

**EAST TENNESSEE'S "ORIGINAL" FORESTS:
WERE THEY "NATURAL?"**

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INTRODUCTION

On May 2, 1963, Secretary of the Interior Udall instructed the director of the National Park Service to take steps to incorporate the philosophy and basic findings of the report his Advisory Board on Wildlife Management had completed earlier that year (Chase 1987). This report, often called the "Leopold report" had implications that to this day are still hotly debated: "As a primary goal, we would recommend that the biotic associations within each park be maintained, or where necessary re-created, as nearly as possible in the condition that prevailed when the area was first visited by white man" (Leopold et al. 1963). Elsewhere in the report, the Advisory Board recommended that the parks should resemble "a vignette of primitive America."

The question for the Park Service, then, is this: What were the forests of North America like when the first Europeans viewed them? The purpose of this paper is partly to seek a solution to this question, not for the entire United States, but for those forests of the East, primarily those of the Southeast. In this area, there is little question that since the time of initial European contact the landscape and its correlating biotic systems have been altered considerably. To trace the forest back to its "primitive" condition is an especially difficult task, because there are few forests remaining (except in very limited areas of the National Park and National Forest Systems) which have not been cut over by European settlers. Also, since the effects of Native Americans on the landscape must be considered (the "Leopold Report" considered only the effects of white man to be

“unnatural”), one must determine the extent of Native American influences, and then take means to imitate them. This is not a simple task, nor can these changes be made overnight.

Many historians of the twentieth century hold firm to the belief that the forests of the east were one continuous forest, stretching from Maine to Florida. Take, for example, the writings of historian Livingston Farrand, in 1904: “On the east, the forest originally formed an unbroken sheet along the entire Atlantic coast as far south as central Florida, and along the Gulf shore into Texas, the general western boundary of the forest reaching or even crossing the Mississippi.” Gordon Day (1957), also noted that in eastern North America there was “everywhere an unbroken forest of giant trees. This perception, that a squirrel could climb a tree in Maine and run all the way to Florida without touching the ground, is an unfounded idea, not supported by the paleobotanical, anthropological, archaeological, and historic record.

The perception that the forest was an untouched, wholly natural environment, free from any cultural influence stems from the widely accepted but wholly unscientific view that prehistoric/preliterate man present in pre-settlement North America had little effect on his environment. This view has been widely accepted by geographers, anthropologists, and ecologists for most of the 20th century for various reasons (Shefford 1963, Braun 1950). Most unsettling however, is the “... romanticized and unscientific idea that ‘primitive’ man was a part of ‘nature’, in direct opposition to ‘civilized’ man who was apart from ‘nature’” (Guffey 1977).

The idea that the forests of eastern North America evolved along with the Native Americans while not being influenced by their presence is unfounded. There is far too much evidence in the anthropological, paleobotanical, archaeological and historical record to assume otherwise. Assuming that the term “natural” describes something uninfluenced by cultural practices, were our “original” forests “natural”? Or were they a “cultural” entity as well? While present-day historians might argue the former, the evidence overwhelmingly indicates the latter.

THE PALEOECOLOGICAL RECORD

In order to gain a clear understanding of the forests of North America prior to European contact, it is necessary to understand the “natural” forces at work on the forest. The paleoecological record is one of the only evidences available to examine this, so it must be considered carefully. The dating method used for examining the paleoecological record is the term B.P., meaning years “before present”. It represents radiocarbon years before A.D. 1950 (Bass 1977). Examination of the paleobotanical record involves removing soil deposits, usually in ponds (where sedimentation is highest and most stable), and dating the various layers. The layers themselves can then be analyzed in terms of presence of pollen, charcoal, and other biological remains (Davidson 1983).

Essentially all the vegetation present in North America today was also present prior to the Pleistocene glaciation, the only difference being their individual ranges and

