

Prehistory of the Southern Forest

BY EDWARD BUCKNER

Individual tree species are the “personalities” of the forest. Most that we see today have been around for a long time, having evolved during the Tertiary Period 35 million years ago. Throughout the geological millennia species migrated individually over the landscape, largely in response to climate changes. While the species composing today’s forests have remained relatively constant in recent geological time, their groupings into “forest associations” have shifted as species responded individually to changing environments. The forest associations making up the southern forest region have become, by far, the most complex of these regions.

Over the past 2 million years there have been radical climatic changes in eastern North America. During the Pleistocene Epoch there were at least twenty major glaciations. Each glaciation lasted approximately 90 thousand years and was followed by an interglacial period lasting approximately 10 thousand years. These shifting climates drove trees north and south across the North American landscape many times. Since each tree species responds differently to these changes, forest associations have always been “in flux,” thus the need to reevaluate them periodically.

The most recent glaciation, the Wisconsin, peaked 18 thousand to 20 thousand years ago. Early in the warming period that followed, while ocean levels were still low due to water locked in the ice fields, man entered the North American landscape via Beringia—the land bridge between present-day Siberia and Alaska. These earliest residents dispersed quickly throughout the Americas. Although anatomically they were “modern humans,” their Stone Age culture relied on hunting-gathering as the means of subsistence. Their primary food was large animals—“megafauna” such as woolly mammoth, mastodons, and elk.

These grazing animals thrived on grasslands or open forests. But by the beginning of the Holocene Epoch (the last 10 thousand years) most megafauna were extinct due likely to a combination of factors such as hunting pressures, climate changes, and habitat losses. As the megafauna disappeared other grazing animals such as bison, deer, and elk became the primary food source for early Indian cultures. During this time, early inhabitants used fire to keep the landscape open, favoring the grasses and shrubs that supported the animals on which they depended.

Also during this warming period the glaciers began their retreat from the Missouri and Ohio River valleys. The boreal forests, having extended as far south as Atlanta, Georgia, migrated to Canada. Temperate species moved out of Gulf Coast refuges to form the forests that now cover much of eastern North America. Thus after the last ice age, the trees migrated into regions that had already been subjected to human influences for thousands of years.

In contrast to the tundra and boreal forests they replaced, if left undisturbed, temperate forests tend to “close,” forming two or three canopy layers that shade the ground and deposit a litter layer the combination of which precludes the development of grasses. The increasing tendency of the forests to close as temperate forest species became more firmly entrenched had to be countered by frequent burning. Had they been aware of the consequences, the native people would have seen the encroachment of the temperate forest as a serious threat to their subsistence. Closed forests provide little toward basic human needs, regardless of the period, especially as human population increases. This is especially true of the late-successional, climax forests in which both plant and animal production is relatively low—generally only replacing mortality.

At the peak of the warming period (Hypsithermal Interval—6 thousand to 8 thousand years ago) rudimentary agriculture began to be practiced. By the time of Columbus approximately half of the food supply for native Americans came from agriculture that was practiced on the rich, moist stream bottoms where competition from native vegetation was most intense. To accomplish this, hot fires had to be used during dry weather when the surrounding uplands were highly flammable, provided there was sufficient fuel buildup since previous fires.

This regular use of fire, along with such uses as warfare and hunting, improved grazing, berry production, and nut gathering, and maintained pines over broad areas that would otherwise have supported hardwoods. Without disturbance conifers would have essentially disappeared from the southern forest; except for hemlock in the mountains, various hardwoods are the climax species throughout the region.

Testifying to the widespread occurrence of even-aged, pioneer (early successional) forests were the thousands of miles

of palisades documented in both the archaeological records and the early EuroAmerican historical accounts. This construction required a nearby source of straight, small-diametered trees that would not have been found in late-successional forests. An obvious source would have been young, even-aged forests that are characteristically found on abandoned agricultural fields and after hot fires.

