

# The Forest Primeval in the Northeast—A Great Myth?<sup>1</sup>

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LET US first apologize to our Canadian hosts for taking a strict interpretation of our subject—a review of fire ecology in the Northeast. We began our task with the Maritime Provinces well in mind and noted reference titles relating to fire in every eastern Canadian province; however, as we moved from the bibliographic phase to the reading phase, we soon realized that we were in the midst of a problem in segregation. It became apparent that we would have to confine our subject to the Northeast U. S. A., since our local libraries were strong on the history of New England but relatively weak on historical material from the adjoining provinces in Canada. This is perfectly natural, but somehow we hadn't previously appreciated this demarcation in the literature until we faced it in the library stacks.

We have also chosen to bend our subject in the direction of historical ecology. In working up a review paper, one hopes to come upon a theme wherein the materials are all available from one source or another, but somehow the pieces have never fitted into a meaning-

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ful composite. So it is with our subject today; we would like to begin by taking aim at a myth that has survived beyond expectation. Following this preliminary discussion, we would like to review the effects of fire and subsequent habitat changes on wildlife in the Northeast.

Great myths die slowly; indeed, we doubt that myths can be dissipated by scholarly work alone. Let us give two examples of myths which have collapsed through practical test versus several myths which have been exposed in the scientific literature but which have never faced empirical test and therefore persist in popular literature. The idea that "the plow would follow the axe" through the Lake States was a myth which died only after a generation of unrewarded toil by immigrant farmers from Northern Europe. The College of Agriculture at Madison, Wisconsin, was one of many agencies which was responsible for the myth. Our knowledge of crop ecology had not progressed to the point that we could foresee the problems of agriculture on podzolized soils, nor did we understand the limitations of the growing season in these areas. Another great myth which has failed to stand the test of time is that the Great Lakes were an inexhaustible fresh-water resource. Limnologists and aquatic ecologists had grave doubts about the truth of this axiom, but most of the public were not aware of the vulnerability of the Great Lakes until the "death" of Lake Erie a few years ago. It is a different matter with myths that do not have to meet the empirical judgment of the public. For example, we now have enough information about lemming emigrations to know that they are certainly not suicidal marches to the sea; but popular writers are unwilling to abandon the drama of this conception and so periodically we continue to see newspaper and magazine accounts of the death marches of the lemmings. Similarly, our popular view of the dove as a gentle, loving bird versus our stereotype of the wicked, cruel and untrustworthy wolf persists despite the suggestions of ethologists that we have our anthropomorphisms reversed. So it is with the great myth of the trackless forest which covered eastern North America. Davey Crockett and others gave rise to the legend in our folklore and Longfellow fixed it in iambic pentameter in every schoolchild's memory with "This is the forest primeval. . . ."

What was the Northeast really like when the first colonists arrived?

Before we look into this question, let's briefly review the topography, vegetation and soils of the region. The geomorphology of the Northeast is quite complex; Thornbury (1965) recognizes six physiographic provinces. Moving from south to north, the coastal plain which has its greatest development in the Southeast extends through Maryland, Delaware, New Jersey, Long Island and ends at Cape Cod. This province, as we shall see, contains most of the "fire types" in the Northeast. Another geomorphic province which is best represented in the Southeast U. S. is the Piedmont Province. The Piedmont extends across southeastern Pennsylvania and includes the northern Triassic Lowland which ends in the Palisades of the Hudson River in New York. Moving inland, the Ridge and Valley Province extends northward through Pennsylvania and the New York-New Jersey state line through the Vermont-New York border, ending in the St. Lawrence Lowland. The Appalachian Highlands and Appalachian Plateau are two additional physiographic provinces which occur in the Northeast. Within the region, they are best represented in Pennsylvania and New York. The remainder of the Northeast can be characterized as the New England Province, including the Adirondack and Catskill Mountains. This region of igneous and metamorphic rock masses shares many features with the Maritime Provinces and the Canadian Shield lying to the north. The details of glaciation in the Northeast have proved far more difficult to untangle than in the Midwest; however, the outlines of glacial drift are well-known. On the western end, glacial drift extends into the northwestern corner of Pennsylvania and then follows more or less the New York-Pennsylvania boundary to northern New Jersey where it cuts across and forms the northern boundary of Long Island. In contrast to the Midwest, much of the glacial till over the Northeast Province is thin, and in some places, difficult to discern.

