3 New England Forests

Two Centuries of a Changing Landscape

Lloyd C. Ireland

Any survey of New England landscapes would be incomplete without a look at the region’s forests, which are its dominant landscape feature. New England forests occupy a broad transitional zone between the temperate hardwoods of the mid-Atlantic, typified by oak and hickory, and the boreal zone to the north, typified by spruce, white birch, and balsam fir. White pine and hemlock are characteristic species of this transition zone, the margins of which follow soil, elevation, and climate differences and do not conform to any simple north-south divide. The United States Forest Service defines several ecological regions within this broader zone, and although states are not satisfactory units for understanding these vegetation patterns, available data often relies on them.

This chapter notes several enduring conditions of the region’s forest geography and speaks of four broad themes in the region’s landscape history: the geographical basis for the forest, the conditions that led to its retreat prior to 1880 and to its subsequent rebound, changes in forest ownership over time, and changing scientific and public perceptions of these forests. A brief essay spanning two centuries must omit much, but this overview begins to place forests within the context of a larger history of the New England landscape.

What do we see when we view the New England forest from a roadside, hilltop, or canoe? In most cases, the forest is composed of relatively new growth and is often associated with a built environment. Although the region contains densely urbanized areas, it is still about 79 percent forested; virtually everywhere away from these towns
and cities, we see forests. It was not always so, however. In most late-nineteenth-century landscape photos, surprisingly few trees appear, and the world seems, by our standards, very bleak. In southern and central New England, up to the 1940s, one could see from the average hilltop distant pastures, fields, farmsteads, marshes, woodlots, and villages. By the 1960s, trees obscured most of these views, and the same scenes today would be richly verdant. Currently, Connecticut is 64 percent forested; Massachusetts, 63 percent, and Rhode Island, 58 percent (see table 3.1). Maine and New Hampshire are almost identical in forest cover: 85 percent for Maine, and 84 percent for New Hampshire. Forests cover 76 percent of the Green Mountain State, which leads the region in the percentage of land in farms, at 14 percent. This percentage is somewhat higher than the percentage of developed land in the state. In southern New England, farmland now occupies far less land than does low-density residential development. This essay is a highly stylized story of how this forest came to be.

<table>
<thead>
<tr>
<th>Type of Cover</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>Forest</td>
<td>79</td>
</tr>
<tr>
<td>Developed low-density</td>
<td>7</td>
</tr>
<tr>
<td>Developed med-high density</td>
<td>2</td>
</tr>
<tr>
<td>Agriculture</td>
<td>7</td>
</tr>
<tr>
<td>Water</td>
<td>4</td>
</tr>
<tr>
<td>Wetland</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: National Land Cover Dataset, Harvard Forest, 2009

Geographic Setting

Four geographic phenomena have shaped the historical evolution of New England’s forested landscape: its geologic history, its river systems, its political and physiographic borders, and its canals. New England’s geologic history supplied its landforms, soils, and resource endowments. At its northern extreme, the Appalachian chain splits into the uplands of the Taconic, Green, and White Mountains from where the land descends in rolling hills and ridges to the broad river valleys and the relatively flat coastal plain. Boreal forests extend southward along the heavily glaciated upland ridges, and temperate species reach northward along the river valleys. North-facing slopes host trees similar to those farther north, and on south-facing slopes, direct sunlight encourages species associated with the mid-Atlantic temperate hardwoods. Differences in geology, topography, and soil type create a shifting tapestry of oak, maple, beech, birch, spruce, hemlock, pine, and fir. Significantly, this geologic history left New England with no fossil fuels and few substantial deposits of metals. For generations, this resource shortage was no concern. The region developed the nation’s leading machinery and metal products industries at a time when metals were easily transportable and wood served as a dominant industrial raw material. Steel rails bore railcars made of wood, locomotives were fueled by wood, and wood products remained a leading economic sector in New England throughout its history.

New England’s combined glacial and geologic history produced a landscape distinctly lacking in flat, well-drained, fertile soils. With the exception of floodplains along the Connecticut River—the so-called intervals below the foothills—and a few favored locales with sandy loams, the region’s rocky slopes and shallow soils did not favor row-crop farming, although some areas supported a vigorous dairy industry. Land unsuitable for agriculture, however, did yield a bumper crop of trees, which has encouraged lumber production since the first colonists set foot on New England soil.

