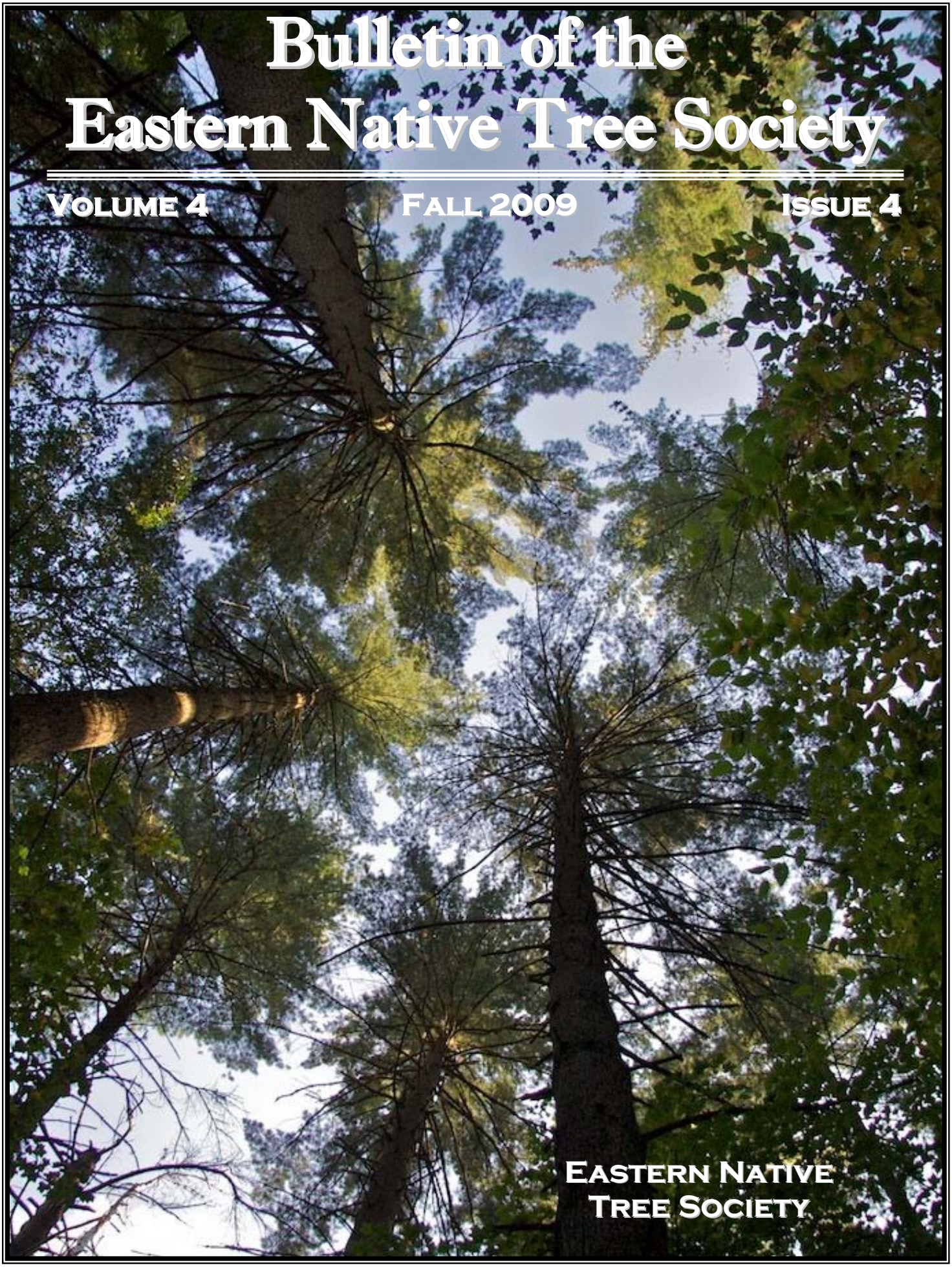
Bulletin of the Eastern Native Tree Society

Volume 4 Fall 2009 Issue 4



Eastern Native Tree Society

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Mission Statement:

The Eastern Native Tree Society (ENTS) is a cyberspace interest group devoted to the celebration of trees of eastern North America through art, poetry, music, mythology, science, medicine, and woodcrafts. ENTS is also intended as an archive for information on specific trees and stands of trees, and ENTS will store data on accurately measured trees for historical documentation, scientific research, and to resolve big tree disputes.

Membership and Website Submissions:

Membership is free when you sign up for our discussion group, ENTSTrees, at: http://groups.google.com/group/entstrees?hl=en. Submissions to the ENTS website in terms of information, art, etc., should be made to Edward Frank at: ed_frank@hotmail.com

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COVER: The graceful canopy of an eastern white pine-dominated grove in Hocking Hills State Park, Ohio. Photo by Randy Brown.

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A SOBERING FUTURE WITHOUT ASH

I recently visited family in the Upper Midwest. While in Wisconsin, word was just hitting the newspapers about the appearance of emerald ash borers near some of the large urban areas in the southeastern part of the state. Just a few days later, while driving through lower Michigan, we got a full taste of what to look forward to—stand after stand with a noticeable component of dead ash trees. The picture included below hardly does this epidemic justice. Untold millions of ash trees are now dead or dying across much of the Midwest, a future that may be in store across the range of *Fraxinus* in the New World. I have even heard people speak of the emerald ash borer as an extinction-level event—a sobering reminder of how vulnerable tree species can be to exotic pests and pathogens.

As we enter the fall and winter of 2009, with fights over human health care and dire prognostications of the swine flu dominating the evening news, it is perhaps not surprising that the ills of our nation's forests are considered trivial in comparison. I know the recent onset of a cold I caught from my kids had me miserable enough to care little (at least for a while) about forest health. But in the grand scheme of things, we have to take our actions far more seriously regarding the impact we have on our forests. We humans brought the emerald ash borer, Asian longhorned beetle, chestnut blight, hemlock woolly adelgid, fire ants, Africanized honey bees, gypsy moth, white pine blister rust, and untold other forest health threats to this country, largely through carelessness and wanton disregard for risk. We supplement their dispersion through this continent via the transport of infested firewood or nursery stock, and then we fumble with efforts to staunch the spread. We are adept at finding alternatives for the pieces of the system we lose—for instance, Major League Baseball will continue using wood bats on even after ash vanishes from American forests by using species like sugar maple as a substitute. But is this our only viable option to respond to these crises? To me, watching a baseball game played solely with maple bats because we just can't find any more ash is more than just sobering—it is a national tragedy.

Don C. Bragg
Editor-in-Chief

A depressing sight all too common in southern Michigan—ash trees killed by the emerald ash borer. Photo by Don C. Bragg.

ANNOUNCEMENTS AND SOCIETY ACTIONS

Details on the 2009 ENTS Rendezvous at Cook Forest

Cook Forest Big Tree Extravaganza, October 3, 2009, Cook Forest State Park, Cooksburg, Pennsylvania
Cook Forest State Park, in conjunction with the Eastern Native Tree Society (ENTS), hosted a series of free events open to the public focusing on the old-growth forests of Cook Forest and the Eastern United States. At this event, forest scientists and naturalists instructed about the latest and most accurate methods to measure tall and noteworthy trees. Events during the day explored the Park's biodiversity, aesthetics, natural and human history, and importance as a National Natural Landmark.

8:30 AM - 8:45 AM - ***Opening Remarks*** by Dale Luthringer (Environmental Education Specialist Cook Forest State Park-EES CFSP). Meet at the Log Cabin Inn Environmental Learning Classroom.

8:45 AM - 10:45 AM - ***Dendromorphometry: The New Discipline of Measuring Trees*** by Robert Leverett, co-founder and Executive Director of ENTS, and other ENTS certified tree measurers. Meet at the Log Cabin Inn Environmental Learning Classroom to learn about traditional base-line methods and problems as well as the latest ENTS measuring methods & techniques used to document tall and noteworthy trees.

11:00 AM - 12:30 PM - ***Measuring the Giants*** by Dale Luthringer, Robert Leverett, and other ENTS members. Meet at the Log Cabin Inn Environmental Learning Classroom and learn about the practical application of dendromorphometry. Join us for an interpretive hike to re-measure the Seneca Pine, largest known living white pine for volume in the state at 11,500 board feet, and the Longfellow Pine, tallest known tree north of the Great Smoky Mountains, last listed at 183.6 ft!

12:30 PM - 1:00 PM - **LUNCH**

1:00 PM - 4:30 PM - ***Searching for the Giants: Seneca & Mohawk Trails, Fire Tower Road*** by Dale Luthringer, Robert Leverett, and other ENTS members. Meet at the Log Cabin Inn Environmental Learning Classroom and then car-pool to the Park Office for a strenuous, often off-trail, interpretive hike up Seneca Trail to the Fire Tower Road loop to search for new big/tall tree records and re-measure old champions. We will re-measure the Seneca Hemlock, tallest known hemlock in the Northeast, and the Jani Pine, one of three documented pines in the 170ft class, located within the finest tall hemlock stand in the Northeast. As time permits, we'll journey through the Fire Tower Road loop documenting ancient red maple, chestnut oak, and white oak before working our way back down to the Park Office.