cover type composition. The range of each individual species changes at a different rate, and therefore, forest cover type composition is continuously shifting. The end of the last full glacial period, the Wisconsin advance, occurred around 18,000 B.P. At that time, spruce-jack pine and pure jack-pine forests dominated the interior southeast. Oak-hickory-pine forests dominated much of the rest of the southeast. By 14,000 B.P., the spruce-jack pine forest had expanded into Kentucky and middle Tennessee. In the mid-latitudes of the southeast, the mixed conifer-hardwood forests were moving northward and eastward replacing the spruce-jack pine forest. By 10,000 B.P., after a major climate amelioration around 12,500 B.P., the spruce-fir populations had been stranded in the highest elevations of the Great Smokies, persisting to the present as relict "islands". The mixed conifer-hardwood forests were being pushed northward by the expanding oak-hickory forests. The mid-Holocene interval from 8,000 to 4,000 B.P. was characterized by a major vegetation change in the southeast United States, resulting in a shift of the oak savannah and oak-hickory forests towards the east, restricting the mixed hardwood forests to favorable gorge and slope habitats in the Cumberland and Allegheny Plateaus. By 200 B.P. the prairie/forest boundary had shifted again, this time slightly toward the west (Delcourt and Delcourt 1981).

In a study of Quaternary period alluvial terraces in the Tennessee River valley, it was noted that "periglacial processes became ineffective at mid and high elevations in the southern Appalachians and tundra was eliminated by 12,500 years ago. Except as relict populations on mountain crests in the Great Smokies, boreal forests of spruce and

fir were replaced by the northern hardwood and deciduous forests during the early Holocene” (Delcourt P. 1980). Delcourt and Delcourt (1985) noted again that “Very rapid species adjustments were occurring throughout the southeast in response to the rapid climate warming that followed the Wisconsin glacial episode”.

The paleoecological record indicates that the climate change, as well as variations in precipitation, had a significant effect on the ranges of the various forest types in eastern North America. It also indicates that a warming trend incurred very rapid species adjustments around 12,500 B.P. Were these simply a “natural occurrence”? Or were there other factors present not seen in the paleoecological record? Perhaps the answer lies in the archaeological record.

THE ARCHAEOLOGICAL RECORD

The archaeological record is useful in determining the social structure, religious structure, lifestyle, and mobility of the prehistoric peoples of North America. Most important for determining their impact on the land are their methods of gathering food and the area each group utilized. The prehistoric peoples of eastern North America have left a relatively complete archaeological record, and it is to that we now turn.

The presence of Native Americans in eastern North America can be traced back almost 12,000 years. “Fluted points[chipped stones indicating the presence of prehistoric

man] and sites containing fluted points have been found subsequently throughout North America, and radiocarbon dates now place this period, called Paleo-Indian, between 10,000 and 12,000 years ago" (Chapman 1985). The first signs of Native Americans in the Tennessee area have been dated (radiocarbon dating of bones from archaeological dig sites) to around 11,000 B.C. These first inhabitants were hunter-gatherers. This group was very nomadic, ranging over a wide area as the large mammals they hunted migrated. Around 8,000 B.C., the groups were more territorial, ranging over a smaller area while still being nomadic. While they were still hunter-gatherers, they also fished and collected freshwater mussels. This group was distinct enough in cultural and social structure to be given the name Archaic (Satz 1979).

Around 1,000 B.C., the group had changed significantly to be renamed Woodland. The Woodland peoples lived in small villages (most often one permanent village and several temporary camps within their territory). They were food-gatherers, and had just begun to cultivate corn. The Woodland peoples are also called the mound-builders, as they were the first group to exhibit purposeful modification of the land around them (at least, modifications that lasted to present day times). The mounds were most often used as burial places. By 900 A.D., culture changes were sufficient to justify another period name, the Mississippian. This culture had villages and towns, with centralized politics and formalized religion. This culture was highly agricultural. Hunting was still a means of getting meat, but the people were wholly settled, and hunted only within their territory (Satz 1979).

By 1600 A.D., cultural groups were distinct enough to have formed tribes. The three main tribes present in Tennessee were the Cherokee, Chickasaw, and Shawnee. Estimates indicate that there were 50 to 80 towns in the southern Appalachians, with a total population of at least 22,000 (Satz 1979).

In a study of the Tellico area in Tennessee, it was noted that terraces containing the remains of Indian campsites have been building up for at least 12,000 years (Chapman 1985). This number as well as Satz's estimate (1979) of 11,000 B.C. correlates rather closely to the climate amelioration noted by Delcourt and Delcourt (1981) at 12,500 B.P., where the rapid shift of species throughout the southeast began to occur. Coincidence? Or did the early Native Americans have a part in causing the shift? Certainly, they did have an effect in later times.