Rivers provide a second geographic context to consider when examining New England’s forest history. With only a few exceptions, the region’s major cities lie along its waterways or look out on its harbors, making the entire region historically accessible to commerce. The Connecticut, Merrimack, Piscataqua, Kennebec, Penobscot, and St. John Rivers penetrate the interior almost to the Canadian border. Until well into the twentieth century, logs moved from New Hampshire’s Connecticut Lakes region down the Connecticut River to sawmills and paper mills in Massachusetts. Before the days of steam power, these rivers provided another essential input: power for saws in the mills. The water-powered sawmill was essential to the settlement process—it was, after all, the only way to get the farmer’s logs converted to boards and timbers—and water power remained a key component in the industry until the advent of steam and electricity in the mid to late 1800s. Those who rebuilt these waterways to move logs and power mills left an enduring legacy. In the downstream estuaries, huge banks of sawdust from the upstream mills choked rivers and altered their channels, while further upstream, timber and stone cribwork boom-anchors still stand as testament to former working rivers. Far to the north, crumbling splash dams stand in the smaller tributaries, and the overgrown logging railroad grades now serve as hiking trails in places that we moderns call “wilderness areas.”

A third context is the nature of New England’s political and physical borders. The region’s long border with Canada is one example of these. Though clearly identifiable
on a political map, this border is "artificial" in several respects. Only a fraction of its length follows natural boundaries like mountain chains or rivers, and the border slices through an economic landscape in which workers and systems of trade often barely recognize its existence. Inhabitants in the Champlain Valley have traditionally looked northward along the Richelieu River to Quebec as much as they have looked southward. Burlington, Vermont, for a time was a major entrepot for Canadian logs and lumber; the St. John River was an export route for Maine logs and lumber floated to tidewater in New Brunswick. Family and business connections across the border are longstanding and deep. The small farms in Quebec and New Brunswick tended horses and grew large families, making it easy for lumber contractors to fill their labor needs; woods camps with as many as 120 horses and 100 men—moosy French-speaking Canadians—created family ties across the border, from Skowhegan, Berlin, and Lewiston in the north to Providence and Hartford in the south.

A second critical border is the sea. Here at this natural boundary stand most of New England's largest cities, and here its earliest industries and commerce developed. New England's sea links to the West Indies and Europe fostered a thriving trade in timbers, planks, boards, bales, and boxes—the staples of its early forest industry. Coasting vessels and steamer lines carried goods and passengers from Long Island Sound to Boston, Bangor, and ports eastward. Ocean vessels overcame the high cost of transportation in this rugged, rocky region, and they linked even the smallest port along the coast to world markets. A trade in Maine firewood to southern New England and New York developed in early colonial days and was followed by a steady flow of lumber out of the Kennebec and Penobscot Rivers to build regional cities. New England's outward orientation meant that its coastal forests disappeared at an early time. After steamers and coasting vessels disappeared in the 1930s, though, farming and fishing fell into decline, local coastal communities lost population, and spruce reclaimed the land; the "pointed firs" in author Sarah Orne Jewett's well-known Sunset Landing were in most instances second-growth forests.

The fourth geographic context that shaped the region's forested landscape was a series of canals, both interregional and international. The Erie Canal, completed in 1825 between Buffalo on Lake Erie and Albany on the Hudson, opened productive midwestern farmlands to eastern markets. The effect on New England agriculture was profound. Symbolically, at least, this marked the beginning of the farmer's retreat from the hill country and the subsequent reforestation in the region. The Erie Canal also opened the vast pineyards of the Lake States, making Chicago, Buffalo, and Albany leading lumber marts and creating stiff competition for New England producers. The Sault Canal, completed in 1869, helped bring the age of sail to an end, because its route was next to impossible for a craft under sail without tugs. As steam replaced wind and steel replaced wood in the shipbuilding industry, New England's maritime economy—a heavy consumer of regional wood supplies—drifted off into history, one shipyard, one wharf, one outpost at a time. Finally, the Panama Canal, finished in 1914, brought the rich forests of the American Northwest to Boston's doorstep. With the canal's opening, northeastern states no longer needed New England's forests for building material. These developments made possible an expansion of the New England forest, in area and volume, during the twentieth century.