4:30 PM - 6:30 PM - **DINNER**

6:45 PM - 6:50 PM - ***Evening Lecture Series Opening Remarks*** by Dale Luthringer, EES CFSP, at the Sawmill Theater for the Arts.

6:50 PM - 7:35 PM - ***Great Old-growth Areas of New York & Massachusetts*** by Robert Leverett, co-founder and Executive Director of ENTS, main conceptualizer of the Eastern Old-growth Forest Conference Series, at the Sawmill Theater.

7:35 PM - 8:20 PM - ***Pocket's Full of Forest*** by Ed Frank, geologist & Web Master of ENTS, at the Sawmill Theater.

8:20 PM - 8:35 PM - **BREAK**

8:35 PM - 9:15 PM - ***Wind, Fire, Deer and Long-term Dynamics of Hemlock-Hardwood Forests of the Sylvania Wilderness, Michigan*** by Dr. Lee Frelich, Director of Hardwood Ecology, University of Minnesota and Vice President of ENTS, at the Sawmill Theater.

9:15 PM - 10:00 PM - ***An Exploration into the History of Ancient Forest at Cook Forest through the Use of Film & other Media*** by Anthony E. Cook, noted author and photographer, at the Sawmill Theater.

Ninth Old-Growth Forest Conference Postponed

Due to a series of scheduling conflicts, the Ninth Old-Growth Forest Conference, previously scheduled for October 22-23, 2009, has been postponed until sometime in 2010.

WHAT IS URBAN OLD-GROWTH?

Edward Frank

Eastern Native Tree Society

It can be, and has been, argued that the term "old-growth" is simply a human construct that has no scientific basis. It is a concept that can be defined to suit the purposes of whoever is using the term to manipulate the situation to their benefit. People who are in favor of exploiting the resource or developing a property upon which the forest site may use a very restrictive definition that allows them to log the patch of forest and develop the property as it suits them without affecting "old-growth." Those people who are in favor of preservation may use a broader definition that would restrict the cutting of the forest in order to preserve it for themselves and future generations. This is a cynical argument that must logically be rejected. Simply because a term can be and has been misused by people or groups with a specific agenda, does not prove that the term old-growth is not a viable concept. This idea can be likened to the idea of art. Different people have different ideas of what are the boundaries and characteristics of art, but both would agree that art exists. Similarly, a person would need to be completely soulless to fail to recognize that old-growth forests exist, it is simply a matter of how to describe it.

There have been hundreds, and more likely thousands, of definitions of old-growth proposed and applied. Many have proposed certain age requirements or other arbitrary boundaries for demarcating what is and is not an old-growth forest. A detailed review of each of these definitions does not really advance the discussion very far. Rather than dealing with specific numerical boundaries, what is needed is an understanding of the core concepts of old-growth forest and how it applies to this particular situation.

In a world that had been untouched by man, all of the forested land would be covered in "primary forest." This category of natural heritage forest can be explicitly defined as forests with continuous of natural disturbance and regeneration (in North America, this usually means that the forest was not cleared for agriculture or heavily logged) (Frelich and Reich 2003). Even when trying to apply this primary forest definition there are additional considerations that need to be made. According to Dr. Lee Frelich, some subjectivity remains as in some regions all forests had at least some selective harvesting, so one still needs to develop subjective criterion for degree of human disturbance that disqualifies a stand as primary forest. It is also important to note that primary forest includes stands dominated by young early successional forest, old early successional forest, young late successional forest, and old late successional forest (Lee Frelich, September 30, 2004, post to ENTS newslist).

In this ideal world, old-growth forests would be those in the late stages of succession and development and would include some patches of younger trees to fill canopy openings created by small-scale disturbances of various ages. According to Frelich and Reich (2003):

> Primary old-growth forests or natural heritage old-growth forests are primary forest stands that are in late stages of succession and development... The natural-heritage criterion for delimiting old-growth makes it clear that natural disturbance is an integral part of the old-growth ecosystem and ensures that old forest will continue to include species in all stages of succession and development that have undergone genetic selection by natural processes, rather than harvesting and high-grading.

We do not live in an ideal world. In most of the eastern United States virtually all of the forests have been impacted to some degree by human activities. Native Americans set fires to drive game and clear land. Early European settlers (if they did not clear areas of land outright) typically would harvest at least some trees for their own use. Commercial logging in the late 1800s and early 1900s clearcut vast areas and essentially denuded much of the eastern United States. Even if the trees in an area were never cut, they have been impacted by human activities. In the 1920s and 1930s chestnut blight devastated the American chestnut population. It was a species that in some places represented 90% of the basal area of the forest.

The Dunbar Twins. Photo by Robert T. Leverett.

More recently, we have had the gypsy moth, emerald ash borer, and hemlock wooly adelgid, all exotic invasive species, all introduced by human activities that are killing large numbers of trees and in some cases threatening to destroy entire species of trees and the related ecosystems. Other introduced species of plants and animals are displacing native populations. Large areas of land are continuing to be logged. Vast areas of land are being cleared for residential and commercial development. The effects of acid rain can be seen across the eastern seaboard. So if the criterion for defining old-growth forest is just this ideally pristine, totally unaffected forest, then we do not have any old-growth forest.

A pragmatic approach, and a more practical one, would be to evaluate a particular patch of forest to determine what characteristics it retains of this idealized primary old-growth forest and to balance those findings against a baseline of how much impact is acceptable for a forest to be considered old-growth. Since there is a wide variation in the degree to which forests have been impacted across the eastern United States, this baseline needs to be developed in the context of local forests. In urban areas, this baseline should be developed with respect to the other forests in the same urban area.

Secondly, there should be an evaluation of the potential to enhance the old-growth characteristics of these patches through removal of invasive species, reintroduction of native species, and similar rehabilitation efforts that includes both active and passive management techniques. These efforts have proven to be effective by many local conservation groups in patches of forest they are striving to preserve. The document "The Gradient of Old-Growth Restoration Practices—Mass Woods" (http://www.masswoods.net/index.php/oldgrowth) states: "There is no one specific 'old-growth condition' to aim for as an objective and therefore no one way to create it. Instead, it is more valuable to consider increasing the amount of old-growth characteristics in your woods in a way that matches your objectives."

If considering whether an area should be preserved or not a third criterion is also appropriate. The question to ask is whether this particular patch of forest is in some way biologically significant. A patch of old-growth is significant simply because it is a rare forest type in the eastern landscape. Other significant characteristics might include the presence of an unusual assemblage of flora, the presence of rare or threatened species of plants or animals, the existence of an unusual ecosystem based around a specialized local environmental condition, a population which contains a concentration of individuals an atypical or uncommon genetic makeup, or similar special circumstances.

As a starting point for a discussion, the following generalized definition is suggested:

> The primary characteristic of an old-growth forest is that it contains a substantial percentage of old trees in a setting that exhibits only limited human impact. These forests are generally characterized as late-successional stage forests for a particular regional or environmental regime. Canopy openings formed by natural processes, such as wind throw and fire, and populated by younger trees are often found contained within the larger old-growth forest.
>
> *Edward Frank, September 2006 post to ENTS newslist*

This definition has no hard edges for this discussion to catch on as it proceeds.

In a suburban or urban setting, the prospects for finding and retaining old-growth forests are even more dire. In a wooded area a patch of old-growth forest can be buffered by surrounding younger forests. These forests protect the patch of old-growth from disturbances related to edge effects and may serve to limit other impacts to the forest as well. Over time as the surrounding forest ages species dependant on old-growth forest to survive can spread out from the core area of old-growth into the surrounding forest. Some species require a large, contiguous area of forest to thrive. These can do well where a core of old-growth forest is surrounded by large tracts of younger forests. In an urban setting however the forest segments are often heavily dissected by roadways and developments. Often, edge effects may extend across the entire area of a particular patch. With a greater edge-to-area ratio these forests are more susceptible to the establishment of invasive species of plants and animals. Human utilization of these areas is also increased and the impacts of foot traffic, bicycles, trash and similar effects are higher than occurs in more isolated areas.

Considering that most forests in the immediate vicinity of larger communities have typically been cut at least several times in their history, any forest section that contains some old-growth characteristics is extremely rare. It is within this context that any evaluation of a particular patch of urban or suburban forest should be conducted. Most of the impacts considered above are indirect impacts. The key consideration in most cases is whether or not old trees are present. If there are any 150 year old trees on a parcel, this demonstrates that the forest has not been cleared for at least that length of time. In an urban setting if more than a handful of old trees are present, those areas should be considered to be urban old-growth and managed as such. Because these urban old-growth areas are so rare, they should be preserved and a management strategy should be developed that will enhance their old-growth forest characteristics. These efforts will likely include removal of non-native planted and invasive species, treatment of trees and plants to protect them from invasive insects, removal of trash and debris from the site, efforts at limiting the impacts of human utilization, replanting and restoration of native tree and plant populations, and protection and restoration of natural water features.

LITERATURE CITED

Frelich, L.E. and P.B. Reich. 2003. Perspectives on development of definitions and values related to old-growth forests. Environmental Reviews 11:S9-S22.

Old-growth longleaf pine near Thomasville, Georgia. Photo by Don C. Bragg.

