

Bulletin of the Eastern Native Tree Society

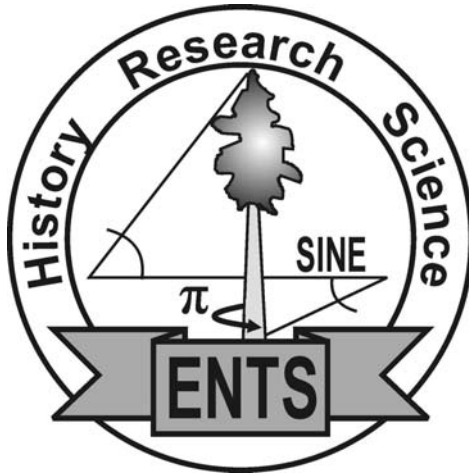
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SOCIETY**





Bulletin of the 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.

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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 sun sets slowly over a lone eastern white pine leaning over the still waters of Shepard Lake just east of Rhinelander, Wisconsin.
Photo by Don C. Bragg.*

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MORE EXCUSES...

This issue of the *Bulletin* is, unfortunately, late. Wait—didn't I use that opening line for my last editorial in the Spring 2008 issue of the *Bulletin*? Unfortunately, the answer is yes, and I have no better excuses this time... Lee Frelich was right when he cautioned me about the time demands that a product such as this would involve. Between work commitments, family requirements, summer vacations and fieldwork, volunteer projects, etc., it has been far too easy for efforts like the *Bulletin* to slip away. So, rather than missing the summer issue entirely, or combining it with the fall issue, I have decided to put out what I had available.

Let me take this opportunity to request new contributions from the ENTS membership. The quality of this journal is directly related to the efforts of the membership. As you can see from past issues, only a small fraction of those that participate in the online discussion group have contributed to the *Bulletin*. I wish to encourage all members to submit material, be it photographs, technical articles, poetry or prose, remembrances, field reports—whatever you think is appropriate, I'll consider!

Oh, and don't feel intimidated by the more quantitative articles that have been published in the past—such technicalities are only a part of the ENTS mission. In the vernacular of the political season which is about to kick into high gear, we have a “big tent” with room for all!

Don C. Bragg
Editor-in-Chief

The loblolly and shortleaf pine-dominated “Good Forty” on the Crossett Experimental Forest has served southern forestry for decades as an example of how appropriate silvicultural practices can rehabilitate abused timberlands and produce structurally diverse forests with considerable economic, ecologic, and aesthetic value. Photo by Don Bragg.



ANNOUNCEMENTS AND SOCIETY ACTIONS

Saving our Hemlocks from the HWA – An Urgent Call for Action

On Thursday, September 18, 2008, Valent USA Corporation, Appalachian Arborists, the Eastern Native Tree Society, and Back 40 Films will be co-sponsoring a hemlock woolly adelgid (HWA) meeting entitled "Saving Our Hemlocks from HWA: An Urgent Call to Action." We cordially invite you to attend this meeting. We are inviting a diverse array of individuals and groups who have a strong interest in the preservation of hemlocks from HWA. These include arborists, forest and park services, forestry commissions, university scientists, land trusts, conservation groups, business leaders, media and legislators. The goal of this meeting will be to help maximize the survival of hemlocks growing on public and private lands in the United States, especially in the southern Appalachians.

This meeting will have several objectives including:

- Summarize the latest research regarding the use of neonicotinoid insecticides for control of HWA
- Propose a near-term management plan for HWA affecting high value hemlock stands and individual trees
- Highlight a documentary that is being developed to raise awareness of the HWA crisis: "The Vanishing Hemlock: A Race Against Time" (<http://southerndocumentaryfund.org/works-in-progress/the-vanishing-hemlock/>)
- Identify obstacles that are preventing more aggressive treatment of hemlocks
- Tour first-hand a forested area that has been heavily impacted by HWA
- Motivate interested parties to collaborate in the effort to preserve as many hemlocks as possible from HWA

Contact Will Blozan (President, Appalachian Arborists and Eastern Native Tree Society) for more details at:

tree_hunter@bellsouth.net

2008 ENTS Fall Rendezvous Set

The next ENTS Rendezvous has been scheduled for October 31 to November 2, 2008. The program is still be formulated, but plans are in place for Will Blozan to climb the Jake Swamp White Pine for the third time (pending cooperative weather) on November 1. Those interested in attending should contact Bob Leverett at:

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2009 ENTS Height Measuring Blitz at the Congaree Swamp National Park?