#### **EARLY DESCRIPTIONS OF VEGETATION IN THE NORTHEASTERN U.S.**

With this brief background in physiography, let us examine the historical record for descriptions of the early vegetation in the Northeast. Two ecologists have already treated this subject with great

thoroughness. Bromley (1935) worked over the literature for Massachusetts, Connecticut and Rhode Island and came to the following conclusion:

The picture which may be gained from the writings of the early travelers is fragmentary, but at least it gives a basis for surmise as to the character of the forest at the time of settlement by the whites. On one subject, all are in accord and that is the observation that the original forest was, in most places, extremely open and park-like, due to the universal factor of fire, fostered by the original inhabitants to facilitate travel and hunting. We do not know the exact Indian population of southern New England at the advent of the whites, but it was probably about the maximum that could exist under the conditions of the times. Dwight (III,31) gave an estimate of about 800,000 distributed over an area of 30,000-40,000 square miles. At any rate, there was probably a sufficient population to bring about an annual burning of most of the country sufficiently dry for a conflagration. The burning of the forests and grasslands, it must be remembered, was a universal custom among the aboriginal people, not only in the Americas, but in many other regions of the world as well.

More recently, Day (1953) has reviewed the role of the Indian as an ecological factor in the northeastern forest. He summarizes his painstaking and scholarly work as follows:

The northeastern United States was occupied from remote times by an Indian population whose size has not been—and perhaps can never be—determined accurately. Most of this population lived in villages. These Indians created sizeable clearings for their villages and fields and probably expanded the clearings as they foraged incessantly for firewood and other necessary materials. Over much of the region, they set fire to the woods to improve travelling and visibility; to drive or enclose game; and to destroy 'vermin.' They probably exercised some influence on the forest through their control over the animals they hunted and through planting food and medicinal plants. It is certain that their activities destroyed the forest in some places and it is hardly to be doubted that they modified it over much larger areas. Seasonal migrations and the periodic relocating of villages widened the range of Indian influence, which extended into unexpected localities and supposedly uninhabited regions.

Perhaps it would be more meaningful if we quoted directly from

some of the observations of early explorers and observers of the New England scene. Morton, writing in 1632, describes the Massachusetts Bay area as follows:

The Salvages are accustomed, to set fire of the Country in all places where they come; and to burne it, twize a yeare, vix at the Springe, and the fall of the leafe. The reason that mooves them to doe so, is because it would other wise be so overgrowne with underweedes, that it would be all a copice wood, and the people would not be able in any wise to passe through the Country out of a beaten path. . . . The burning of the grasse destroys the underwoods, . . . and this custome of firing the Country is the meanes to make it passable, and by that meanes the trees growe here, and there as in our parks; and makes the Country very beautiful, and commodious.

Another observer (Wood 1639, p. 17-18) gives the following description of the vicinity of the Massachusetts Bay Colony:

And whereas it is generally conceived, that the woods grow so thick, that there is no more clear ground than is hewed out by labour of men; it is nothing so: in many places, divers acres being clear, so that one may ride a hunting in most places of the land, if he will venture himself for being lost: there is no underwood, saving in swamps and low grounds that are wet . . . for it being the custom of the *Indians* to burn the woods in *November*, when the grasse is withered, and leaves dryed, it consumes all the underwood, and rubbish, which otherwise would overgrow the country, making it impassable, and spoil their much affected hunting; so that by this means in those places where the *Indians* inhabit, there is scarce a bush or bramble, or any combersome underwood to be seen in the more champain ground. . . . In some places where the *Indians* died of the plague some fourteen years ago, is much underwood, as in the mid-way betwixt *Wessaguscus* and *Plimouth*, because it hath not been burned. . . .

Moving out from the southern New England coastal area, there is abundant evidence to suggest that fire played an important role in the character of the vegetation as far north as Lake Champlain, as far west as western New York and Pennsylvania, and as far south as the loblolly pine and oak stands of Maryland. Some references from western New York can serve to illustrate the evidence for the open character of much of the interior forest. Adam Hubley, an officer

with General Sullivan's expedition against the Indians in 1779, described a camp in the Finger Lakes area (Cook 1887, p. 157) as ". . . a most beautiful plain, interspersed with marshes, well calculated for meadows. Wood, chiefly pine, interspersed with hazel bushes, and great quantities of grass. . . ." The observations of later travelers through the same region, following the devastation of the Indian villages by Sullivan's expedition, suggests that the absence of traditional Indian fires was soon apparent in the vegetation of the area. Dwight (1823, p. 47-48) describes "openings" north and west of the Finger Lakes and comments on the presence of "many, many young trees." This leads him into a remarkably perceptive discussion (p. 49-52) of the role of the Indian in maintaining open conditions in the forests of southern New England. Today's traveler along the roads bordering the eastern edge of Cayuga Lake can still see occasional old open grown white and black oaks. Some of these wide-crowned veterans are more than 200 years old and thus predate settlement.