WOODMEN OF THE WORLD GRAVE MARKERS

Don C. Bragg

Research Forester, USDA Forest Service, Southern Research Station, Monticello, Arkansas

Driving across America, the Woodmen of the World monuments are easy to spot in many old rural graveyards. Their uniqueness is often surprising, especially amongst more modest markers in the small, neatly manicured countryside cemeteries that often sprout up in the southern United States. They are a clear sign that the site has been a burial ground for a long time, and are works of art rarely seen in the general public.

A Woodmen of the World grave marker from the Hickory Grove Cemetery south of Crossett, Arkansas. Photo by Don C. Bragg.

Another intricately carved Woodmen of the World headstone from the Hickory Grove Cemetery, showing some of the unique characteristics often seen. Photo by Don C. Bragg.

I have seen these markers for years, and had admired their often intricate details, but I never looked into their background until recent posts to the ENTS email lists by others expressing their fascination with them. I have yet to find much information on them online. The Woodmen of the World website (http://www.woodmen.org/) describes this organization as an open admission fraternal benefit society founded in 1890 by Joseph Cullen Root. In addition to the service, insurance, and investment services offered, one of the benefits of this organization was for a decent burial for members, including the now famous grave monuments.

Initially free, then for a $100 rider on their life insurance policies, these markers helped to distinguish members. However, high costs caused the Woodmen to quit offering this

benefit in the 1920s (apparently members and lodges still got these distinctive markers and monuments on their own for many years afterwards).

The symbols and markings on the headstones relate to both general cultural traditions and those of the fraternal organization, and I would not want to guess at what they are intended to mean. The intricacies of the monuments themselves, faded and time-worn as they are, are still very impressive in today's relatively monolithic grave marker environment. There are even special sections in a few cemeteries across the country dedicated to Woodmen members.

Interestingly, the Woodmen organization still sticks by their original goal of not leaving any member's grave unmarked, and still offer their membership metal plaques that can be attached to other markers.

A corroded metal plaque graces a Woodsmen's monument in the Hickory Grove Cemetery. Such plaques are one of many stylistic possibilities that could be incorporated into the Woodmen grave markers. The inscription below the stump, a symbol of the Woodmen, reads "Dum Tacet Clamat" or "Though silent, he speaks." Photo by Don C. Bragg.

Top: Not all Woodmen markers are of the vertical log style. This marker has a number of pieces of firewood, each one intricately carved (note the annual growth rings, checks, and offset "cut" marks at the ends of these logs).

Left: Many women got Woodmen grave markers through the women's auxiliary Woodmen Circle.

Below: A close-up of the details of one of the branch stubs on a Woodmen marker. All photos on this page are from a Monticello, Arkansas, cemetery and were taken by Don C. Bragg.

BACKYARD BOUNTY: BROAD BROOK'S CONTRIBUTION TO FOREST AESTHETICS

Robert T. Leverett

Founder, Eastern Native Tree Society

INTRODUCTION

Broad Brook is the unfitting name of the small, narrow stream flowing immediately behind my wife's house in Florence, Massachusetts. At initial glance, there is nothing exceptional about the little stream. In places it meanders and in places it rushes, but never with great force. For most of Northampton, Broad Brook is no more than a name on a map, but my wife has enjoyed a 30-year connection with the stream and that connection now extends to me.

At the time I met Monica, little did I realize that she lived in a beautiful section of Florence surrounded by conservation land under the ecological influence of Broad Brook. The stream begins about a mile and a half north of our house in a small wetland lying at an altitude of about 400 ft. From its beginning, it meanders slowly from a series of springs. After about three quarters of a mile, it picks up speed as it runs through a densely wooded section with steep banks and then passes our house at an altitude of about 230 ft. Just south of the house, Broad Brook creates a small wetland and then without fanfare flows into Fitzgerald Lake, helping create an attractive 600-ac conservation property. The entrance to Fitzgerald Lake is about a half mile from our front door step, so we are indeed fortunate. A conservation group called the Broad Brook Coalition overseas the Fitzgerald Lake property in partnership with the City of Northampton. Monica is a past president of Broad Brook Coalition and has been an active supporter of the conservation area for years.

I don't recall when Monica first talked about the woods behind her house that border on Broad Brook. Nor do I recall when she first mentioned that a tuliptree grew in those woods. I doubt that I thought much about it at the time, but later when I got the chance to become more intimately acquainted with Monica's woods, I discovered that she didn't have just one tuliptree. I counted six, tall, slender, forest-grown trunks. Their presence added a degree of stateliness to the woods. I also observed three conspicuously tall white pines. Suddenly, Monica's woods had earned my respect.

I later discovered that the stream corridor has more tuliptrees, scattered here and there for about half a mile upstream. With my colleague Professor Gary Beluzo, we recognized that the small population represents one of the most northeasterly concentrations of tuliptrees in New England, and for that reason alone has special ecological significance. I soon recognized that not only Monica's tuliptrees, but also a scattering of northern red oaks appeared to be impressively tall for what I expected to grow in the area. This recognition is made more significant because I am accustomed to routinely walking through the best forests that the Bay State has to offer. It wasn't long before I concluded that the forest along the Broad Brook stream corridor area was worth studying—either that or I wanted to impress my future wife. Either way, I began by computing a standard Rucker Height Index, first for the woods immediately behind Monica's house and later extended to the area upstream.

During the time I was compiling Broad Brook's index, I became increasingly curious as to what might be typical growth for the woodlands along the stream corridors in the hills just east of the Berkshires of Massachusetts. I had gotten mixed signals about the growth potential of the hills. What should we expect out of the forests along the hill streams? Broad Brook provided an opportunity to collect some solid data on the foothills country. So a more formal research project took shape beginning in the summer of 2005 and it has continued since.

BROAD BROOK FOREST ENVIRONMENT

The surface rock along Broad Brook corridor is mostly granite, perhaps deposited by the Wisconsin glacier ten thousand years ago. Boulders are common, and as a consequence, at least at first glance, the corridor does not look like a productive tree growing environment, certainly not matching the deep alluvial soils of much of the Connecticut River Valley immediately to the east. In the heart of the valley region, I am accustomed to seeing nine- to thirteen-foot circumference silver maples, sugar maples, cottonwoods, and northern red and pin oaks growing in yards, along streets, and in the corridors bordering New England's biggest river. A few straggling American elms from an earlier period also make the valley forest and urban tree corridors something of a spectacle compared to what one sees in the Berkshire hill towns to the west.

Today the valley exhibits a variety of tree species planted one hundred to one hundred and twenty five years ago in the towns bordering the Connecticut River and across its floodplain. Trees in the valley grow either in deep, rich soils or in sand plains—deposits of glacial Lake Hitchcock. However, once the hills are reached, average tree size quickly drops. In addition, most of the hilly lands have been thoroughly worked over, repeatedly cut by generations of land owners. Most of the woodlands are pretty scruffy looking, and as a consequence, one sees long stretches of re-growth woodlands that are far from inspirational. It is easy to conclude that the hill forests

have little to offer the big tree aficionado. One imagines that the hills region requires at least one hundred and fifty years to re-grow a visually appealing and ecologically interesting forest. But such a conclusion would be a rush to judgment. Broad Brook has taught me that there is potential in the hill forests. Let's now examine the Broad Brook woodlands more completely.

We will begin by carving out a strip of land one fifth mile by three-fourths mile along Broad Brook as our corridor to study. This computes to 96 ac of continuous woodlands. Within the study area there are approximately 30 species of native trees of varying age classes. The following list is reasonably complete: eastern white pine, white birch, black cherry, eastern hemlock, American beech, eastern cottonwood, northern red oak, white ash, bigtooth aspen, white oak, green ash, American elm, black oak, pignut hickory, slippery elm, chestnut oak, shagbark hickory, pitch pine, scarlet oak, sugar maple, black locust, pin oak, red maple, tuliptree, American hornbeam, black birch, butternut, eastern hophornbeam, yellow birch, and shadbush.

Conspicuously absent from the list is American sycamore and striped maple. Also, there may be mockernut hickory and perhaps one or two other species that I have not identified, but the above list applies only to the 96 ac.

Within the research area, there are several small patches of forest with trees between 150 and 200 years old, but most of the forest is between 30 and 120 years of age with the most prevalent age distribution of the canopy trees in the 60 to 100-year class – not atypical for recovering farmlands. All in all, the age distribution along Broad Brook is varied enough to provide a good growing profile for the stream corridor and a growing profile is what I specifically sought in order to begin an assessment of the growth potential of the hilly area east of the Berkshires.

After roaming Broad Brook corridor and measuring many trees, I am finally satisfied that I have a handle on both the Rucker height and girth indices, and from a tall tree interest, I am especially pleased with what grows immediately in our backyard. The following list (Table 1) of carefully measured trees represents what I believe to be close to the maximum heights (which I will later present) that the Broad Brook corridor can produce. All trees have been measured with the ENTS-approved sine top-sine bottom height routine and are accurate to +/- 1.0 ft.

What is immediately striking about the trees in the above list is their modest, if not small, girths, excepting for the huge-double trunk white pine. There are larger trees in terms of girth than those listed above distributed throughout the Broad Brook corridor, but for the most part, the larger trees have crowns that have flattened out and are shorter by a few ft than the more slender trees that make up the Rucker Height Index.