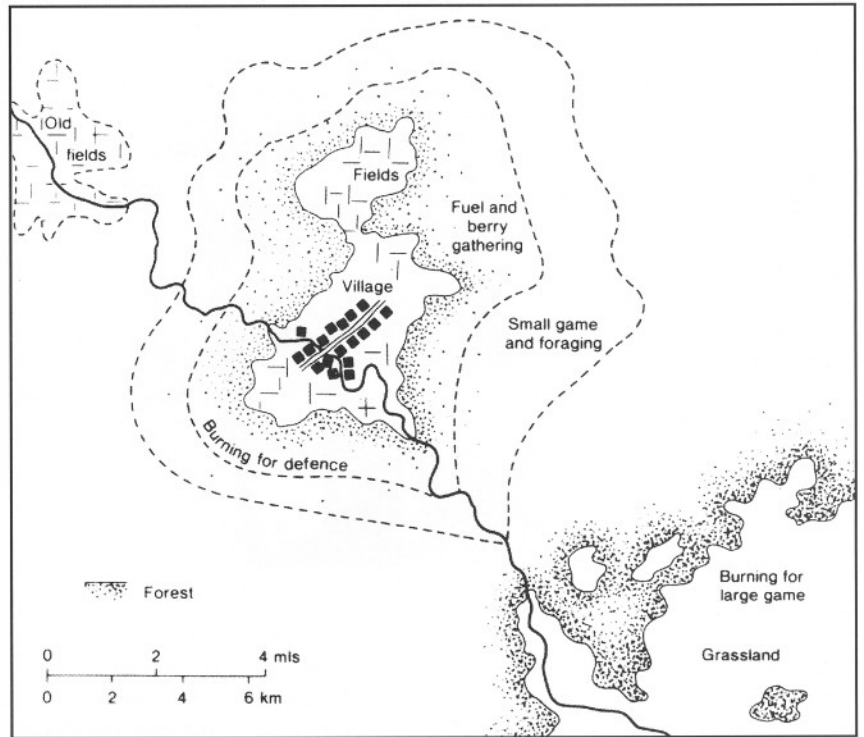
Due to highly variable fire rates and intensities, there resulted a diversity in fire effects that maintained landscape conditions ranging from closed, multilayered forests to “park-like” woodlands to open prairies. Factors contributing to the varied fires included: fuel buildup, fuel moisture, relative humidity, wind speed and direction, slope angle and position, aspect (direction the slope faces), temperature, and days-since-last-rain. Ecologists have argued that, were it not for Indian fires and buffalo grazing, the boundary between the tall grass prairie and eastern forests would have been much further west in 1492, possibly even eliminating the tall grass section of the western prairie.

Landscape diversity was the greatest in the undulating, hilly, mountainous sections of the South. Aspect and slope position strongly influenced both soil and surface moisture conditions and, in turn, fire behavior. Upper slopes and those facing south-to-west dry more rapidly and burn with greater frequency and intensity, which maintained disturbance-dependent species such as the yellow pines. Later successional types, possibly climax, were common on lower north-to-east slopes where fires were both less frequent and less intense. These diverse landscape conditions provided both the plant and animal needs of the native people.

Trees adapted to these conditions where they survived long enough. In the South there are three serotinous-cone pines (the pond, table mountain, and sand pines) whose cones remain closed until fire opens them and prepares the site for the successful establishment of these light-demanding trees. Another fire-adapted species is longleaf pine. This stately flagship of the southern pinery once occupied approximately 90 million acres in the southern coastal plain. Today it is relegated to



“Natural” stand of southern pine.



Schematic presentation of Indian forest use, from Michael Williams, *Americans and Their Forests*. Cambridge University Press, 1969, p.40.

roughly 4 million acres, its demise due largely to effective fire prevention and protection.