Plans are being formulated for a group effort to accurately measure many of the big trees in the Congaree Swamp National Park. A tentative date of February 20-23, 2009, has been discussed, but no plans have been finalized. This discussion thread can be found on the ENTS website at:

http://www.nativetreesociety.org/events/congaree_swamp_np_expedition.htm

Erratum

FIRE, STONE, AND FOREST
Don Bertollette

In this article (Bertollette, D. 2008. Fire, stone, and forest. *Bulletin of the Eastern Native Tree Society* 3(2):14-17) the use of the label "Younger Dryas" twice on page 14 was incorrect—in both cases, it should be replaced with "Neo-glacial Period".

THE SENATOR CYPRESS IS RE-ELECTED TO TOP POSITION IN EASTERN FORESTS: MAY 2006

Will Blozan

President, Eastern Native Tree Society

A recent trip to Florida allowed me to see the famous “Senator Cypress” in Longwood, Florida, northeast of Orlando. The tree is preserved in a tiny park simply named “Big Tree Park.” It has the indignity of being caught up in a dispute of whether it is in fact the largest baldcypress known in the US, specifically its rank on the American Forests National Register of Big Trees. A heated and (unprofessional) debate between the nominators of the Cat Island Cypress in Louisiana (the current National Champion) and the Florida Big Tree Register has made its appearance on the internet and in numerous newspapers. Basically, the Cat Island Cypress is a huge flared “turnip” with a hugely inflated girth due to buttressing. Furthermore, it is a fusion of two genetically identical sprouts of moderate size, and as so does not represent a single-trunked tree. In extreme contrast to the shape and size of the Cat Island tree, the Senator is an absolutely huge single-trunked tree with a massive trunk of slow taper and impressive straightness. It looks more like the giant conifers of the Pacific Northwest, evoking images of western red cedar.

American Forests will resolve big tree disputes if accurate volume measurements can verify that one contending specimen is larger than the other. This has been employed in the case of the huge sequoias and Sitka spruce and perhaps a few other species. In fact, I was asked a few years ago to visit and measure both cypress trees (via climbing) to determine the “winner.” I refused due to the obvious fact that the Cat Island tree was a twin, and the Senator was so vastly larger. I think American Forests put up a vote instead and the Cat Island tree won.

I had seen quotes of some volume estimates of the Senator and set out on an online search for some numbers and, more specifically, the methods used. I found many different numbers listed ranging from about 3,600 ft³ to 4,217 ft³. Some were apparently just for the trunk below branching. I found no reference to a climber taking aerial measurements even though it has been climbed many times. In fact, one of my former employees climbed it for cuttings for the Champion Tree Project. The only methodology I could find was a study using a Spiegel Relaskop. Although this instrument can be very accurate, the measurer split the tree up into 16 foot logs to calculate volume. I suspected that was not enough resolution to accurately assess the volume—certainly not the portions above the trunk—so I returned armed with the macroscope.

Since I have personally climbed the two largest known specimens of live oak (~ 5,100 ft³) and tuliptree (~ 4,100 ft³) and

measured the Webster Springs Sycamore (~ 3,150 ft³), I have a good idea of how large 4,217 cubic feet is. As I did the first time I saw the Senator Cypress, I kept exclaiming aloud over and over how huge the tree was, and felt strongly that even the 4,217 ft³ figure was low. I also found that a boardwalk and deck had been built near the tree and extended to the neighboring tree. The neighboring tree, formerly known as the “Senator’s Brother,” was renamed “Lady Liberty” last year (after it apparently changed sex). The board walk provided a level reference for all the trunk measurements and a clear line of site in opposing 90 degree locations. It was a dream come true! However, the dream had its downside—walking visitors shook the macroscope and the trunk was so huge that it extended past the reticle scale! Because the subtropical growth just off the boardwalk was so thick and blocked a clear view, I had to stay put and “split” the scale readings based on a common reference point on the trunk. This worked fine and I cross-checked the readings when I returned home by replicating the distance and scale reading. (Actually, the “splitting of the scale tends to slightly underestimate the width, but I used the actual calculated width in the subsequent volume calculations).