My first stated conclusion is that within the areas that have the deepest soils and consistent soil moisture, the canopy is well-populated with trees that top 100 ft in height. From many measurements, I conclude that the average canopy height throughout the good growth corridor where mature trees dominate is between 90 and 105 ft. For example, on slightly less than an ac that covers Monica's property, there are 19 trees exceeding 100 ft in height representing about 80% of the canopy trees. This is exceptional, but were the acreage doubled, the number of 100-footers would go up by at least half.

Table 1. Broad Brook (Florence, Massachusetts) Rucker Height Index report.

Height (ft)	Common name	Location	Circumference (ft)	ENTS points	Date when last measured
137.6	Eastern white pine	Upper	14.9	2044.1	10/8/2008
129.0	Tuliptree	Monica	6.8	877.2	4/15/2009
120.0	Hemlock	Monica	8.1	972.0	9/16/2007
119.4	Pignut hickory	Upper	6.6	788.0	10/8/2008
113.0	Northern red oak	Monica	5.7	644.1	4/15/2009
110.0	White ash	Monica	4.7	517.0	4/15/2009
109.7	White oak	Monica	6.9	757.3	5/5/2007
108.7	Black birch	Upper	6.4	695.5	10/8/2008
107.4	Scarlet oak	Monica	7.3	784.0	10/15/2005
106.5	Sugar maple	Monica	6.9	734.7	5/5/2007

Rucker Index (10 spp) = 116.1 (height); 7.4 ft (girth); 881.4 (Points)

The following list (Table 2) includes 25 trees in Monica's Woods that I have tagged for special growth monitoring. Heights are given to the nearest half foot, girths to the nearest tenth of a foot.

Table 2. Tagged trees in Monica's Woods.

Tag #	Species	Height (ft)	Girth (ft)
8	Eastern white pine	134.0	6.9
7	Tuliptree	129.0	6.8
11	Eastern white pine	128.0	8.0
6	Tuliptree	125.5	6.7
9	Tuliptree	125.0	5.9
12	Tuliptree	122.0	7.0
18	Eastern white pine	119.0	7.2
14	Tuliptree	117.0	6.8
3	Northern red oak	113.0	5.7
19	White ash	110.0	4.7
5	Northern red oak	108.5	6.7
4	Northern red oak	108.0	6.5
2	Red maple	105.0	4.7
16	Northern red oak	104.0	6.3
13	Northern red oak	101.0	6.1
25	Northern red oak	101.0	5.9
23	Northern red oak	100.5	6.1
20	Black oak	100.0	5.9
10	Northern red oak	99.0	7.3
15	Northern red oak	98.5	7.1
1	Northern red oak	97.0	5.8
17	Northern red oak	96.0	5.9
24	Tuliptree	91.0	4.5
21	Northern red oak	90.5	6.3
22	Northern red oak	88.5	6.8

Within the area encompassing the above list, no other trees meet the criteria of a height of at least 80 ft or a girth of 4.5 ft. The list is complete in terms of these particular criteria. It is a census of the bigger and taller trees.

A quarter mile upstream from the house, larger, older trees become more common, but heights are not greater than what is found on Monica's property, with the exception of an area of about two acres in size that contains a small grove dominated by tall white pines that includes the 137.6-ft white pine, a 119.4-ft pignut hickory, and a 108.7-ft black birch.

For areas within the 96-ac region that are populated with white pines, the vast majority of the pines that form the canopy are between 100 and 125 ft in height. Most are relatively young with vigorous crowns and exhibit young bark characteristics for fully the upper half of the trunk—a sign of youth in the species. These pines have plenty of growing left to do and suggest to me that the species with the greatest potential for continued high growth are the white pines.

Average tree height begins to drop on the upper reaches of the hills that border the stream corridor. The average canopy height on the upper hill terrain is between 85 and 95 ft. This is an area dominated by oaks, maples, and hickories and is conspicuously dryer. Therefore, I conclude that available moisture rather than soil type separates the upper from the lower hill forests.

What is striking about Monica's Woods (the woods on the property that Monica owns) is the dominance of trees in the 5 to 7-ft girth class. Trees in this range can easily top 100 ft, and in the case of white pines and tuliptrees, 120 ft, yet even they are not large girth-wise. The oaks are experiencing very slow radial growth and suggest that 8 to 9 ft may represent maximum girths. Where trees have grown for much longer periods on upper Broad Brook, circumferences are seldom over 10 ft, and then that dimension applies only to the white pines. Exceptions to the 10-ft girth barrier are a few isolated pines, including one single-stemmed, 120-ft giant that reaches 11.3 ft.

My overall conclusion is that the Broad Brook corridor can produce plenty of single-stemmed hardwoods between 7.0 and 8.5 ft in girth and white pines 8.0 to 10.0 ft around. Taken at the age threshold of 150 years, the maximum girths for the Broad Brook forest can be set at 9 ft for hardwoods and 10 ft for pines with only an extremely thin scattering of exceptions for both classes. Maximum heights can be set at 100 to 110 ft for tall hardwoods with the exception of hickories, which can be placed at 110 to 115 ft (with a few noted exceptions).

I note that the white pines of Broad Brook are not old enough to show clear height limits, but I suspect we can establish a ceiling of between 130 to 135-ft with a scattering going over that. To put a finer point on the conclusion, I believe we have the potential for, at most, half a dozen exceptions, with the absolute height limit placed at between 140 and 145 ft. However, the pine groves that presently top 120 ft all show good crown growth and are still relatively young trees. So, why do I insist on a 140 to 145 ft maximum? I draw on my knowledge of what grows in a much larger area to choose those limits. I have measured white pines all through the valley and hills region. Only one pine has been confirmed at over 140 ft. In addition, only eight sites have been confirmed within the valley with trees reaching to 130 ft. As more white pine stands mature, other sites will be added, but 140 ft seems to be a distant goal.

One offsetting factor to continued height growth for the white pines is that their longevity may not be high within the Broad Brook corridor due to annual periods of root saturation in the wetter spots where the larger, taller trees grow. Also, the zone that will produce maximum heights is narrow. Scanty soils on the upper hill sides will not support vigorous pine growth or heights above about 115 ft.

As a general observation, vigorous, long-term tree growth of all species within the high growth strip of the corridor is hostage to saturated soils during spring, earthworms in large areas, thin soils on granite bedrock, and probably a host of root fungi. Given these impediments, it is surprising that height growth is as elevated as the above numbers show.

With allowance for just being wrong, I submit the following summary of the growth patterns and potential of key species in the Broad Brook corridor (Table 3). Other species could be included, but at best they represent very minor contributions to the forest.

Table 3. Encapsulation of growth patterns and potential for key species along Broad Brook near Florence, Massachusetts (mod. = moderate).

	Typical mature		Maximum		
Species	height (ft)	girth (ft)	height (ft)	girth (ft)	Distribution
Eastern white pine	120	8.5	140	11.0	high
Northern red oak	95	8.0	115	10.0	highest
White oak	90	7.5	110	8.5	sparse
Tuliptree	105	7.0	130	7.5	sparse
Pignut hickory	100	6.5	120	7.0	mod.
Red maple	85	6.0	110	7.0	high
Black birch	80	5.5	110	7.5	high
White ash	95	5.5	115	7.5	sparse
Eastern hemlock	95	6.5	120	9.0	mod.
Sugar maple	90	7.0	110	8.0	mod.
Yellow birch	75	5.5	85	7.0	mod.

How do the above numbers compare to forested regions elsewhere in Massachusetts? I will now make comparisons for each of the above 11 species. The maximum heights and girths I list for are equal to or slightly above what I have thus far measured in Massachusetts. I am attempting to set the maximum heights, not only on what I have actually measured, but what I believe to be the realistic maximum species potential for the general region. For example, the tallest accurately measured white pine in Massachusetts is the Jake Swamp tree in Mohawk Trail State Forest. At 168.5 ft, the Jake tree is not through growing. Furthermore, there are 8 other pines in Massachusetts over 160 ft in height and an additional two or three will likely join the 160 and over club within the next five years. However, crown damage, disease, and the vagaries of weather may take a toll. As my attempt at divining the balance point between the growth and destructive forces, I have placed the maximum height for white pine at 170 ft in Massachusetts, recognizing that there is a high probability that Jake Swamp will exceed this height within three years.

There are no sites in Massachusetts other than Mohawk Trail and Monroe State Forests with trees in the 160-ft height class and with at least one tree poised to move into the 170-ft class. Consequently, it is an easy call to set the maximum height for the species in Massachusetts at 170 ft. Comparable justifications can be given for the maximums that I've chosen for the other 10 species. Let's now examine the potential for each of the 11 species listed for Monica's Woods.

Eastern white pine: Relative to the Connecticut River Valley, the Broad Brook corridor gets high marks for eastern white pine growth potential. How does it do against the best the state has to offer? As a percentage of maximum height potential for Broad Brook compared to the maximum for the state, eastern white pine achieves a score of 82% (140/170). The actual single tallest tree in the Broad Brook corridor currently measures 137.6 ft and has remaining growth potential. So, 140 ft as a singular maximum is conservative, but I am looking more broadly than at the statistical outliers.