NATIVE AMERICAN POPULATIONS

There are few written accounts of the expeditions of the earliest European explorers prior to actual settlement times. For this reason inferences from the historical record of the late seventeenth and early eighteenth centuries must be made not only about the forest itself but also about the Native American populations of the pre-settlement era. Explorers of pre- and post- settlement North America did make note of their surroundings, and often estimated the number of individuals in the villages they came across, but they were not census takers, and sifting through all the journals (many of

which have just recently been translated to English) for such information is a long and arduous task.

Most anthropologists who have studied Native American populations have not been able to agree on the actual numbers present at the time of European contact. Estimates have ranged from as little as 900,000 (Kroeber 1939) to as high as 18,000,000 (Dobyns 1983). Mooney's estimate (1910) of 1,150,000 was the most widely accepted number until recent years, but most people perceived that number as the maximum population at the time of initial European contact. A revision of his estimates was finished posthumously in 1928.

In 1976, Douglas Ubelaker published his research on Mooney's estimates. Ubelaker examined all of Mooney's notes, and his discoveries raised some interesting questions. "My impression from examining Mooney's notes", Ubelaker said, "is that he was attempting a minimal estimate for the data described. His notes continually used language such as "at least" and "no less than". When confronted with conflicting ethnohistorical estimates, Mooney usually chose the most conservative. Thus, while the actual aboriginal number probably is no less than that indicated by Mooney, it could be considerably higher". Ubelaker also noted that some of Mooney's sources for aboriginal estimates were from 1600, others were dated as late as 1845. His sources came from the earliest point at which he could obtain reliable European estimates. Ubelaker suggested that "the numbers represent neither the number prior to European contact (at 1600) nor the maximum aboriginal number prior to population decline . . . Thus, his estimates actually were designed to serve as a beginning point from which to trace population- not

as a definite number". Five years after the publication of Ubelaker's analysis of Mooney's estimate, Ubelaker suggested that Mooney's estimate had indeed been low. He estimated that the population prior to contact (1600) was 1,894,350, with a possible range of 1,213,475 at the low end, and 2,638,900 at the high end (Ubelaker 1981).

Dobyns (1983), an epidemiologist, insists that the population at the time of European contact (1520) was much higher. He notes that "Before the invasion of peoples of the New World by pathogens that evolved among inhabitants of the Old World, Native Americans lived in a relatively disease-free environment. He goes on to suggest that the introduction of the Old World pathogens altered the population of the New World dramatically. "Because the native population lacked immunity to viruses and germs that evolved in the Old world, Indians succumbed in large numbers to ailments that scarcely affected the immune colonists. Epidemics of lethal pathogens began to spread widely through the North American population no later than A.D. 1520 and did not end until 1918". He lists, in order of their impact on population, eight diseases that occurred in epidemic proportions throughout the Native American population during that time period: smallpox, measles, influenza, bubonic plague, diphtheria, typhus, cholera, and scarlet fever. He also mentions that typhoid, tularemia, and malaria occurred in less epidemic proportion. His estimate of 18,000,000 individuals north of Mesoamerica (1.4 individuals per square kilometer), while astoundingly high, emphasize the fact that the effects of Old World disease had a severe effect on Native American populations prior to the settlement of North America.

Evidence of the severity of these epidemics is found in the historical record as well. In an account of Fernando DeSoto's exploits, Winship (trans. 1896) told the following story. It seems that DeSoto and his marauders reached Cofitachequi (a chiefdom and capital city of the Chelaques on the southern Atlantic coastal plain), he was met by the local chieftain. The chieftain had heard of the Spanish greed for pearls, so she sent DeSoto and his followers to an abandoned village nearby. Upon arriving at that village, the explorers were astonished to find a complete village standing, with cribs still full of maize that was still fresh, grass just beginning to grow in the streets, and a chest full of fire-blackened pearls sitting in the temple. Upon inquiring about it, it was discovered that a year prior to DeSoto's arrival, the entire village had succumbed to an epidemic. The few villagers who were unaffected had been taken into neighboring villages. (Winship trans. 1896).

While there is still considerable disagreement on the actual populations of Native Americans in North America prior to European contact, there is little doubt that the numbers were high enough for the Native Americans to be impacting their immediate environment, and potentially, they were high enough to assume that the impact was widespread. However, it is also duly noted that after initial European contact, numbers declined, and thus, impact declined. The results of this reduction could have skewed post-settlement observations of Native American impacts. Buckner (1989) suggests that "by the time historical accounts were being written (eighteenth century) former Indian old fields and fire-maintained uplands were supporting 50-150 year old forests that could easily be perceived as pristine and virgin".