Since I was able to measure the tree from adjacent sides I could ascertain the potential for an elliptical shape of the trunk. It turns out that the lower trunk was quite round but the upper section before branching was fairly elliptical. I replicated measurements at specific heights and entered the widths into an elliptical area calculator formula and converted the area to circumference for the volume estimations. Before I did that I cross-checked my baseline distances to confirm my accuracy with the laser. I was thoroughly impressed that the calculated horizontal distances were within 1.8 ft of each other from the east side and spanned an arching 2.6 ft from the south side. This confirmed the obvious straight projection of the trunk in one direction and the gentle curve in the other. For this reason, I feel the measurements are very accurate and exactly reflect the observed characteristics of the tree. The tight readings also indicate the roundness of the tree trunk. I also remeasured the total height to 113.7 ft, which is identical to the reading I got from another vantage point three years ago on my first visit.

The Senator is a huge tree, but has a short trunk capped by a twisted mass of gnarly limbs. The highest point I was able to measure for volume was 96.4 ft above ground, which was 17.3 ft below the highest tip. The main trunk has a diameter of 11.2 ft at DBH (in sheer coincidence, 11.2 ft is the exact girth at the 96.4 ft height and the basal diameter is 17.5 ft, almost the exact

distance below the top!). My diameter measurements were taken about 10 ft apart or at inflection points. There was surprisingly little change between the points, hence I felt no need to take more (i.e., closer) measurements. Here are the numbers, adjusted for elliptical equivalents:

Position	Diameter (ft)	Height (ft)
Top	0.00	113.7
Trunk	3.58	96.4
Trunk	6.00	84.4
Trunk	7.09	75.3
Trunk	6.96	64.9
Trunk	7.63	54.1
Trunk	8.18	43.3
Trunk	8.74	23.6
Trunk	9.38	12.4
Trunk	11.27	4.5
Base	17.50	0.0

These numbers, without limb volume, yield a whopping displacement volume of 5,175.3 ft³, surpassing the Middleton Oak as the largest eastern tree. I believe this estimate contains over 97% of the tree, since the cantilevered limbs will hardly add much volume to the trunk figure. There is a substantial reiteration on the north side that would bring the volume up to over 5,200 ft³. All parts considered, I would say the tree scales around 5,300 ft³, which is likely more than twice that of the Cat Island Cypress.

The Cat Island Cypress has a girth of 53.8 ft, or 17 ft in DBH. Due to the extreme buttressing, the functional diameter of this portion is far less, perhaps as low as 8 ft in "diameter." Most of the space encompassed by the girth measurement is air whereas the Senator is all wood. Using a conic frustum formula based on the estimated figures below, this likely overstated scenario would scale the 83-ft-tall Cat Island Cypress to 2,028 ft³.

Based on these estimations, the Senator Cypress is obviously far larger. I would love to visit the Cat Island Cypress and perform a basal footprint and trunk profile map to calculate the volume of the twin tree. There are likely hundreds of baldcypress trees larger in volume than the Cat Island Cypress scattered throughout the US, including the "Lady Liberty" adjacent to the Senator. Curiously, in a survey of the largest baldcypress in Florida, the "Lady Liberty" was not considered whereas the other trees measured were quite a bit smaller in volume than what I would estimate for the "Lady Liberty" tree. I hereby cast my vote for the Senator Cypress to be the reigning National Champion!

Here is a website concerning the tree with links to others:

<http://www.championtrees.org/champions/volume.htm>



A "stitched" image of the Senator Baldcypress from Florida. Will Blozan estimates this cypress, though not listed as the national champion by American Forests, is easily the largest known *Taxodium distichum* (in terms of volume), and is also probably the largest known tree by volume in the eastern United States. Photo by Kathie Wyatt Blozan.

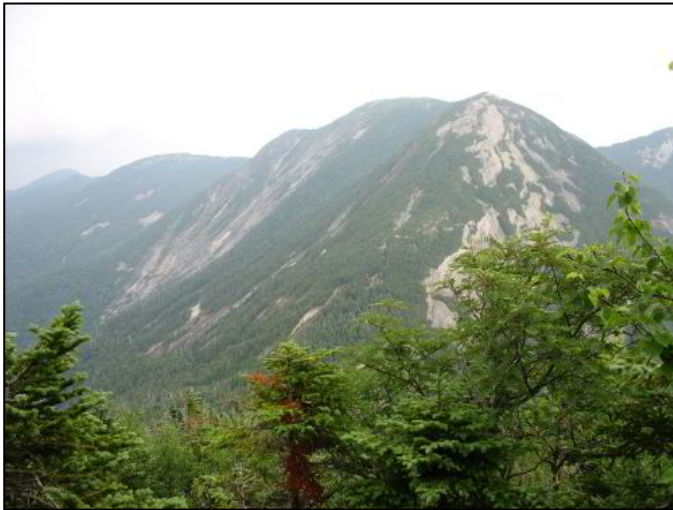
ADIRONDACK HIGH PEAKS: AUGUST 2008

Jess Riddle

Eastern Native Tree Society

In 1892, the New York State legislature established the Adirondack Park, which now encompasses nearly six million acres and occupies most of northern New York. The following website contains more information:

http://www.apa.state.ny.us/About_park/index.html



Gothics: the Great Range Trail is visible as thread of exposed rock on the ridge in the center of the photograph. Photo by Jess Riddle.