For girth, the Broad Brook's score is 85% (11/14). Note that I am doing an apples-to-apples comparison. I do not compare the girths of open-grown eastern white pines to forest-grown specimens. There are open-grown eastern white pines in Massachusetts that reach to 16.8 ft in girth, but none of such a dimension grow in closed canopy stands. From the data I have gathered, 14 ft is the limit and the likelihood of trees in that girth range is extremely minimal. So far, forest grown pines reaching 13 ft in girth have been documented in four places in Massachusetts.

Northern red oak: The Broad Brook corridor scores 85% (115/135) for height and 67% (10/15) for girth. Northern red oak is well sampled in Massachusetts. Open-grown specimens can reach 20 ft in girth. Forest-grown specimens can reach 125 ft in height with an absolute maximum potential of 135 ft against a maximum currently measured height in Mohawk Trail State Forest of 133 ft. The corresponding girth potential is 15 ft for the northern red. However, I acknowledge that I have yet to find a fully forest-grown specimen of that dimension. I do see evidence that with a little extra light, a few forest-grown oaks might be able to achieve a 15-ft girth.

White oak: Broad Brook's height score is 93% (110/118). Its girth score is 71% (8.5/12). In Massachusetts, the white oak has been sampled far less than the red oak There is a small chance of a white oak somewhere in Massachusetts above 120 ft in height, but it is doubtful I will be fortunate to locate it. Based on what we have measured elsewhere in the Northeast, the white oak falls shy of the northern red oak's potential. White oaks can achieve large girths as open-grown trees, but they usually achieve only modest proportions in stands, especially within New England. The maximum value of 12 ft gives the species the benefit of the doubt.

Tuliptree: Broad Brook scores 92% (129/140) for height potential against the best in Massachusetts, but a very modest 62.5% (7.5/12) for girth. The best tuliptree growth in Massachusetts that I've documented is in Robinson State Park, Agawam, Massachusetts, for both height and girth (forest-grown trees). A tuliptree in Monica's Woods, only yards from our patio, measures an impressive 129.0 ft, best within the Broad Brook corridor. Again, as with other species, I am only comparing forest-grown specimens. There are open-grown tuliptrees in Massachusetts that reach 16 ft in girth with a potential for 20 ft.

Pignut hickory: The pignut scores 92% (120/130) for height and 78% (7/9) for girth. The pignut is under-sampled in Massachusetts. However, based on what I've seen, the above

numbers are reasonable. Hickories grow taller than oaks where the two species occupy the same site, but Mohawk Trail State Forest shows extraordinary growth potential for the northern red oak, which is why its potential shows higher than the hickory. There are no pignuts growing in Mohawk.

Red maple: Broad Brook scores a modest 85% (110/130) on height and 78% (7/9) on girth. Red maple has been widely sampled in Massachusetts. Open-grown trees can achieve relatively large girths (above 10 ft), but a 9-ft girth, forest-growth red maple in Massachusetts is a giant. Red maple's modest performance in Broad Brook is a puzzle to me.

Black birch: Broad Brook scores 96% (108/112) on height and 83% (7.5/9) on girth. Black birch has been very widely sampled in Massachusetts, lending credibility to the foregoing scores. Locations like Mount Tom State Reservation and Mohawk Trail State Forest are awash with impressive black birches that push the limits for the species in Massachusetts. It now appears that the black birch's tolerance for marginal soils allows it ample opportunity to compete. Open-grown birches can reach 10 ft in girth, but 9 ft pushes the limit for their forest-grown cousins and this limit may be too generous.

White ash: Broad Brook scores poorly on this species. The height score is 77% (115/150) and the girth score is a paltry 54% (7.5/14). I am unsure as to why the ash scores so low along Broad Brook. The white ash has been well sampled in Massachusetts and elsewhere in the Northeast. Ash is a species that needs rich soils with high levels of nitrogen. Broad Brook appears not to provide either. The coves in the Berkshires are its preferred habitat. The 150.3-ft white ash in Mohawk Trail State Forest is the tallest measured for its species in the Northeast. The state-wide maximum for girth is influenced by a single tree growing in Monroe State Forest.

Eastern hemlock: Broad Brook scores moderately well on height at 86% (120/140), but only 69% on girth. In awarding a maximum girth potential of 9 ft for Broad Brook, I am acknowledging the longevity of the species. Broad Brook hemlocks have a way to go in achieving their maximum girths, but with long lives, they can slowly get there. The modest overall score for hemlock is a little surprising since there are fairly large concentrations of eastern hemlock that achieve respectable proportions within Broad Brook. I note that the state maximum height has been strongly influence by a single hemlock growing in Ice Glen, Stockbridge, Massachusetts.

Sugar maple: Broad Brook scores 81% (110/136) for height and 62% (8/13) for girth. As with white ash, sugar maple prefers rich sites. The Broad Brook corridor apparently does not provide enough and the small population of sugar maples reflect this situation. The state maximums for sugar maple rely on the extraordinary growth achievements within Mohawk Trail State Forest.

Yellow birch: Broad Brook scores 81% (85/105) on height potential and 54% (7/13) on girth. These low scores, especially for girth, are surprising. It may be a lack of community development for the species. The habitat supports yellow birch, but more at the margins.

We can summarize these statistics and compute a composite site score for each species (Table 4).

Table 4. Relative scores for Broad Brook.

Common name	Height score	Girth score	Species score
Eastern white pine	78.0	79.0	78.5
Northern red oak	85.0	67.0	76.0
White oak	93.0	71.0	82.0
Tuliptree	92.0	62.5	77.0
Pignut hickory	92.0	78.0	85.0
Red maple	85.0	78.0	81.0
Black birch	96.0	83.0	90.0
White ash	77.0	54.0	65.0
Eastern hemlock	86.0	70.0	77.5
Sugar maple	81.0	62.0	71.0
Yellow birch	81.0	54.0	67.0
Average	86.0	69.0	77.0

The composite score of 77.0 has not been thoroughly analyzed with respect to how other noted big tree/tall tree sites compare, but sites such as Mohawk Trail State Forest and Ice Glen will score well into the 90s. Other big tree sites in central and eastern Massachusetts will score in the low to mid-60s, with a few possibly making it to the low 70s. To further the analysis, I constructed a hypothetical central Massachusetts site with presumed local aesthetic appeal. What would a handsome center of the state forest site likely produce? My model scored 67. This seems intuitively correct to me based on personal observation over several decades of tree hunting.

The above scores should be kept in mind while considering that there are many Massachusetts sites with trees considered mature by timber specialists that would have no trees reaching 100 ft in height or 3 ft in diameter. At 77%, Broad Brook scores comparatively high.

The above somewhat novel approach to big tree site ranking draws from the Tree Dimension Index (TDI) for scoring big tree points. I have merely extended the concept to include an entire site and provided a final species average based on 100 points instead of 200 or 300 as with TDI.

BROAD BROOK AESTHETICS

What can be said about the aesthetic impact of the forest along the Broad Brook corridor? For me, it is a mixed impact. There are spots that are quite lovely and then there are areas that are not. As a whole, Monica loves Broad Brook. She sits on a rock near our house listening to the little stream gurgle and splash as it passes over a cluster of conspicuous rocks. It is a rapid in miniature. She is drawn to the stream and much of the aesthetic for her is tied to the water. Undeniably, streams add aesthetic appeal for most people.

Broad Brook begins its brief journey as a pacific trickle from a number of springs. It meanders through a marsh, and then rushes as it passes through a section with steep banks and a pronounced stream gradient. Walking on the side of the hill above the stream in this area, one is in constant audible communication with flowing water. However, Broad Brook returns to a lazy meander near its southern terminus near Fitzgerald Lake. In its upper reaches it casts its spell as the architect of small, attractive wetlands with abundant mosses. It creates a forest aesthetic different from its lower reaches. One is aware of the dominance of springs that feed the meandering nascent stream.

The forest in the headwaters region has the expected mix of hemlock, red maple, and birch, but is punctuated by large, old eastern white pines in slightly drier spots. In some ways, the upper stretches represent the pinnacle of aesthetic forest effect for the corridor. But the little stream has other faces that it presents to the attuned eye. Becoming sensitive to forest aesthetics necessitates that sensitivity be developed for each woodland face.

In July and August, Broad Brook's flow is minimal and one can step across it in places without getting wet. During the hot days of summer, Broad Brook presents itself as a forest friend, a residue of spring's runoff available to forest denizens to quench their thirst. Its presence is that of a forested stream, but in no place does it give one a head rush. Gentleness is its message.

As one walks the forest along the sides of Broad Brook and observes the forest floor, one acknowledges aesthetic spots, but there are stretches where the forest floor is cluttered and unattractive and the trees spindly. How do these spots figure into aesthetics? Do we demand a continuous stream of inspiring images or do we value variety more? If so, in Broad Brook we do see contrast. A small section of near old-growth lies about a mile upstream from Fitzgerald Lake. The wooded haven is attractive, almost exciting. There is the hint of forest primeval. I believe a few trees approach 200 years in age and many exceed 150. I believe that a swath of the Broad Brook corridor was a wood lot around 170 years ago and the near old-growth areas date to that period.