There can be little doubt as to the fact of annual, or at least frequent, burning by the Indians throughout the Northeast. The boreal forest areas of the Adirondacks and northern New England are possible exceptions to this generalization. Apparently, fire was of less importance in these regions; however, Peter Kalm (Benson 1937, p. 374) makes the following entry from a camp at Crown Point at the south end of Lake Champlain:

The country hereabouts, it is said, contains vast fir forests of white, black and red varieties, which formerly had been still more extensive. One of the chief reasons for their decrease is the numerous fires which happen every year in the woods through the carelessness of the Indians, who frequently make great fires when they are hunting, which spread over the fir woods when everything is dry.

An early surveyor (Campbell 1772) described the Moose River Plains in the Adirondacks as "almost clear"; he also referred to the nearby Oswegatchie plains as "burnt land." A later observer (McMartin 1823) stated that the Moose River plains were burned annually by the Indians to drive game.

We conclude then, that for a variety of reasons, the Indians of the Northeast used fires throughout the range of their activities. We also

conjecture that annual burning was a fixed pattern over much of this area. The pine-oak of the coastal plain, the chestnut-oak association of the interior and much of the transition forest were dramatically affected by these activities; moreover, the boreal forest may have been influenced by fire to a much greater degree than is presently recognized. Raup (1937) is the only ecologist to take serious issue with the importance of Indian fires in determining vegetation patterns in the Northeast. He did not object to the descriptions of the character of the pre-settlement woodlands in the Northeast, but challenged the concept that Indian fires were responsible for the establishment of this vegetative pattern. Raup's interpretation emphasized that the vegetation was an expression of the climatic edaphic complexes which occurred throughout New England. He states, "We may infer that a warmer and drier climate has occurred in New England in the past 3000 years . . . so recent that the effects of it are still with us in the form of disrupted ranges for southern animals, plants and forest types." He concludes that repeated fires alone could not have accounted for the shift from northern hardwoods to oak-chestnut over much of the Northeast. It is his contention that oak-chestnut forest antedates the burnings by the aborigines and the colonists. We do not feel that Raup adequately confronts the evidence on the role of Indian fires in altering vegetation in the Northeast but recognize his importance as a lone dissenter.

#### **THE ROLE OF INDIAN ACTIVITY IN MAINTAINING PRIMITIVE WILDLIFE ABUNDANCE**

If we accept the notion that burning by Indians was a widespread practice, it becomes much easier to explain the abundance of upland wildlife which has been reported by early observers. Indeed, as underscored by Day (1953), the Indian's impact on the environment included cultivation, planting and cutting as well as accidental and intentional use of fire. In total, the Indian was probably most important for his role in maintaining a mosaic of seral stages, particularly in the areas surrounding village sites. The itinerant nature of their agriculture and the need to shift village sites as local firewood became scarce

would enhance the effect of the Indian as an ecological patterning agent.

Rather than a land of dark and thick forest, the Indian's world was one of open woods and seral edge. Impenetrable forests were widespread on cold, moist slopes or wet depressions where ground fires were not likely to carry—but these stands were discontinuous. Many of the early travelers comment on the difficulty of passage through these unburned areas; for example, Lt. Col. Hubley (Cook 1887, p. 157) describes a march near Ithaca, New York as “At about 11 o'clock, A.M., we entered an extensive hemlock swamp, not less than six miles through; the path through almost impassible. . . .” Dwight (1823, p. 46) gives a similar description of travel through a maple swamp east of Batavia, N. Y.: “After groping and struggling for three hours, through this miserable tract of four miles, we arrived at nine o'clock at our destined inn.” The point to note is that these difficulties are quite in contrast to the relative ease with which the travelers moved along Indian trails through open woods which were more or less free of shrubs, seedlings or saplings. Indeed, the occurrence of bison (*Bison bison*) in western Pennsylvania and New York would indicate the presence of more or less continuous grazing areas through this range.

Wildlife managers still refer to deer (*Odocoileus virginianus*), turkey (*Meleagris gallopavo*) and ruffed grouse (*Bonasa umbellus*) as “forest game;” however, as our knowledge of habitat needs increases, we realize that each of these species could be better characterized as a woodland-edge inhabitant or user. A high degree of interspersion is essential to the welfare of these animals and the Indians' activities tended to encourage “edge effect.” Similarly, we know enough of the early occurrence of quail (*Colinus virginianus*) throughout southern New England (Forbush 1927, p. 4) to speculate that this species would have been favored by the weeds, cultivated crops and abandoned plots of Indian agriculture. The virtual disappearance of native quail from much of this range in recent times is not surprising when one observes that farm retirement, forest regeneration and fire suppression have characterized the treatment of this bird's range in the present century.