Retreat and Renewal

At the end of the French and Indian War in 1763, forests encompassed most of the New England landscape away from the seacoast, and the agricultural frontier stood at the lower sections of the region's river valleys. Little of the land beyond the riverbanks had been cut for large logs other than masts for the British Royal navy or the local shipyards. Forest clearing was driven by agricultural expansion and by lumber markets. The lumber market mushroomed around 1800 with the rising demand for fuel, construction lumber, shipbuilding, and later ties and timber for railroad lines. The pace of clearing varied, but farm expansion peaked in most areas by 1880. At that date, up to 70 percent of the region's land was "in farms" except in the far north country and the Green and White Mountains. In most areas, however, farmers retained woodlots, partially wooded meadows, and poorly drained backlands, so that even in 1880 the proportion of land actually cleared and improved rarely exceeded 50 percent. Broadly speaking, the late nineteenth century saw the retreat of this agricultural frontier from the uplands of New England.

In the second half of the nineteenth century, thousands of residents abandoned farms in New England's hill country. Clearing forests had been a symbol of progress, and abandoned landscapes became symbolic of the region's economic and social decline. But the forces that precipitated this problem were national and global in scope. The latter decades of the century brought falling farm prices, caused by expanding grain production in the Midwest and elsewhere in the world. High labor and grain costs made it difficult to sustain livestock, and the region's varied and small-scale ownership pattern—together with its broken terrain and rocky soil—made it harder to deploy mechanized farming methods designed to suit more even ground. Such changes were not clearly recognized at the time, but in general farmers found fewer competitive uses for the millions of acres of pasture, field, and orchard they had so laboriously cleared and fenced. Consequently, much of this grew back to
Large-scale paper mills required increasing amounts of three key ingredients: wood, power, and clean processing water. All three were found in abundance across northern New England. Wherever rivers could drive logs and power mills—or be reengineered to do so—new industrial towns arose, including Groveton on the upper Connecticut River, Millinocket on the Penobscot River’s West Branch, and Baileyville on the St. Croix River in easternmost Maine. This growth was all the more spectacular because the industry moved to the source of timber and water supply on the remote upper watersheds. At Rumford Falls in Maine, the site of a huge fall of water on the Androscoggin River, Hugh J. Chisholm’s Oxford Paper Company created a modern industrial community virtually from the ground up, complete with connecting railroads, waterworks, a light and power company, worker housing, libraries, hotels, theaters, clubs, several business blocks, and a savings bank. Huge, remote mills were not feasible before the advent of hydroelectric power. In 1911, the Maine State Water Storage Commission estimated that the Androscoggin River was the most heavily developed water power source in North America.1 Over its length from New Hampshire to the Maine coast, it powered at least eight paper mills, in addition to the large textile manufacturing complex at Lewiston. In 1917, Congress removed a tariff on Canadian newsprint, leading to a dramatic increase in imports, and in the 1940s and 1950s, southern paper mills took over the packaging market. The mill towns of southern New England then shifted to specialty papers and relied on purchased pulp and rags. The paper on which U.S. currency is printed is still made in Massachusetts.4

Conservation initiatives were another means by which the region’s forests rebounded. Around the turn of the century, massive wildfires burned through the slashings left behind by the last wave of New England loggers. Fires in the White Mountains were legendary, their smoke at times detectable in Boston and Portland. Such fires threatened not only the logging interests but also tourism and the water delivery systems for the downriver textile mills. Fires and destructive logging practices triggered interest in conservation and led to the establishment of state forestry agencies. This conservation did not bring an end to forest harvesting, however; the woodlots of the settled areas were cut repeatedly for fuel, fencing, and building, and the pine growing back in the old pastures was cut heavily for boxboards and matchsticks. In fact, the region’s lumber production peaked in 1909, the same year as did the national total.

A comprehensive survey of the nation’s forests appeared in 1920 in the so-called Capper Report—the first detailed overview of the American forest in forty years.2 By this time, the country had lost half its original forest, and New England was
Who Owns the Forests?