Part of the value of the Broad Brook corridor for me has become the challenge it presents to me in defining forest aesthetics. Broad Brook persuades me to try my hand at defining what we want as a pure forest aesthetic. A say pure forest aesthetic because Broad Brook enters the contest with a handicap. Its setting is that of a woodland with few supporting props. It is not located in a scenic mountain setting such as Mohawk Trail and Monroe State Forests or an immense boulder like Ice Glen. It offers no plunging waterfall like Bashbish Falls. It is not ensconced in an exquisite little gorge like Windsor Jambs. Broad Brook gets no dramatic staging. It must compete solely on the merits of its trees and other plant assemblages – which focuses me on the purity of the woodland dimension.

I will now turn to forest aesthetics as a more general topic. What follows is my initial shot over the bow, as it were, with what I hope will be chapters to follow.

FOREST AESTHETICS—A GENERAL APPROACH

What draws us to a forest? Do we seek secluded places with dense undergrowth that provide respite from the sights and sounds of the world we usually live in? Do we seek open glades with a few large trees to sit beneath (park-like woodlands)? Do we search out places that feature cathedral stands of trees? What woodland scenes appeal to us most? What characteristics detract from forest aesthetics? These are questions that must be answered if we are going to give dimension to forest aesthetics. In the end, aesthetic appeal will always be a matter of personal taste, but an evaluation system has relevance to decisions that we must make as a group. Where do we begin?

Appealing to the tastes of our distant ancestry, some of us are attracted to glades thinly populated with trees of conspicuous size, preferring open-grown tree forms that are characterized by long, outstretched limbs, on which we can climb. Savannas can be highly appealing in their combination of open grasslands and clusters of big, mature trees, but others find their dream woodlands elsewhere. Some among us prefer the appearance of dense conifer stands, the northern forest look, featuring the pointed crowns of spruce and fir and harboring small ponds that pleasantly punctuate the visual impact of forest borders. For others, there is the forest cathedral that in the eye of the public reaches its climax in California's groves of redwoods and sequoias. However, even in the subdued East, large, tall conifers define a forest aesthetic that attracts many people. For the Northeast in particular, the white pine and hemlock leviathans of Cook Forest State Park in Pennsylvania epitomize the tall tree look. Cook's pines, measuring up to 4 ft in diameter and free of limbs for nearly 100 ft of their 160-ft heights, represent the East's gold standard. To walk within the forest cathedral of Cook Forest with its shafts of sunlight dancing on the forest floor is to rekindle a pioneer spirit and reconnect to our eastern woodland heritage. Still others prefer a softer forest look or a more tropical one punctuated by luxuriant foliage. The shopping list of preferences is long.

We all probably agree that at least some large trees add to the aesthetic impact of a woodland, but how large is large? At what point does diminished tree size eliminate the big tree aesthetic? For my tastes, sprinkle plenty of 2 to 3-ft diameter trees around free of limbs for the first 40 to 60 ft and a palpable woodland aesthetic emerges. I have often noticed that a big tree look develops when trunks reach between 25 and 30 inches in diameter. Sprinkle enough trunks around in this diameter class with boles rising limb free for 40 to 60 ft and a recognizable forest aesthetic is established—with caveats, of course. Wrap the trunks in vines and aesthetic appeal diminishes. Introduce urban trash and the aesthetic collapses. Saturate what otherwise would be fairly open space with seedlings and saplings and the aesthetic may not disappear,

but it is definitely reduced. The aesthetic of trunk form demands breathing space.

Some people approach aesthetics more from an ecological perspective. In their view, if a characteristic is good for the forest, it should be absorbed into the gestalt of aesthetic appeal. Knowing that a feature is ecologically important raises its aesthetic score. Otherwise the visual impact of abundant coarse woody debris can be disconcerting to those who want their woods to appear manicured. We should not forget that the European model ranks high with a segment of the population who are slaves to precision and order. They want their woodlands to appear as extensions of barbered city parks—not real forests, but nonetheless visually appealing to virtually all of us. But even with the ecological benefit acknowledged, there can be such a thing as too much forest clutter. If the floor is covered in small trunks, limbs, and branches, scattered among small trees, the appearance can be that of a disheveled, disintegrating woodland. In such places, there is little for the eye to focus on. By contrast, add big, uprights trunks and a scattering of equally big, moss-covered prostrate trunks and the visual impact reverses and we behold the forest primeval.

Large root structures can add dramatically to the aesthetic appeal. People seem to prefer big root systems to small, telephone-pole like bases. There is a Merlin magic to root systems that engulf rocks and invite ground plant colonization. Scatter some large rocks around and the effect is magnified.

But in the end, isn't all a matter of opinion? Yes, I suppose, but not all opinions are equal or valuable for defining a formal forest aesthetic. There are people who see woodlands only as habitat for the animal species in which they are interested. This group of woodland visitors has low expectations for the characteristics that rightfully vie for consideration in aesthetic considerations. Then there is the poor urbanite who is just thankful for any woodland as a departure from the urban prison of glass, steel, and concrete. However, urban woodlands are often strangled with invasive plants and deluged with trash. Personally, I would never deny our urban sisters and brothers their woodland refuges, but I often find more negatives than positives in urban woodlands. On the other hand, the larger urban parks often have excellent collections of very large trees (Philadelphia's Fairmount Park is an example). One must be open to give and take.

With this brief introduction to aesthetics, I pose a question. Can we measure the visual effects of our woodlands in such a way as to rank forest sites on aesthetic appeal? Can we devise a weighted ranking system that will have value to woodland managers who have to make administrative choices?

At this point, I am unable to quantify aesthetics except in a highly general way, but am open to the idea of developing a quantitative system. For my parting shot, I am satisfied to list attributes. Accordingly, I offer the following set of criteria for consideration.

CRITERIA FOR EVALUATING FOREST AESTHETICS

1. Does the site have cohorts of well-formed, large diameter, reasonably healthy, attractively spaced trees? In the narrative above, I suggest diameters of 25 to 30 inches as a minimum with trunks free of limbs for 40 to 60 ft. This is a criterion that begs for numerical evaluation. Is a forest site of a few acres harboring 50 trees in the large diameter class more aesthetic than a forest with half the number? However, size is not everything. Malformed trees such as weevil damaged white pines detract from the forest aesthetic. Tree symmetry can be a positive attribute, especially with conifers, but older trees develop a pleasing asymmetry that is easy to recognize, and hard to evaluate. The asymmetry of old pines is aesthetically pleasing while weevil-damaged asymmetrical forms are not.

2. Is there both horizontal and vertical heterogeneity in the forest's structure, suggestive of natural processes as the architects of structure, composition, and form? Trees in neat rows, plantation style, do not add to the forest aesthetic. Forest aesthetics are not equivalent to tree plantation or garden symmetry. The latter has its place, but not as part of forest aesthetics.

3. Are there individually outstanding trees? Champions of girth, height, and crown spread can add measurably to both the physical and psychological appeal of a forest. Here size is relative, but minimums can be established. Small, compact places like Big Oak Tree State Park in Missouri that have many state champion trees in a contained area exude a magic that calls to tree lovers everywhere. One expects superlative forests to grow champions.

4. Are there visual enhancers within the forest interior such as isolated large rocks, rock ledges, streams and cataracts? If so, are they fairly widely spaced so that they provide variety without overwhelming the forest as a forest? At some point we transition from a forest and look toward a landscape aesthetic, i.e. the forest aesthetic morphs into a landscape aesthetic. The forested sides of canyons and snow-capped mountains may add to the landscape aesthetic, but their beauty is often only in the context of the broader landscape. I would emphasize that the landscape aesthetic stands apart from the interior forest aesthetic.

5. Is there an absence of invasive species, plant and animal that denude or over- power natural plant colonization? Vines, shrubs, earthworms, excessive deer, etc. all reduce the forest aesthetic. Urban forests often suffer from alien species invasion with catastrophic consequence, especially around their edges.

6. Is there a well-established canopy structure that provides a discernable "roof" to the forest with open areas beneath the bottom of the canopy that impart a dimension of spaciousness to the forest? A young, shrubby forest with little open space may appeal to a timber specialist with an eye for future timber value, but economic criteria have no place in defining forest aesthetics. Young forests are seldom aesthetic except as they are folded into a larger mosaic of age classes with the totality exhibiting age class variety with ecological worth.

7. Are there large, well-defined root structures with moss and liverwort carpets to add visual texture and attractiveness to the forest floor? Large root masses for trees are almost always attractive to people. In some primordial way big root systems appeal to our sense of developmental completeness. The tree can be appreciated as fulfilling a greater purpose by holding soil in place, providing cover for wildlife, and offering a mystical dimension.

8. Are there abundant spring ephemerals? Splashes of early spring color on the forest floor can endear us to a woodland as little else can. Spring ephemerals often communicate the presence of forest balance. More to the point, the absence of ephemerals is noticeable to the true forest aficionado.

9. Are there attractive, shiny-leaved shrub species such as mountain laurel, rhododendron, or azalea to add spring color and a mantle of dark green to the lower zones of a forest? The aesthetic attributes of the forests of the southern highlands are inextricably connected to the rich assortment of heath plants. Note also, that the presence of large-leaf heath plants or their equivalents defines a different forest appeal.