The park includes approximately 2.5 million acres of Forest Preserve, designated “forever wild,” and most of the Adirondack Mountains, a still rising section of the Canadian Shield. The low relief of the mountain range’s southern and western sections, often just a few hundred feet, gives little indication of the High Peaks region’s ruggedness. There, streams cascade through gorges, sheer cliffs plunge into glacial lakes, the peaks extend up into climates too harsh for trees, and landslides and avalanches scar the slopes. Those features combined with the close proximity to New York City have made the region a mecca for outdoor recreationists, and lead to the development of an extensive trail network.

Lee Davis, another grad student at SUNY-ESF, and I recently took a three day trip through the heart of the region focusing on the higher peaks. We started at slightly over 2,000 ft elevation in the flat lands south of Lake Placid, and briefly passed through an old red pine plantation with wild sarsaparilla dominated herb layer. However, following a small stream towards the larger mountains we soon reached a gentle, north-facing slope where the logging operations of the late 1800s appeared to have removed only red spruce, which along

with eastern white pine was the most prized timber species of the time. Sugar maples, some approaching three feet in diameter, formed most of the overstory along with American beech, most of the larger ones showing damage from beech bark disease, and yellow birch. Sugar maple also dominated the understory, although striped maple and beech sprouts were also common.



A typical steep stretch of the Great Range Trail. Photo by Jess Riddle.

Passing through a shallow gap brought us to the slopes surrounding Marcy Dam where more intense logging activity had dramatically altered the forest’s composition. The dense canopy comprised paper birch and balsam fir, except along the stream banks where yellow birch and mountain-ash added diversity. In that forest, paper birch saplings were rare, but balsam fir and red spruce formed a well developed understory over bunchberry, goldthread, starflower, and whorled wood aster.



Above: Mount Colden behind Marcy Dam Pond. Below: mountain sandwort, one of the common species in the alpine zone. Photos by Jess Riddle.



We ascended from Marcy Dam towards Avalanche Pass, our gateway to the interior of the High Peaks region. Unlike the nearby Green Mountains or the higher ranges of the southern Appalachians, each of which consists of essentially one large, undulating ridge with descending spur ridges, the High Peaks region contains several distinct northeast-southwest oriented ridges with occasional cross-linking ridges, more like New

Hampshire's White Mountains. Avalanche Pass separates the McIntyre Range with Algonquin Peak, the second highest peak in New York at 5,114 ft, from the Great Range with Mount Marcy, the highest mountain in New York at 5,344 ft. At the pass, we also left behind the signs of past logging disturbance, but the forest was far from undisturbed. In 1999, several acres of forest and soil on one side of the pass slipped off the mountain side and piled small paper birch and conifer trunks over ten feet high in the pass. On either side of the landslide's base, northern whitecedar cling to low cliffs and red spruce, balsam fir, and paper birch dominate the surrounding forest.



Meadow rue blooming beside Avalanche Lake. Photo by Jess Riddle.

Continuing through the pass brought us to the larger expanses of rock bordering Avalanche Lake where a 200 ft high rock wall rises directly out of the lake. The trail weaves around the lake by traversing the forested talus slope that separates the opposite shore from the higher cliffs of Avalanche Mountain. The more tame upper and lower margins of the lake provided open habitat for white meadowsweet, leatherleaf, meadow rue, sedges, and grasses.

After re-entering the forest at the downstream end of Avalanche Lake, species composition varied little as we followed a small stream to Lake Colden, skirted the edge of the lake, and gained elevation along the upper reaches of the Opalescent River. Bunchberry, whorled wood aster, northern

beechness, and many bryophytes also thrived in the shade provided by balsam fir and smaller numbers of red spruce, paper birch, and near the waterways, northern whitecedar.