HISTORICAL ACCOUNTS

As was noted above, there are few historical accounts available for the period of initial European contact, and therefore actual accounts of the pre-Columbian forest (that forest present prior to European contact) are scarce, and only cover the very edges of the continent. For this reason, one must refer to the accounts of the explorers of the post-settlement period. These accounts must be read with some skepticism, for if the epidemics had a significant effect on the Native American Population, then the character of the landscape might have already been altered by the wholly "natural" process of forest succession. Evidence from this historic (although somewhat "after-the-fact") perspective indicates that the landscape seen by the initial settlers as well as the explorers had been altered considerably by the native population.

In 1859, while writing a history of South Carolina, John Logan quoted James Glen, a former Governor of the Carolinas as saying "The country lying between the Atlantic Ocean and the Mississippi River, is about a thousand miles in depth from east to west; it is intersected by a ridge of mountains running from north to south, called in Virginia the Blue Mountains or Alleghany, and in this province, the Cherokee or Appalachian Mountains . . . Some of the most credible of the Cherokee Indians, who have often traversed every part of the country, both in going to war and hunting, describe it to me as the most delightful, as well as the most fertile in the world; abounding in large, extensive plains and savannahs, swarming with deer and buffalo".

Logan goes on to say, "As late as 1775, the woodlands, carpeted with grass, and the wild pea-vines growing as high as a horse's back, and wild flowers of every kind, were the constant admiration of the traveler and adventurous pioneer. The forests of those early times were far more imposing than any now remaining in this part of the ancient Cherokee Nation. The trees were generally larger, and stood so wide apart that a deer or buffalo could be easily seen at a long distance -- there being nothing to obstruct the vision but the rolling surface. On the elevated hill-tops the strolling hunter often took his stand to sweep, at a single view, a large extent of the country. The pea vine and grasses occupied the place of the bushes and young forest growth that render the woods of this present time so gloomy and intricate".

In a letter to F. Higgeson a man named Graves made the following statement about an area around Salem, Massachusetts: "open plains, in some places 500 acres, not much troublesome for to cleer for the plough to goe in" (Higgeson 1630). William Byrd (1866) wrote of the area around the Roanock River in Virginia that "There is scarce a shrub in view to intercept you prospect, but grass as high as a man on horseback". He also wrote of his journeys (Byrd 1928): "we met with old fields where Indians had formerly lived, and the grass grew as high as a horse and his rider". This was a description of an area near present-day Leaksville, North Carolina.

Maxwell (1910) wrote "In Tygart Valley, near the western base of the Alleghany Mountains, the first settler, in 1753, discovered large tracts of land over which forests had but lately closed, and smaller areas still in sod; while on Cheat River, forty miles

distant, James Parsons, in 1769, found trees apparently about a century old, which had taken possession of land that had formerly been cleared, as he judged from the uniform size of the timber, and the fact that the trees had grown up through artificial cobblestone floors, perhaps used as drying places for the Indian corn, nuts, fruit, and fish". In describing the Shenandoah Valley, he noted that "an area now covered in part by three counties -- Fredrick, Berkeley, and Jefferson -- was treeless. The burnt lands extended across the present state of Maryland and into Pennsylvania, and in those states were long-called 'Barrens'".

Denevan (1992) noted that "the Alabama Black Belt vegetation was described by William Bartram in the 1770's as a mixture of forest and grassy plains, but by the nineteenth century, there was only 10% prairie and even less in some counties". While traveling along the Little Tennessee River, William Bartram (1776) related this intriguing view: "A vast expanse of green meadows and strawberry fields; a meandering river gliding through, saluting in its various turnings the swelling, green, turfy knolls, embellished with parterres of flowers and fruitful strawberry beds; flocks of turkeys strolling about them; herds of deer prancing in the meads or bounding over the hills; companies of young, innocent Cherokee virgins, some busy gathering the rich, fragrant fruit, others having already filled their baskets, lay reclined under the shade of the floriferous and fragrant native bowers of Magnolia, Azalea, Philadelphus, perfumed Calycanthus, sweet Yellow Jessamine and Cerulean Glycine frutescens, disclosing their beauty to the fluttering breeze, and bathing their limbs in the cool fleeting streams; whilst

other parties, more gay and libertine, were yet collecting strawberries, or wantonly chasing their companions, tantalising them, staining their lips and cheeks with the rich fruit”.