10. Is there a variety of tree and shrub species filling recognizable niches? This is more of an ecological aesthetic than a visual one. Knowledge about the niches reinforces the psychological dimension of aesthetics. The ecological importance of a favorite woodland adds to its aesthetic appeal and should be included in the computation of an overall aesthetic score.

11. Is there an absence of signs of past human disturbance and domination? The existence of rock walls can be pleasing or detracting, depending on one's personal preference. In my view, the human artifacts are almost always negatives in their contribution toward forest aesthetics. Stranded remnants of orchards, recovering fields, logging scars, strangling vines do not a forest aesthetic make.

12. Are there at least a few glades populated with grasses and sedges scattered within the forest interior? A mixture of ecotypes can greatly enhance the visual quality of a forest and the sense of discovery as one passes from one zone or type to another. Variety trumps uniformity.

13. Are there patriarchs of the forest—older trees that speak to past forest generations and provide ties to a colonial and possibly a presettlement past? Knowing that a tree or stand is ancient can boost one's appreciation for an otherwise ordinary appearing stand of trees. In addition, with age often comes a satisfying asymmetry and set of proportions that speak to our sense of completion of form. Young trees may suggest potential, but true forest aficionados thirst for fulfillment, for achieving full potential.

14. Are there species of showy flowering trees present? Larger blossoms count extra. Although, the show may be temporary, it should figure into the overall visual aesthetic of a forest. This criterion is admittedly better met in regions like the southern Appalachians that have an abundance of flowering trees to include magnolias, tuliptrees, buckeyes, dogwoods, redbuds, and silver bells. Nonetheless, northern climes do have their show trees - shadbush, black locust, black cherry, red maple, sugar maple, to name a few.

15. Are there species of mature trees present with showy autumn foliage? Trees with large, spreading crowns can mesmerize us especially when they reflect sunlight at full color. Sugar maples, red maples, black gum, sweet gum, etc. and other notably colorful species advertise a forest as little else can. New England is advertised by its annual show put on by its sugar and red maples. Here tree maturity is important. Young forests do not rival their mature counterparts for color.

16. Are there ample wildlife species present? Our sense of forest completeness and fulfillment of mission requires the presence of animal life. The forest is not just about trees, but encompasses the idea of the web of life. However, in pointing to the wildlife criterion, I do not speak only of game animal species. Their presence is fine, but does not carry more weight than the contribution of small mammals, reptiles, song birds, and a host of life forms that make the forest work as an integrated, mutually dependent ecosystem.

17. Is there varied topography that allows one to glimpse the forest at ground level and from vantage points on hills and rock ledges that provide mid-trunk and canopy views? At first thought, it may seem unfair to penalize a forest because it is not growing in varied terrain, but we are talking aesthetics here and a variation in view platforms is a positive.

CONCLUSIONS

I am well aware that the above criteria are subjective and tinted with my own tastes and prejudices. However, I would hope that the list offers at least a crude starting point for further discussion and research and may point to the direction that a quantitative evaluation of forest aesthetics should take with the intent of creating a system available to land mangers who must decide from among a list of choices with winners and losers. Most importantly, I have structured the above list around what one actually sees in a forest, not what one contemplates in the abstract, sitting at a desk, in front of a computer screen, or around a table as part of a committee effort. Forest aesthetics must be grounded in forest reality.

For me, little Broad Brook and the woods behind our house in Florence have stimulated the process of serious thought about what should comprise a system of forest aesthetics. Monica's Woods set me to thinking about the components and characteristics that we should consider. The absence rather than presence of landscape features has focused my attention on the interior forest features and how they must be distributed to capture one's attention and imagination. My next step is criteria refinement. After that comes the development of a numeric evaluation system.

The job of criteria refinement and numeric evaluation will be no small task. It is more than I can individually handle. It will

require diverse input, but we must be wary of overly focused modes of thought. I have already referred to a couple—the economically motivated and the forest only as habitat line of thinkers. And yes, I would have to add the "big trees as the only valid criterion school of thought". I must be willing to take my own medicine. We seek a big tent, but need to proceed with caution.

Well, we have a lot of work to do and many forest sites to evaluate in terms of aesthetics before we can be confident that we have all the criteria. With due recognition that in the final analysis, beauty is in the eyes of the beholder, the time has come for ENTS to roll up its sleeves and go to work. It is time for forest aesthetics to take center stage and we have our webmaster Ed Frank to add what will be a deluge of useful and challenging ideas.

Weathered red pine clinging to life along a cliff face in Massachusetts. Photo by Robert T. Leverett.

SOME OF THOSE INEXPLICABLE MOMENTS…

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I had one of those head-slapping moments this week. Two, actually… The first came in a news item I read about how much of a challenge the City of New York is having in planting trees along their streets and in their parks. According to this news article, there appears to be a small but vocal number of individuals that get bent out of shape whenever the city (or some of its associates) appear to plant trees. For some people, their reasons seem personal—they don't want their view blocked, or they have an unpleasant event in their past that apparently turns them against trees in their immediate vicinity. For others, the city's efforts to plant trees is a waste of scarce resources that apparently provides them with no real value. Whatever the reason, a number of acts of vandalism have occurred, usually with the tree experiencing the worst end of it.

The second moment came when Will Blozan forwarded a picture of the topped trees in his neighbor's yard. For years, while my wife and I lived in Logan, Utah, we spent many a day scratching our head over the logic of tree topping as a practice. We have yet (thank goodness) to see tree topping to any great extent since we've moved back east, but of course it still happens.

What causes people to turn on the trees in their yard or neighborhood? I'm not talking about doing what needs to be done—I've certainly cut down my fair share of trees over the years, and we're currently planning to have a couple large loblolly pines removed from our yard (and some exotic hardwoods, too). Rather, I'm trying to understand how people develop either such an animosity to street trees that they'll go out of their way to destroy them in preference to a polluted, lethargic, development-choked river channel or show such indifference to the long-term health and integrity of yard trees.

Having grown up in the countryside, spending my youth exploring the woods of northern Wisconsin and the Upper Peninsula of Michigan, trees became such an ingrained part of my being that becoming a forester by training just made sense. I have had many a moment, standing in the natural majesty of the Rocky Mountains or even the primeval dampness of a southern river bottom, where I simply close my eyes and absorb the essence of the scene. The sighing of the wind through the branches; the earthy, pungent smells of damp earth or the refreshing bite of drying pine needles in the sun; the absence of the clamor of modern technology or the din of humanity; all of this has an innate ability to erase the burdens of contemporary life, at least for a little while.

I like to think I am not overly melodramatic with my personal life experiences, that my pragmatism carries the day and keeps me grounded. But I also know that I must periodically reconnect with the natural world in whatever way is possible at the time. If I'm in an urban area, even the sight of a vibrant, healthy tree feels like a taste of the good life. In my suburban life, the robustness of the trees in our neighborhood contributes to the quality of our lives. These things I would not sacrifice if there was any way I could avoid them.

I will freely admit to being awkwardly nostalgic for the trees and forests of my youth, akin to some of Bob Leverett's thoughts on forest aesthetics. Although it disturbs me to see these memorable trees or forests altered, I have come to accept change, whether it happens through natural disturbances or timber management. What is hard to accept, let alone understand, is the wanton destructiveness of our species.

However, I recognize that one of my biggest challenges in bettering myself as a person is to develop an appreciation for other points of view. What seems completely illogical to me probably seems reasonable (at least at the time) to someone else. If I'm lucky, other people will grant me the same courtesy, and perhaps then we can reason out these inexplicable moments, rather than confronting each other.

Editor's note: Rather than digging up another old trip report while Bob's letting the sand run through his toes along the Atlantic coastline, I figured I'd sneak in some running commentary on the foibles that make us human...

--DCB

INSTRUCTIONS FOR CONTRIBUTORS

SCOPE OF MATERIAL

The *Bulletin of the Eastern Native Tree Society* accepts solicited and unsolicited submissions of many different types, from quasi-technical field reports to poetry, from peer-reviewed scientific papers to digital photographs of trees and forests. This diverse set of offerings also necessitates that (1) contributors specifically identify what type of submission they are providing; (2) all submissions should follow the standards and guidelines for publication in the *Bulletin*; and (3) the submission must be new and original material or be accompanied by all appropriate permissions by the copyright holder. All authors also agree to bear the responsibility of securing any required permissions, and further certify that they have not engaged in any type of plagiarism or illegal activity regarding the material they are submitting.

SUBMITTING A MANUSCRIPT

As indicated earlier, manuscripts must either be new and original works, or be accompanied by specific written permission of the copyright holder. This includes any figures, tables, text, photographs, or other materials included within a given manuscript, even if most of the material is new and original.

Send all materials and related correspondence to:

Don C. Bragg
Editor-in-Chief, *Bulletin of the ENTS*
USDA Forest Service-SRS
P.O. Box 3516 UAM
Monticello, AR 71656

Depending on the nature of the submission, the material may be delegated to an associate editor for further consideration. The Editor-in-Chief reserves the right to accept or reject any material, regardless of the reason. Submission of material is no guarantee of publication.

