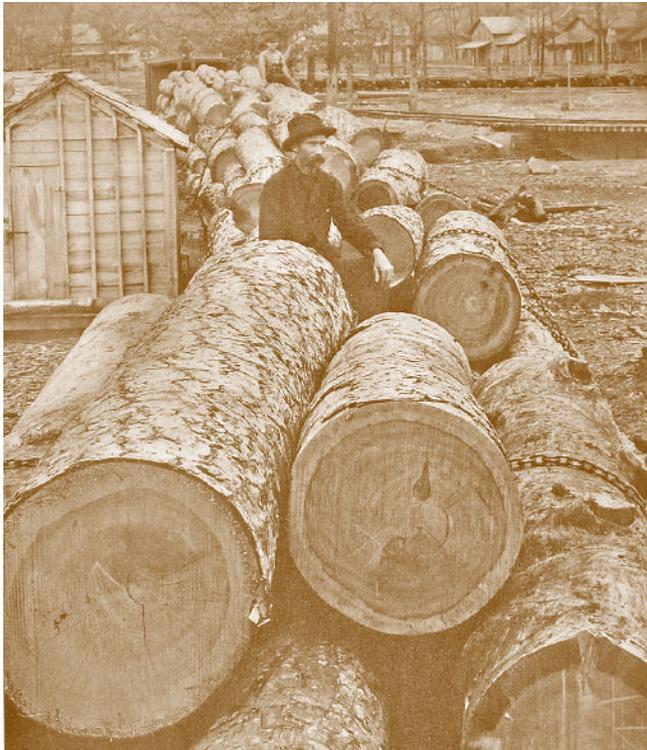


Figure 2—Log train. (Courtesy of American Lumberman)

The sawmill at Grandin, east of the Current River (fig. 3), consumed 70 acres of woodland a day, and produced in excess of 250,000 board feet of dimension lumber (fig. 4) and related products (mostly lath and shingles) daily (Cunningham and Hauser 1992).

Although these mills consumed enormous quantities of timber, they supported the industrialization of Missouri at the turn of the century. Comparable figures for Missouri are not available, but the lumber industry employed 73 percent of all factory wage earners in Arkansas in 1909.⁴ Many small towns came into existence in rural Missouri during that time. While some disappeared with the mills, others remain to this day. But without question, industrialization came at a cost—the loss of all but a few acres of Missouri’s virgin forests.

FOREST RECOVERY, 1920–1950

By 1920, the pine forests, and the mills, and the jobs were gone. Those who had come to work the woods tried to stay and eke out a living from the thin soils of the deforested hills. Their efforts only produced meager crops and more erosion (fig. 5). Forest recovery was further inhibited by the common practice of allowing domestic livestock to wander over the countryside, foraging for any available vegetation. By 1928, large areas of the once rich timberland had become wasteland.

In 1929, the Missouri National Forest Association successfully lobbied the Legislature to permit the Federal government to purchase land in Missouri for a national forest. Eight purchase units were set up in 1934–35, and the Mark Twain and Clark National Forests became a reality. Eventually, 1.5 million acres of cut-over forest land was acquired in these two national forests—the land that nobody else wanted.



Figure 3—Grandin mill. (Courtesy of American Lumberman)

⁴ Gray, John. Cited on <http://arkforests.org/favorite-history.html>.

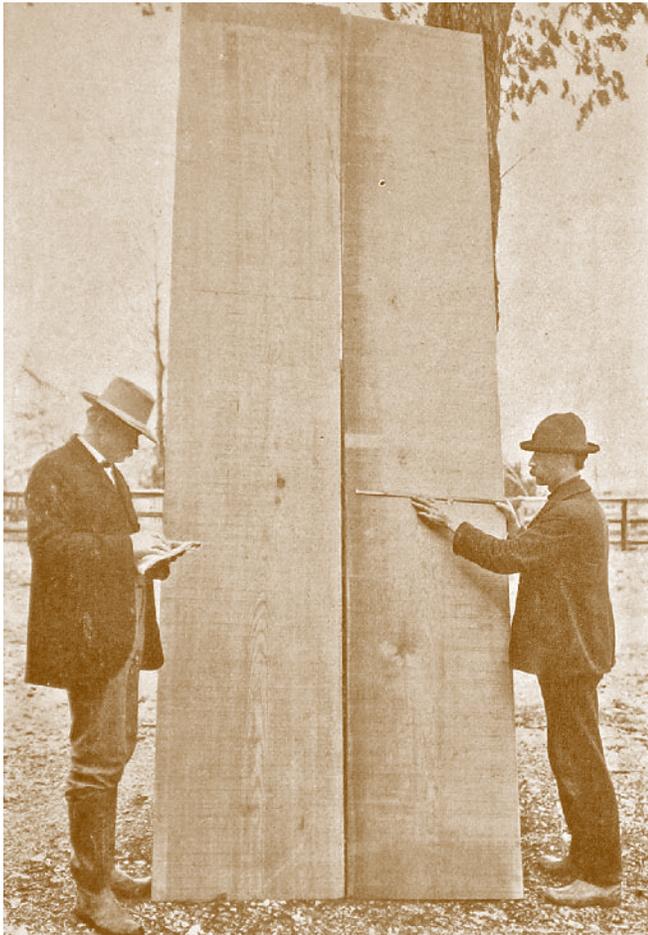


Figure 4—Shortleaf boards, from the Grandin Mill. (Courtesy of American Lumberman)