There are also many references to buffalo (considered a plains-dweller) in the east. “The precise period when the last buffalo was seen in upper Carolina was, doubtless, never ascertained; they were abundant in Middle Tennessee in 1775, and it was probably about that time that the last body of them disappeared from the country east of the Blue Ridge” (Logan 1859). Even Farrand (1904), who claimed that the forests of eastern North America formed “an unbroken sheet” as far south as Florida and as far west as the Mississippi River, noted that “originally the bison ranged from the Alleghenies to the rockies and even further west into Oregon and Nevada, and from the Great Slave Lake southward to central Mexico”.

The historical accounts from the earliest period of settlement even into the late nineteenth century indicate that the landscape was more of an open savanna than a closed forest. Bison need a lot of grass and open space to roam. Grass and open space are not found under the closed canopy of the forest, nor are the strawberry fields Bartram described. And if this truly is the landscape of pre-settlement America, why have the areas left relatively undisturbed for almost 75 years (the Great Smoky Mountain National Park, Cherokee National Forest, as well as forests within state parks and forests) not begun to exhibit those characteristics? If they were indeed a “natural” entity completely free of “cultural” influences, wouldn’t they begin to look like the savannas they once

were? The answer to this last question is a profound "no". It is an accepted ecological fact that if the whole of Eastern North America were left undisturbed, the forest canopy would close rather than remain an open savanna. If left undisturbed long enough, a climax stage would be reached. This, too, is a closed-canopy forest (Kuechler, 1964). So where did these savannas come from?

FIRE, THE INDIAN, AND THE FOREST

It has been noted that fire has been available for use by man since at least 9,000 B.P. (Buckner 1989). The extent to which primitive man used fire as a tool has been the subject of much of the debate between the "little-impact" school of writers (who limited pre-settlement Native American use of fire to that for cooking and keeping warm) and the "major-impact" writers (who expanded the use of fire to include it as a tool for clearing and hunting). To deny the early Native Americans of fire as a tool for clearing would be to significantly decrease the amount of land they could impact. Fire was the only tool available to them that enabled them to significantly alter large areas of vegetation -- they had no saws, no axes (stone axes do not chop down trees).

It has been pointed out that "throughout the world, most of man's food plants (both wild and cultivated) have been annual heliophiles, the plants that benefit most from burning" (Oakes 1939). Forest succession toward the unchanging, closed-cover, climax condition is to the disadvantage of man today as well as man in the past in terms of food

and fiber. The use of river bottoms by pre-settlement Native Americans for growing crops is an archaeologically and paleoecologically documented fact (Guffey 1977). Chapman (1985) indicates that the majority of archaeological sites in east Tennessee are situated along rivers and streams. These fertile areas would be quickly overgrown with inedible vegetation without some means of control. That the Native Americans used fire as a means of controlling the growth of this vegetation and to clear those fertile sites is a logical and likely assumption. William Cronon (1983) noted that "fire creates conditions favorable to strawberries, blackberries, and other gatherable foods". This was yet another benefit of fire for the Native Americans.

It is known that certain tree species, such as pines and eastern redcedar, have an affinity for openings created by fire. In a paleoecological study of the Holocene vegetation of Lake in the Woods, Cades Cove, the Great Smoky Mountains National Park, Davidson (1983) used "the combination of charcoal influx curves, the cross-sectional area of charcoal standardized per Eucalyptus grains counted, sedimentation rates, and the percent of pines (Pinus spp) and eastern redcedar (Juniperous virginiana), (indicative of disturbance) and the percent of American chestnut (Castanea dentata), (indicative of drier climatic conditions)" to determine fire frequency in the history of that area. It was found that "there was a peak in effective fire frequency [the amount of impact fire would have on the vegetation at that frequency] at 1,700 B.P.". Davidson also noted that around 1,900 B.P. there was a significant increase in pines (Pinus spp) which followed a peak in charcoal influx.

There are two ways that fire could have occurred on the landscape of pre-Columbian North America: lightning and man. Was it possible for lightning fires alone to keep the landscape as open as it is said to have been in the historical record? Could it have maintained those species considered to be fire-dependent that are still found in eastern North America, such as longleaf pine, jack pine, and table-mountain pine (Little 1980)?