All submissions must be made to the Editor-in-Chief in digital format. Manuscripts should be written in Word (*.doc), WordPerfect (*.wpd), rich-text format (*.rtf), or ASCII (*.txt) format.

Images can be submitted in any common format like *.jpg, *.bmp, *.tif, *.gif, or *.eps, but not PowerPoint (*.ppt). Images must be of sufficient resolution to be clear and not pixilated if somewhat reduced or enlarged. Make sure pictures are at least 300 dots per inch (dpi) resolution. Pictures can be color, grayscale, or black and white. Photographs or original line drawings must be accompanied by a credit line, and if copyrighted, must also be accompanied by a letter with express written permission to use the image. Likewise, graphs or tables duplicated from published materials must also have expressly written copyright holder permission.

PAPER CONTRIBUTIONS (ALL TYPES)

All manuscripts must follow editorial conventions and styling when submitted. Given that the *Bulletin* is edited, assembled, and distributed by volunteers, the less work needed to get the final product delivered, the better the outcome. Therefore, papers egregiously differing from these formats may be returned for modification before they will be considered for publication.

Title Page

Each manuscript needs a separate title page with the title, author name(s), author affiliation(s), and corresponding author's postal address and e-mail address. Towards the bottom of the page, please include the type of submission (using the categories listed in the table of contents) and the date (including year).

Body of Manuscript

Use papers previously published in the *Bulletin of the Eastern Native Tree Society* as a guide to style formatting. The body of the manuscript will be on a new page. Do not use headers or footers for anything but the page number. Do not hyphenate text or use a multi-column format (this will be done in the final printing). Avoid using footnotes or endnotes in the text, and do not use text boxes. Rather, insert text-box material as a table.

All manuscript submissions should be double-spaced, left-justified, with one-inch margins, and with page and line numbers turned on. Page numbers should be centered on the bottom of each new page, and line numbers should be found in the left margin.

Paragraph Styles. Do not indent new paragraphs. Rather, insert a blank line and start the new paragraph. For feature articles (including peer-reviewed science papers), a brief abstract (100 to 200 words long) must be included at the top of the page. Section headings and subheadings can be used in any type of written submission, and do not have to follow any particular format, so long as they are relatively concise. The following example shows the standard design:

FIRST ORDER HEADING
Second Order Heading
Third Order Heading. The next sentence begins here, and any other levels should be folded into this format.

Science papers are an exception to this format, and must include sections entitled "Introduction," "Methods and Materials," "Results and Discussion," "Conclusions," "Literature Cited," and appendices (if needed) labeled alphabetically. See the ENTS website for a sample layout of a science paper.

Trip reports, descriptions of special big trees or forests, poetry, musings, or other non-technical materials can follow less rigid styling, but will be made by the production editor (if and when accepted for publication) to conform to conventions.

Table and figure formats. Tables can be difficult to insert into journals, so use either the table feature in your word processor, or use tab settings to align columns, but DO NOT use spaces. Each column should have a clear heading, and provide adequate spacing to clearly display information. Do not use extensive formatting within tables, as they will be modified to meet *Bulletin* standards and styles. All tables, figures, and appendices must be referenced in the text.

Numerical and measurement conventions. You can use either English (e.g., inches, feet, yards, acres, pounds) or metric units (e.g., centimeters, meters, kilometers, hectares, kilograms), so long as they are consistently applied throughout the paper. Dates should be provided in month day, year format (June 1, 2006). Abbreviations for units can and should be used under most circumstances.

For any report on sites, heights must be measured using the methodology developed by ENTS (typically the sine method). Tangent heights can be referenced, especially in terms of historical reports of big trees, but these cannot represent new information. Diameters or circumference should be measured at breast height (4.5 ft above the ground), unless some bole distortion (e.g., a burl, branch, fork, or buttress) interferes with measurement. If this is the case, conventional approaches should be used to ensure diameter is measured at a representative location.

Taxonomic conventions. Since common names are not necessarily universal, the use of scientific names is strongly encouraged, and may be required by the editor in some circumstances. For species with multiple common names, use the most specific and conventional reference. For instance, call *Acer saccharum* "sugar maple," not "hard maple" or "rock maple," unless a specific reason can be given (e.g., its use in historical context).

For science papers, scientific names MUST be provided at the first text reference, or a list of scientific names corresponding to the common names consistently used in the text can be provided in a table or appendix. For example, red pine (*Pinus resinosa*) is also known as Norway pine. Naming authorities can also be included, but are not required. Be consistent!

Abbreviations. Use standard abbreviations (with no periods) for units of measure throughout the manuscript. If there are questions about which abbreviation is most appropriate, the editor will determine the best one to use. Here are examples of standardized abbreviations:

inch = in	feet = ft
yard = yd	acre = ac
pound = lb	percent = %
centimeter = cm	meter = m
kilometer = km	hectare = ha
kilogram = kg	day = d

Commonly recognized federal agencies like the USDA (United States Department of Agriculture) can be abbreviated without definition, but spell out state names unless used in mailing address form. Otherwise, spell out the noun first, then provide an abbreviation in parentheses. For example: The Levi Wilcoxon Demonstration Forest (LWDF) is an old-growth remnant in Ashley County, Arkansas.

Citation formats. Literature cited in the text must meet the following conventions: do not use footnotes or endnotes. When paraphrasing or referencing other works, use the standard name date protocol in parentheses. For example, if you cite this issue's Founder's Corner, it would be: "…and the ENTS founder welcomed new members (Leverett 2006)." If used specifically in a sentence, the style would be: "Leverett (2006) welcomed new members…" Finally, if there is a direct quotation, insert the page number into the citation: (Leverett 2006, p. 15) or Leverett (2006, p. 16-17). Longer quotations (those more than three lines long) should be set aside as a separate, double-indented paragraph. Papers by unknown authors should be cited as Anonymous (1950), unless attributable to a group (e.g., ENTS (2006)).

For citations with multiple authors, give both authors' names for two-author citations, and for citations with more than two, use "et al." after the first author's name. An example of a two-author citation would be "Kershner and Leverett (2004)," and an example of a three- (or more) author citation would be "Bragg et al. (2004)." Multiple citations of the same author and year should use letters to distinguish the exact citation: Leverett 2005a, Leverett 2005b, Leverett 2005c, Bragg et al. 2004a, Bragg et al. 2004b, etc.

Personal communication should be identified in the text, and dated as specifically as possible (not in the Literature Cited section). For example, "…the Great Smoky Mountains contain most of the tallest hardwoods in the United States (W. Blozan, personal communication, March 24, 2006)." Examples of personal communications can include statements directly quoted or paraphrased, e-mail content, or unpublished writings not generally available. Personal communications are not included in the Literature Cited section, but websites and unpublished but accessible manuscripts can be.

Literature Cited. The references used in your work must be included in a section titled "Literature Cited." All citations should be alphabetically organized by author and then sorted by date. The following examples illustrate the most common forms of citation expected in the *Bulletin*:

Journal:

Anonymous. 1950. Crossett names giant pine to honor L.L. Morris. Forest Echoes 10(5):2-5.

Bragg, D.C., M.G. Shelton, and B. Zeide. 2003. Impacts and management implications of ice storms on forests in the southern United States. Forest Ecology and Management 186:99-123.

Bragg, D.C. 2004a. Composition, structure, and dynamics of a pine-hardwood old-growth remnant in southern Arkansas. Journal of the Torrey Botanical Society 131:320-336.

Proceedings:

Leverett, R. 1996. Definitions and history. Pages 3-17 *in* Eastern old-growth forests: prospects for rediscovery and recovery, M.B. Davis, editor. Island Press, Washington, DC.

Book:

Kershner, B. and R.T. Leverett. 2004. The Sierra Club guide to the ancient forests of the Northeast. University of California Press, Berkeley, CA. 276 p.

Website:

Blozan, W. 2002. Clingman's Dome, May 14, 2002. ENTS website http://www.uark.edu/misc/ents/fieldtrips/gsmnp/clingmans_dome.htm. Accessed June 13, 2006.

Use the hanging indent feature of your word processor (with a 0.5-in indent). Do not abbreviate any journal titles, book names, or publishers. Use standard abbreviations for states, countries, or federal agencies (e.g., USDA, USDI).

ACCEPTED SUBMISSIONS

Those who have had their submission accepted for publication with the *Bulletin of the Eastern Native Tree Society* will be mailed separate instructions to finalize the publication of their work. For those that have submitted papers, revisions must be addressed to the satisfaction of the editor. The editor reserves the right to accept or reject any paper for any reason deemed appropriate.

Accepted materials will also need to be accompanied by an author contract granting first serial publication rights to the *Bulletin of the Eastern Native Tree Society* and the Eastern Native Tree Society. In addition, if the submission contains copyrighted material, express written permission from the copyright holder must be provided to the editor before publication can proceed. Any delays in receiving these materials (especially the author contract) will delay publication. Failure to resubmit accepted materials with any and all appropriate accompanying permissions and/or forms in a timely fashion may result in the submission being rejected.

A hint of fall colors in the baldcypress along Lake Providence in northern Louisiana. Photo by Don C. Bragg.