Ownership and use trends in the New England forest have roots that extend back to the land distributions devised by colonial governments and the region’s “grand proprietors.” The earliest settled regions were distributed in grants of various sizes, but these were fairly quickly broken up into the typical New England farm, “100 acres, more or less.” Later, in areas where it was clear that an agricultural future was unlikely, governments auctioned off whole townships, usually six miles on a side. These rectangles took no account of waterways, heights of land, or other natural conditions that might affect uses of the land, but they still form the basis of landownership and transactions in the wildlands, although often fragmented into halves, quarters, and even smaller portions. Late-eighteenth-century conveniences thus continued to affect land use two centuries later.

By the 1890s, the expansion of roads and streetcar lines and the popularity of recreational touring led to movements for state parks. Concerned about timber shortages, states purchased worn-out farms to plant trees and establish state forest systems, the disappearance of deer, beaver, fox, and songbirds brought support for wildlife management areas and preserves. During this era, governments at all levels began acquiring land instead of disposing of it. This movement was often led by conservation and nonprofit preservation groups such as the Massachusetts-based Trustees of Reservations and the Society for the Protection of New Hampshire Forests. In some instances, wealthy individuals took personal initiative for conservation as well, the leading examples being the creation of Maine’s Baxter State Park in 1931, spearheaded by Maine governor and conservationist Percival Baxter, and Maine’s Acadia National Park, founded in 1919 with significant support from the Rockefeller family. Energetic campaigns by a range of business and conservation groups also led to establishment of the White Mountain and Green Mountain National Forests in the early twentieth century.

In New England’s unsettled northern reaches, land passed through the hands of lumber companies, loggers, and Boston investors. Paper companies acquired huge forest estates to support their investments in hydro dams and mills. This left New England with a three-tier pattern of commercial timberland holdings, the first two being large companies owning hundreds of thousands of acres, and smaller, often family-held lumber firms with ten thousand to twenty thousand acres. Today several family groups hold extensive wildland tracts, notably the Pingree heirs with lands in far northern Maine and the scattered family groups managed by Prentiss and Carlisle of Bangor. Defying all predictions, these families held their lands largely intact well after all of the major paper companies had left the scene.
In the 1960s and 1970s, rising prices for imported coal and oil handicapped the region’s sawmills and paper mills, and in the late 1990s, the U.S. paper industry faltered. After a series of mergers, restructuring, and large land sales, the industry ended the first decade of the new century owning essentially no land in northern New England. Most of this land has fallen into the hands of financial investors of various kinds.14 During this process, however, aggressive and innovative conservation organizations raised millions of private and federal dollars and acquired major properties for conservation. Of the 2.1 million acres once owned by Great Northern Paper Company, more than 400,000 acres fell into conservation ownership or were covered by conservation easements by 2005. Massachusetts leads the region in public forest ownership, with 31 percent, and Maine stands at the other extreme, with 6 percent—the lowest of any forested state in the nation. In Vermont and New Hampshire, the two national forests dominate public ownership, accounting for 31 percent of public lands regionwide (see table 3.2).

Table 3.2: Forest Land Area by Ownership and State, 2007

<table>
<thead>
<tr>
<th>State</th>
<th>Total Acres</th>
<th>Public Acres</th>
<th>Percent of Total</th>
<th>Federal Acres</th>
<th>Percent of Public</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecticut</td>
<td>1,794</td>
<td>411</td>
<td>23%</td>
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<td>0%</td>
</tr>
<tr>
<td>Maine</td>
<td>17,673</td>
<td>1,098</td>
<td>6%</td>
<td>16,575</td>
<td>15%</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>3,171</td>
<td>992</td>
<td>31%</td>
<td></td>
<td>11%</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>4,850</td>
<td>1,204</td>
<td>25%</td>
<td>3,646</td>
<td>64%</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>356</td>
<td>53</td>
<td>15%</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Vermont</td>
<td>4,618</td>
<td>754</td>
<td>16%</td>
<td>3,864</td>
<td>49%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32,462</strong></td>
<td><strong>4,511</strong></td>
<td><strong>14%</strong></td>
<td><strong>27,951</strong></td>
<td><strong>31%</strong></td>
</tr>
</tbody>
</table>