A study by the National Park Service examined fire control records for the Great Smoky National Park for the period 1940 to 1979. These included both lightning and man-made (arson or brush). A model of fire rotation was developed and presented. It indicated that even a twenty-fold increase (to account for the fact that the National Park Service at that time had a strict fire-suppression policy) in the size of the fires, those caused only by lightning are not likely to maintain fire dependent forest types (Harmon, 1981).

The historical record also indicates that Native Americans used fire frequently for numerous reasons. They used fire to open up the forest: "The Salvages are accustomed to set fire of the Country in all places where they come, and to burne it twize, in the yeare, viz: as the Spring and the fall of the leafe. The reason that mooves them to doe so, is because it would otherwise be so overgrown with underweeds that it would be all coppice wood, and the people would not be able in any wise to passe through the country out of a beaten path" (Morton 1632). They also used them to create grasslands so that the buffalo and elk would have grazing areas. Bayard Taylor (1866) was near Omaha,

Nebraska on the Missouri River and saw "a phenomenon of which I had often heard -- the spontaneous production of forests from prairie land. Hundreds of acres, which the cultivated fields beyond had protected against the annual inundation of fire, were completely covered with young oaks and hickory trees. From four to six feet in height. In twenty years more those thickets will be forests".

How did the Indians clear the agricultural land? Williams (1989) suggests the following sequence. Occasionally, trees were felled with stone axes. Initially, small brush was either burned or uprooted. The larger trees were girdled by bruising or peeling the bark (occasionally burning it off) around the entire circumference of the tree. The area was then simply maintained on a yearly basis by fire.

CONCLUSION

Although the idea that the forests of pre-Columbian America were a continuous belt of pristine, virgin timber is a likable one, evidence indicates they were not. The pre-settlement forests were a product of both "natural" and "cultural" processes. They were open, supporting grasses and grassland animals as well as forest animals, and resembled savannas. They were maintained by Native American-caused fire, and certain trees, such as the table-mountain pine and jack pine, developed fire-dependent characteristics (such as cone serotiny, thickened bark, or sprouting) as a result. The extent to which the Native Americans altered the landscape may never be known, as it is nearly impossible for

anthropologists to come up with reliable number for pre-Columbian populations, but it is most likely that they altered it considerably. Evidence for this can be found in the archaeological, paleoecological, anthropological and historical record.

What implications does this have for the National Park Service? If, as the "Leopold Report" maintains, the Parks should recreate a "vignette of primitive America" (Leopold et al. 1963), and the "primitive America" is that of pre-Columbian America, then it is necessary for the National Park Service to make some changes (at least in the southeast). Fire suppression should be done away with (except to protect adjacent lands) and a prescribed burning program should be initiated. There will need to be reintroduction of species formerly thought to be grasslands animals once the savannas are re-created. The National Park Service will have to take a part in actively managing their forests if they are, indeed, going to "re-create" primitive America.

REFERENCES

- Bartram, William. *Travels through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the Extensive Territories of Muscogulges, or Creek Confederacy, and the Country of the Choctaws*. Philadelphia: James and Johnson, 1791; London: reprinted for J. Johnson in St. Paul's Churchyard, 1794.
- Bass, Q.R. *Prehistoric Settlement and Subsistence Patterns in the Great Smoky Mountains*. Thesis: University of Tennessee, Knoxville, 1977.
- Braun, Lucy. *Deciduous Forests of North America*. Philadelphia: The Blackiston Company, 1950.
- Buckner, Edward. *Evolution of Forest Types the South*. United States Department of Agriculture, General Technical SE-58. Atlanta, GA, 1989.
- Byrd, William. *History of the Dividing Line Between Virginia and North Carolina*. Richmond, 1866.
- Byrd, William. *A Journey to the Land of Eden*. Edited by Mark van Owen. New York: 1928.
- Chapman, Jefferson. *Tellico Archaeology*. Knoxville: University of Tennessee Press, 1985.
- Chase, Alston. *Playing God in Yellowstone: The Destruction of America's First National Park*. San Diego, Harcourt Brace Jovanovich, Publishers, 1987.
- Cronon, W. 1983. *Changes in the Land: Indians, Colonists, and the Ecology of New England*. New York: Hill and Wong, 1983.
- Davidson, Jean Leighton. *Paleoecological Analysis of Holocene Vegetation, Lake in the Woods, Cades Cove, Great Smoky Mountains National Park*. Thesis: University of Tennessee, 1983.
- Day, Gordon, M. "The Indian as an Ecological Factor in the Northeastern Forests". *Ecology*, 34(2): 329-346, 1957.
- Delcourt Hazel R., and Paul A. Delcourt. "Quaternary palynology and vegetational history of the southeast United States". In: *Pollen records of late-Quaternary North American sediments*. Edited by V.M. Bryant and R. Halloway. American Association of Stratigraphic Palynologists Foundation, 1985.
- Delcourt, Paul A. "Quaternary Alluvial Terracement in the Tennessee River Valley, East Tennessee". In: *Tennessee 1979 Archaeological and Geological Investigations in the Tellico Reservoir*. Edited by Jefferson Chapman. The University of Tennessee Department of Anthropology Report of Investigations, No. 29, 1986.
- Delcourt, Paul A, and Hazel R. Delcourt. "Vegetation Maps for Eastern North America: 40,000 yr B.P. to the Present". In: *Geobotany II*. Edited by Robert C. Romans. Plenum Publishing Corporation, 1981.
- Denevan, William M. "The Pristine Myth: The Landscape of the Americas in 1492". In: *Annals of the American Association of Geographers*. 82:369-385, 1992.
- Dobyns, Henry F. *Their Numbers Became Thinned*. Knoxville: The University of Tennessee Press, 1983.
- Dobyns, Henry F. "Estimating aboriginal American population: An appraisal of techniques within east hemisphere estimate". *Current Anthropology*. 7(4), 1988.