**FIRE SUPPRESSION AND THE EXTIRPATION  
OF THE HEATH HEN**

Our well-intentioned concern with the control of wildfire was probably instrumental in the decline and extirpation of the heath hen (*Tympanuchus cupido*). Gross (1928) outlines the early distribution of these birds as: "It was chiefly on the sandy scrub-oak plains of Massachusetts, Connecticut, Long Island, New York, New Jersey and Pennsylvania that they existed in large numbers when white men first came to America."

Although Gross points out that information on the early distribution and abundance of the heath hen is very scanty, it is clear from his citations from Morton's *New English Canaan* and Wood's *New England's Prospect* that the birds were very abundant locally. He also includes reference to Nuttall's somewhat amusing report: 'According to information I have received from Governor Winthrop, they were so common on the ancient brushy site of Boston, that laboring people or servants stipulated with their employers not to have heath hen brought to the table oftener than a few times a week.' Forbush (1927) also quotes Nuttall's reference to the local increase and spread of the heath hen following forest clearing and early farming. This sounds remarkably like the pattern which later occurred in the Midwest (Ammann 1957; Hamerstrom et al. 1957) and testifies to the adaptability and responsiveness of *Tympanuchus cupido* to habitat change.

While the early records of the heath hen are meagre, its decline in the 19th century and demise in the 20th century are quite well documented. The last specimens recorded from New York were taken by a Colonel Pike in 1836 in the 'Comac Hills' of Long Island (Dutcher 1893, p. 272). Gross (1928) considered the heath hen as gone from the mainland of Massachusetts and Connecticut by 1840 but lingering in parts of New Jersey and Pennsylvania until about 1869. He concludes (p. 500) "By 1880 the surviving members of this interesting race, excepting for subsequent introductions, have been restricted to the Island of Martha's Vineyard."

In the valiant efforts to save the last remnant of the heath hen, it

is ironic that a gale-swept wildfire on May 12, 1916 was apparently responsible for a near-complete nesting failure. By 1920, the birds had recovered to a quarter of their 1916 population; however, they subsequently dwindled to a last survivor in 1931 (Bent 1932). The account of the last decades of the heath hen's existence are quite well documented by such distinguished observers as E. W. Forbush and A. O. Gross (who also wrote the section on heath hen in Bent's Life History series); however, ecology and wildlife management were not far enough advanced to allow them to see the historical role that fire played in perpetuating the heath hen's habitat. This ecological myopia is also reflected in the text of a legislative appropriation towards the preservation of the heath hen on Martha's Vineyard (Gross 1928, p. 509): "Suitable and sufficient fire-stops should be made and maintained in order to minimize the dangers of brush-fires, which in the past have proved so disastrous to the birds, vegetation and property." While we cannot be certain of the importance of various proximate factors in the terminal decline of the heath hen, we can be quite certain that no firmer seal of doom could have been applied to the birds than to exclude fire from their habitat.

#### DISCUSSION AND CONCLUSION

In conclusion, we feel that the great myth of the trackless forest which covered the Northeast has obscured some of the probable reasons for the great abundance of deer, turkey, quail, and heath hen which are so well described by early observers. A broken forest with a high interspersion of grassy openings could easily have been maintained through annual burning by Indians. This pattern of habitat manipulation would have been favored by the warm, dry climatic pattern which has prevailed over the past 3000 years. This is long enough for the practices to have become firmly established in the culture of the resident Indians. It is, indeed, ironic to realize that our inhibitions in the use of fire to maintain the scrub pine-oak habitat of the heath hen were, perhaps more than anything else, responsible for the demise of this magnificent open-land grouse.

Turning our attentions to today's needs, we should take a new look at the role of fire as a factor in the distribution and abundance

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of wildlife in the Northeast. Where wildlife, rather than forest values, are foremost, there is much to recommend that we explore the possibility of annual or at least frequent burning in open oak stands to recreate conditions described by early explorers. We have come to accept oak woods and pine stands with choked understories of shrubs and seedlings as a normal condition. Annual burning of mature woodlands has been a highly successful wildlife management practice in the Southeast over the past 50 years. It is time that wildlife biologists gave serious thought to reintroducing the practice over the range of the oak-chestnut association in the Northeast.

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