In the third bracket of forestland ownership are thousands of small proprietors who hold their land largely for amenity values. In long-settled areas that were once farmland, these ownerships are highly fragmented, and they are now in the hands of some nine hundred thousand owners, of whom 73 percent own nine acres or less. Even today vegetation patterns show how complicated these property holdings can be. Flying overhead, an observer can see dense, dark green pine stands in clear and unnatural rectangles. As properties pass to heirs and new owners, they often fragment once again. A "terminal cut" and a series of house lots then mark the end of most forest uses. At the other end of the spectrum are the large landholders, about 2 percent of all landowners, who own 44 percent of the region’s total private forest area. This skewed size distribution creates difficult challenges for forest management, environmental protection, and public access.

Perceptions of the Forest

Forest use and ownership are two elements of New England’s landscape history; perceptions of the forest are a third. Scientific perceptions are particularly important in this category. New England was an early center of scientific forest research. The Harvard Forest in Petersham, Massachusetts, and the Hubbard Brook Experimental Forest in New Hampshire are but two examples of this lively scientific legacy. The region’s most famous naturalist was Henry David Thoreau, whose journals refer in detail to the habitats, fruits, and seasonal patterns of countless species. Yet when
Thoreau was writing, the notion of an ecosystem had not yet been invented, and even the much-read report of the 1880 census authored by Harvard botanist Charles Sprague Sargent displayed little awareness of the interrelation between trees and other natural systems.42

In due course, ecologists defined ecological communities, traced nutrient flows in forests and waters, analyzed disturbances, and studied natural succession. Paleoecologists digging cores out of logpiles came to grips with the region’s vegetation changes since the retreat of the glaciers. By the 1970s, forest measurement had become more precise and more comprehensive. Foresters advanced from simply counting tree stems to estimating total biomass in stems, leaves, and roots. When the threat of climate change appeared, they were able to take these measurements one step further to understand how forests store and cycle carbon itself.43 Ecologists now pursue a range of subtle details in their research. They know that standing dead trees and fallen logs, formerly viewed as forest clutter, play an important part in the ecosystem. They understand that ephemeral features such as vernal pools and seasonal headwater streams are important enough to be mapped and protected. The size of forested patches is widely regarded as important to species using them as habitat, as are the interconnections between these patches.

Like scientific perceptions, public perceptions are critical to understanding landscape history.44 Public perceptions fit into two very broad categories. Those who live in urban or suburban New England tend to be distant from and independent of local woods industries, and they see the forest largely as a recreational or spiritual resource. By contrast, those who live in rural areas tend to be better acquainted with farm and forest products and other resources extracted from the land. As the suburbs spread, the countryside after the Second World War and later as retirees and recreationists built retreats along the coasts, in the mountains, and on the lakeshores, conflicts between these two groups became common, for although members of both consider themselves conservationists, they often define that category in profoundly different ways.

Another common perception is to imagine the forests as “our forests.” Some of them are publicly owned, of course—14 percent, regionwide, to be precise. But most are privately owned. A corollary of this imagining is to consider publicly owned forests as devoted to nature preservation alone. Strong political pressures have been brought to bear to convert the region’s national forests into parks or reserves; similar pressures are latent in debates over state forests. Advocates of preservation are fond of quoting Thoreau’s observations on the importance of wiliness, but they often overlook his views on the virtues of a simple lifestyle and of self-sufficiency.

Increasingly, the old hunting camps are replaced by large, even lavish leisure mansions; preserving the view from those mansions will entail buying more of the region’s timber from forests far away and out of sight.45

Conclusion

The early-twentieth-century conservation movement emerged from an awareness that forests were important to society, and they were threatened by uncontrolled forest fires and poor cutting practices. At the turn of the twenty-first century, the threats look very different. There is little likelihood that New England’s forest will be cut down to feed mills any time soon. Indeed, because of readily available alternative wood supplies, regional forests have increased in volume over the past half century. Many species of forest wildlife are more abundant than they were a century ago, some to the point of becoming pests.