By the mid-1930s, Missouri forest and wildlife resources were at an all-time low. The forests were burned and abused. Gravel, eroded from the hillsides, choked the once-clear streams. An estimated 2,000 deer remained in the entire State, and turkeys declined to a few thousand birds in scattered flocks. An additional factor that reduced harvesting pressure on the recovering forest in the 1930s was a sharp drop in building and corresponding lumber demand. And over the 1930s and 1940s, there was a shift away from the use of wood as a home heating and cooking fuel.

Forests benefited greatly from services provided by the Depression era Civilian Conservation Corps (CCC) Program. Enrollees in the CCC helped fight forest fires, built fire lookout towers, and, on the national forests, constructed roads, campgrounds, picnic areas, and swimming lakes. Enrollees also planted trees on thousands of acres of worn out and eroded highland farmland in national forests in the 1930s.

Fire control was the first step in restoring forest cover. Voters approved the Missouri constitutional amendment creating the Conservation Commission in 1936. This new Agency included a forestry division—an innovative idea at a time when most other fish and wildlife agencies were separate from forestry departments. Missouri's early conservationists recognized that a healthy forest resource was essential to healthy fish and wildlife populations.

By World War II, fire prevention programs began to pay off. Once fires were reduced, efforts could be turned to managing the forest. Foresters planted thousands of seedlings, harvested trees damaged by fire, and removed undesirable trees. Private landowners were taught how to improve their forests and



Figure 5—Missouri hillbilly farm, U.S. Forest Service photo 380537. (Photo by Leland J. Prater, April 1939)

wildlife habitat. Among the more interesting social events in small towns during that time was the arrival of a State or Federal forester in a truck equipped to show movies about fire control and forest management.

ERA OF MODERN FORESTRY, 1950–PRESENT

Tremendous progress in forest management has been made in Missouri since the late 1940s (Law 1992). The once impossible task of fire control in the Ozarks has been accomplished. Today less than one-tenth of 1 percent of Missouri burns each year. Deer and turkey are found in record numbers. Restoration programs have reintroduced ruffed grouse and river otters (Palmer 1991).

Since the 1940s, Missouri Ozarks forests have had to meet major increases in demand for all forest values. There has been a strong increase in demand for lumber and other wood products. In response to the increasing worth of Missouri forest products and values, public and private forest landowners have made capital and resource investments to improve timber productivity, grow wildlife populations and expand wildlife habitat, protect watersheds, and promote forest vigor and health.

Among the most important products of Missouri forests is high-quality water. Water use in Arkansas increased by 200 percent over the past 20 years and is expected to increase by another 140 percent by the year 2035; trends in water use in Missouri are likely to be similar. This has focused attention on effective protection of forested watersheds and on the adequacy and application of voluntary best management practice standards as a tool for minimizing nonpoint source water pollution caused by logging and other forest operations (Missouri Department of Conservation 1997).

Finally, forest management includes a large measure of government and private support for the practice of forestry, especially on private lands. Since 1950, there has been extensive public and private investment in forestry. This has included investments not only in the forests themselves, but also in the intellectual capital of forestry—forestry education, research in forestry and natural resources, and improvements in the manufacture of forest products and the efficiency with which they are produced. These advances have been applied on public lands and forest industry lands, where professional foresters and biologists translate research into practice.

For nonindustrial private forest (NIPF) landowners, who in 1989 owned 83 percent of Missouri's timberland area, technical assistance and public cost sharing have been important incentives to participate in forest management. But perhaps the most important determinant of NIPF landowner activity in forest management has been, simply, the landowner's knowledge of forest management and his or her desire to apply that knowledge.

THE PIONEER FOREST, 1951–2001

This is where Pioneer Forest merits special attention. Not only is it the largest NIPF ownership in Missouri, it is also second to none in the dedication of the owner and professional staff to the art and science of forestry. It stands as a testament to the recovery of Missouri Ozark forests under a program of modern forestry that embraces wood products, wildlife, recreation, aesthetics, and water resources. Three elements of modern forestry receive special emphasis at the Pioneer Forest.