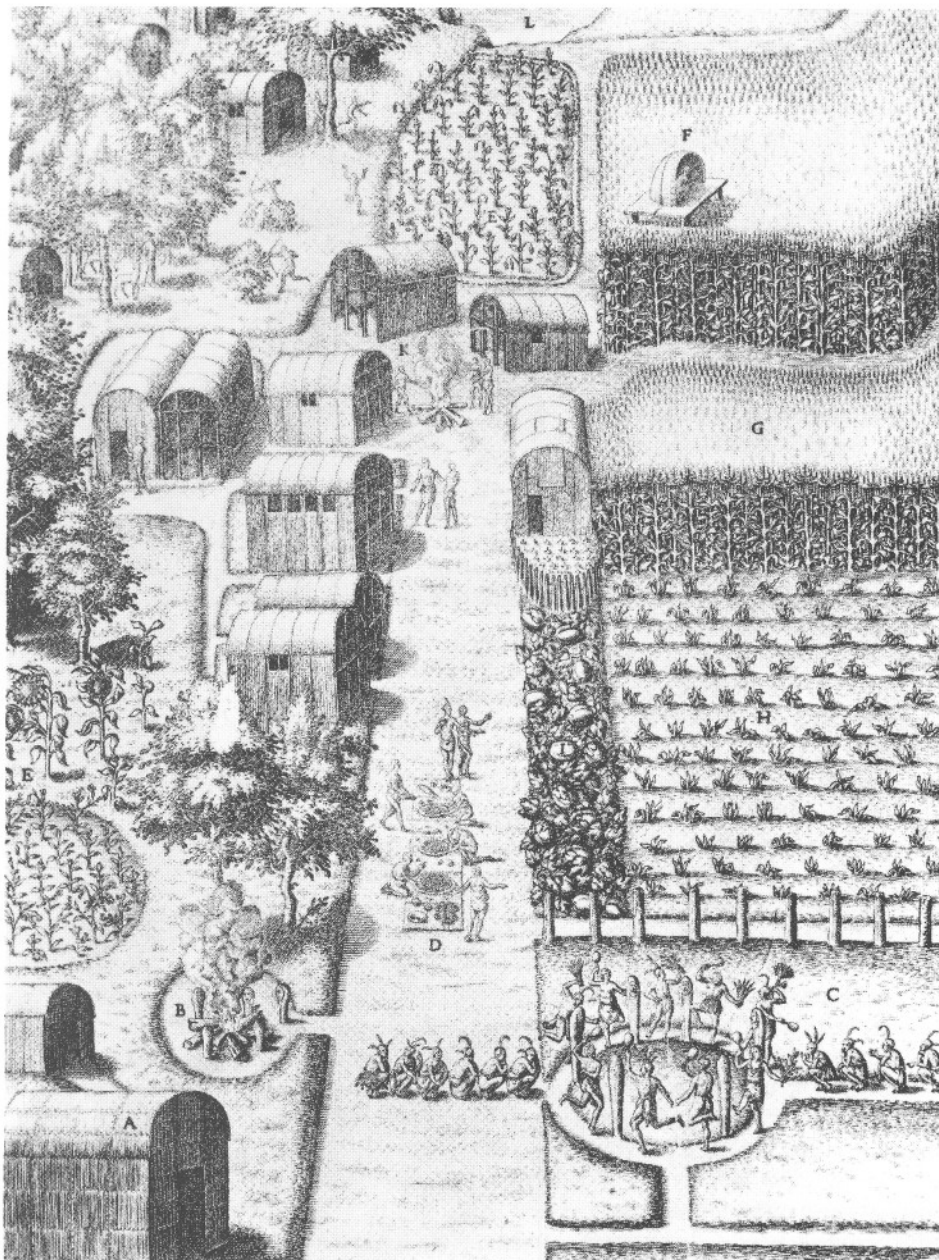
There can be little question that the southern forest of 1492 contained a strong cultural imprint. People were here, altering the landscape, before the trees that compose today's forests arrived. While the landscape was likely a mosaic of cover types and successional stages, changes in its prehis-

toric character did not end at this time.

Records of the southern interior landscape did not begin until the sixteenth century. Around 1540 DeSoto's chroniclers provided sketchy descriptions alluding to open landscape conditions and evidence of recently abandoned agricultural fields. However, detailed characterizations were not available until around the time of the Revolutionary War when botanist William Bartram traveled through the region.

Events occurred between the years of DeSoto and the revolution that had profound effects on the southern forest. Early explorers were highly resistant to, yet carriers of, European diseases such as smallpox, influenza, malaria, and typhoid fever. However, the American Indians, having had no previous exposure, caught the extremely virulent diseases quickly. Archaeological and historical evidence attests to the occurrence of pandemics during the sixteenth and early seventeenth centuries that ravaged the native population with mortality estimated as high as 90 percent. Since recent estimates of the native American population in 1492 go as high as 100 million, mortality was likely more than 50 million. This freed much of the land from cultural pressures allowing forests to close—a condition that, over broad areas, had never before been the case. These 100-to-200-year-old forests were the wildernesses described in many early historical accounts of the southern forest region. Their fate over the next two centuries is a matter of the historical record.

Man has been a dominant factor in the evolution of North American landscapes since we first arrived over 12 thousand years ago. Not only have we altered the landscape, we have imparted "genetic fixes" in species that influence their abili-



Indians raised abundant crops of corn, as well as sunflower and squash, in their North Carolina village of Secoton. Library of Congress.

ty to compete in these culturally altered ecosystems. As in the past, the character of tomorrow's forests will be dependent on our action or inaction. Knowledge and understanding of past conditions and plans to identify desired future conditions are essential if we are to steer our forests toward ecological, economic, and aesthetic health.

Reprinted from *Forest Farmer*, vol. 54, no. 4, July/August 1995.