Despite this conservation, the outlook is not entirely optimistic. Meeting America’s lumber and paper needs from the forests of Oregon, Quebec, and Georgia reduced the pressures on the New England forest generally, but expansion of the paper industry put a premium on the spruce and fir timber in the northern woods. As a result, the volume of timber production roughly doubled from 1953 to 2007, according to U.S. Forest Service data, while cutting cycles were compressed dramatically. Foresters in Connecticut in 1900 found few stands older than forty years, but a typical spruce tree cut in Maine in 1900 was two hundred years old. Today, there are few commercial stands older than fifty or seventy-five years in Maine’s north woods.

Intensive forestry is one response to these rising pressures. Some “tree plantations” are now receiving their first thinnings, after which their linear, artificial look will be broken up somewhat. Measurements tell us that these stands are growing twice as fast—or more—than unmanaged natural stands nearby. Still, only rarely do these managed stands dominate the visitor’s view. Even today, most advice on forest management comes from loggers, and only a tiny fraction of the smaller woodland holdings are under professional management plans.

There are other causes of concern for New England’s forested landscape. Over the past two centuries, it has lost some key species—notably the American elm and the chestnut—due to exotic diseases. Oak forests have been buffeted by the gypsy moth, and hemlocks and various hardwoods are threatened by other imported insects. The ornamental Norway maple is at times a troublesome invasive that spreads into the wild, and other exotic shrubs, vines, and understorey plants spread
by suburban landscaping worry ecologists. Local hunting bans, a decline in hunting activity, and the elimination of predators led to a boom in deer herds in the twentieth century, and excessive feeding threatens forest understories, shrub layers, and regeneration of important commercial species. Efforts to control deer populations by hunting have been controversial, but in the case of the land surrounding the Quabbin Reservoir in Massachusetts, population reductions led to a prompt return of regeneration.26

Between 1997 and 2005, some fifty-two thousand acres of forest were lost to development each year in New England, and twenty-nine thousand forest acres were shifted to “other” categories.27 Thirty-one thousand acres of agricultural land were also developed annually. Roughly one-third of the region's forest is owned in parcels of less than one hundred acres. Often located in areas vulnerable to low-density sprawl, these are likely to be divided into even smaller pieces with each passing generation, making the wood growing there difficult to access or harvest. Moreover, the proliferation of “no trespassing” signs reduces opportunities for recreational walking, berrying, cross-country skiing, and snowmobiling—activities that were for generations a hallmark of rural New England life. The interstate highways now threaten to carry low-density sprawl to the farthest corners of northern New England. The forest is not being “cut down” as much as it is being “cut up.”

Climate change is another ominous shadow hanging over the forest. Among a range of other problems, computer projections suggest the disappearance of maples in most of New England in a mere fifty to a hundred years.28 The past two centuries have seen dramatic changes in the region’s forest landscape, but a change like this will be harder to reverse than the fires and forest clearing of the nineteenth century.

On the brighter side, local land trusts and regional organizations are spearheading a movement to preserve “working” forest landscapes in New England. A notable example in Massachusetts is the Wildlands and Woodlands project, spearheaded by scientists and experts connected to the Harvard Forest. The project is a bold attempt to halt accelerating forest fragmentation by preserving large areas of working forest and increasing the number of smaller reserves.29 In a region that can import virtually all its raw materials and energy, it is natural that New Englanders have begun to see forests as amenity goods and not as sources of products and employment. But even today, the landscape provides jobs and regional income. Should New Englanders rely more on their own wood production? Will a growing interest in “local purchasing” change attitudes on this issue? How will locally produced wood energy fare, given the vexing technical and political problems that all biofuels encounter?
Over the history of New England’s forests, factors such as geophysical conditions, changing patterns of forest cover, ownership trends, and perceptions about the use and management of forests have all played significant roles. Is this history, we can discern trends that perhaps above all remind us that forests are subject to change and challenge. The challenges facing coming generations will generate deep economic and ideological divisions, but this is nothing new to the story of New England’s forested landscape. And perhaps lively controversy will prove healthy; it at least demonstrates how firmly committed so many New Englanders are—city and country dwellers alike—to caring for the forests that cover so much of the regional landscape.

Notes


2. National Land Cover dataset (results differ somewhat from results of the widely used "FLA" dataset), summary by Brian Hall of the Harvard Forest.


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