First, the Pioneer forest staff and owners are committed to productive forest management. They employ an uncommon form of forestry—uneven-aged silviculture and the single-tree selection method, whose goal is the production of large, high-quality logs of desired species (fig. 6). Competition least as concerned about what remains after the cut as they are about what is removed. Finally, Pioneer Forest maintains long-term inventory plots to ensure that the management program in fact meets the goal of maintaining and improving species composition, stand volume growth, and successful regeneration over time.



Figure 6—Three age classes of oak on Pioneer Forest property. (Photo by J.M. Guldin)

Second, the forest management practiced on Pioneer Forest maintains the forest canopy on every acre throughout the forest. Such practices provide continuous protection of water quality and go beyond the traditional best management practices referenced earlier. Examples of the practices employed include keeping all logging equipment out of stream bottoms, leaving a forested stream buffer in which only high-value trees are considered for removal, and removing less than one-half of the volume on any given acre to be harvested. Further protections are used where significant areas of the forest are adjacent to the Current and Jacks Fork Rivers and the Ozark Scenic Riverways National Park. Here, a no harvest zone extends a minimum of 300 feet from the river center.

Finally, these activities speak to a larger element of the success of Pioneer Forest over the past 50 years—a stewardship ethic. Both the forest owner and the professionals who manage the forest are personally and professionally committed to the highest standards of land stewardship. The financial stakes that drove the period of exploitation are still in play; NIPF landowners can get more quick cash by liquidating their forests than they can get by managing them.

Resisting the impulse to liquidate forests for this short-term cash potential is perhaps the most difficult test that NIPF landowners face—and they face that test daily. The founder of Pioneer Forest, Leo Drey, and his committed staff of professional resource managers have met that test daily for 50 years. There is no better example of enlightened and abiding stewardship of NIPF land, or any timberland, than the stewardship practiced at the Pioneer Forest.

LITERATURE CITED

- Cunningham, B.; Hauser, C. 1992. The decline of the Missouri Ozark forest between 1880 and 1920. In: Journet, A.R.P.; Spratt, H.G., Jr., eds. 1992. *Toward a vision for Missouri's public forests: a conference held on the campus of Southeast Missouri State University*. Unnumbered publication. Cape Girardeau, MO: Department of Biology, Southeast Missouri State University: 14-19.
- Foti, T.; Richards, L.L.; Andre, J.; Voeller, J.E. 1999. Prehistoric and historic ecological changes. In: *Ozark-Ouachita Highlands assessment: terrestrial vegetation and wildlife*. Report 5 of 5. Gen. Tech. Rep. SRS-35. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 7-20. Chapter 2.
- Law, J. 1992. The development of modern management. In: Journet, A.R.P.; Spratt, H.G., Jr., eds. 1992. *Toward a vision for Missouri's public forests: a conference held on the campus of Southeast Missouri State University*. Unnumbered publication. Cape Girardeau MO: Department of Biology, Southeast Missouri State University: 20-34.
- Lottinville, S. 1999. *A journal of travels into the Arkansas territory during the year 1819, by Thomas Nuttall*. Fayetteville, AR: University of Arkansas Press. 361 p.
- Maizel, M.; White, R.D.; Root, R. [and others]. 1998. Historical interrelationships between population settlement and farmland in the conterminous United States, 1790 to 1992. In: Sisk, T.D., ed. 1998. *Perspectives on the land-use history of North America: a context for understanding our changing environment*. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR 1998-0003 (Revised September 1999). 104 p. Chapter 2.
- Missouri Department of Conservation. 1997. *Missouri watershed protection practice. 1997 management guidelines for maintaining forested watersheds to protect streams*. Jefferson City, MO: Missouri Department of Conservation.
- Nigh, T. 1992. The forests prior to European settlement. In: Journet, A.R.P.; Spratt, H.G., Jr., eds. *Toward a vision for Missouri's public forests: a conference held on the campus of Southeast Missouri State University*. Unnumbered publication. Cape Girardeau, MO: Department of Biology, Southeast Missouri State University: 6-12.
- Palmer, B. 1991. *Missouri forests—their history, values and management*. Unnumbered publication. Jefferson City, MO: Missouri Department of Conservation. 24 p.
- Schoolcraft, H.R. 1821. *Journal of a tour into the Interior of Missouri and Arkansas, from Potosi, or Mine a Burton, in Missouri territory, in a south-west direction, toward the Rocky Mountains, performed in the years 1818 and 1819*. London: Richard Phillips and Co. 170 p.
- Spetich, M.A.; Shifley, S.R.; Parker, G.R. 1999. Regional distribution and dynamics of coarse woody debris in Midwestern old-growth forests. *Forest Science*. 45(2): 302-313.
- Strausberg, S.; Hough, W.A. 1997. *The Ouachita and Ozark-St. Francis National Forests: a history of the lands and U.S. Forest Service tenure*. Gen. Tech. Rep. SO-121. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 45 p.
- U.S. Census Office. 1864. *Eighth census of the United States in 1860*. Washington, DC: U.S. Government Printing Office.