- Dobyns, Henry F. "Estimating aboriginal American population: An appraisal of techniques within east hemisphere estimate". *Current Anthropology*. 7(4), 1988.
- Farrand, Livingston. *Basis of American History, 1500-1900*. New York: Harpers and Brothers Publishers, 1904.
- Guffey, Stanley Z. "A Review and Analysis of the Effects of Pre-Columbian Man in the Eastern North American Forests". *Tennessee Anthropologist*. 2: 121-137, 1977.
- Harmon, Mark. *Fire History of the Great Smoky Mountains National Park, 1940-1979*. United States Department of the Interior, NPS, NPS-SER Research/Resources Management Report No. 46, 1981.
- Higgeson, F. *New England Plantation*. Massachusetts Historical Society Collection, Series 1, 1859. With appended letter from a Mr. Graves.
- Kroeber, A.L. *Cultural and Natural Areas of Native North Americans*. University of California Publications in American Archaeology and Ethnology. Berkeley: University of California Press, 1939.
- Kuechler, A.W. *Potential Natural Vegetation of the Conterminous United States*. American Geographic Society Special Problem No. 36, 1964.
- Leopold, A.S., et al. "Wildlife Management in the National Parks". *Report of the Advisory Board on Wildlife Management to Secretary of the Interior Udall*. March 4, 1963.
- Little, Elbert L. *The Audubon Society Field Guide to North American Trees, Eastern Region*. New York: Alfred A. Knopf, 1980.
- Logan, John H. *History of the Upper Country of South Carolina from the Earliest Periods to the Close of the War of Independence*. Volume 1. Charleston: S.G. Courtney and Co., 1859.
- Maxwell, Hu. "The Use and Abuse of Forests by the Virginia Indians". *William and Mary College Quarterly Historical Magazine*. 19(2), 1910.
- Morton, Thomas. *The New English Canaan of Thomas Morton (1642)*. Edited by Charles Adams, Jr. Publications of the Prince Society. Boston: John Wilson and Son, 1883.
- Satz, Ronald N. *Tennessee's Indian Peoples from White Contact to Removal, 1540-1840*. Knoxville: University of Tennessee Press, 1979.
- Shefford, Victor E. *The Ecology of North America*. Urbana: The University of Illinois Press, 1963.
- Taylor, Bayard. *Colorado: A Summer Trip*. New York: G.P. Putnam and Sons, 1867.
- Ubelaker, Douglas H. "The Sources and Methodology for Mooney's Estimates of North American Indian Population". In: *The Native Population of the Americas in 1492*. Edited by William M. Deneven. Madison: University of Wisconsin Press, 1979.
- Ubelaker, Douglas H. "North American Indian Population Size, A.D. 1500 to 1985". *American Journal of Physical Anthropology*. 77: 289-294, 1981.
- Williams, Michael. *Americans and Their Forests*. Cambridge: University of Cambridge Press, 1989.