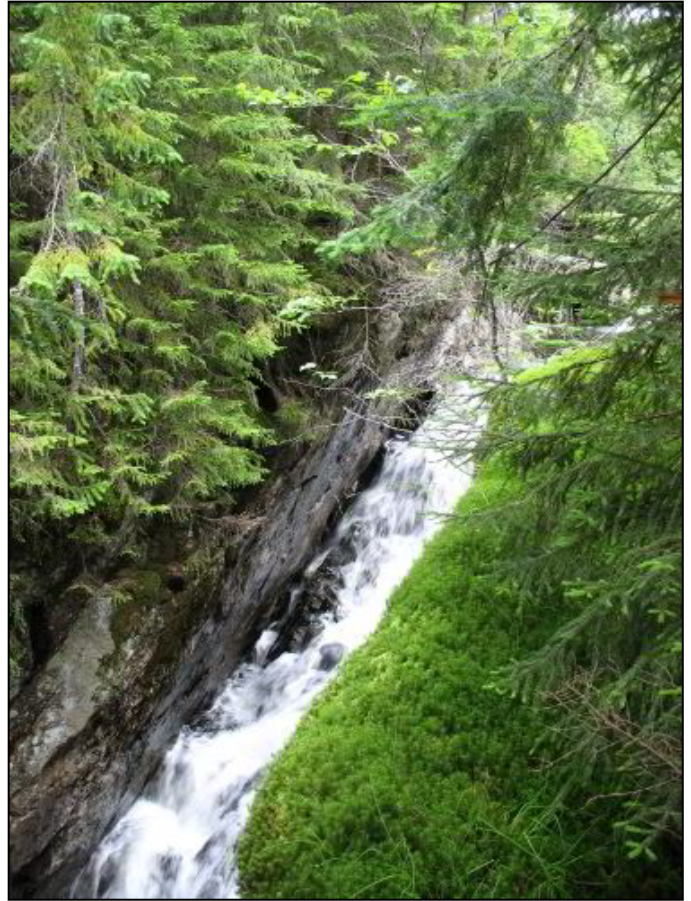


Eriophorum vaginatum variety *spissum*. Cotton sedge thrives around the edges of high elevation bogs. Photo by Jess Riddle.

The Opalescent River cascades over and sluices through highly fractured bedrock, and the rock exposed along its edges provides the cedars with habitat sharing many features with that of the cliff dwelling cedars seen around Avalanche Lake. However, cedars also grow at a short distance from the river and along smaller streams not on bedrock. At around 3,300 ft elevation, the gradient of the Opalescent River drops dramatically, the water courses around boulders rather than bedrock, and whitecedar vanishes from the banks. Instead, mountain-ash and shrubs including a viburnum, alder, Bartram's serviceberry, and round-leaved dogwood grow scattered along the stream bank amongst the three dominant tree species: balsam fir, red spruce, and paper birch. In that upper hanging valley, draining the slopes of Mount Colden and Mount Marcy, most of the mature individuals of those canopy species had died within recent decades leaving a dense regenerating forest of saplings.

Above the relatively sheltered slopes along the upper Opalescent River, wind and cold take their toll on both forest diversity and forest stature. By 4,300 ft elevation, trees over 40 ft tall were scarce, as was red spruce, and paper birch persisted

only as scattered small individuals. The climate and balsam fir canopy favored bunchberry, bryophytes, and to a less extent northern beech fern. As we continued toward the top of Mount Marcy, the canopy height gradually declined to about 15 ft, but the firs remained straight.



Above: rapids on the upper reaches of the Opalescent River. Below: *Rhizocarpon geographicum*, a yellow crustose lichen that is one of the dominant species in the alpine zone. Photos by Jess Riddle.





Krummholz on Mount Marcy. Photo by Jess Riddle.

That stunted forest transitioned on the upper side into krummholz, the twisted and dwarfed community produced where harsh alpine conditions approach the limits of tree tolerances. The krummholz's dense canopy formed primarily from interlocking branches of balsam firs less than five feet tall, but spruce, probably black spruce, dominated some patches and resin birch, paper birch, and mountain-ash, probably showy mountain-ash, grew scattered amongst the conifers. On the summit of Mount Marcy, the severe conditions forced the krummholz to give way to an alpine community, home to many species rare in the state. Most of the community consisted of crustose lichens, especially *Rhizocarpon geographicum*, covering the bare, windswept rock of the summit, but plants could survive where boulders or rock ledges provided shelter or crevices allowed soil to accumulate.



The edge of a rock outcrop. Photo by Jess Riddle.

Most of the alpine plants are fairly unobtrusive since they adopt low, compact growth forms to stay close to the relatively warm ground and minimize wind exposure, but mountain

sandwort and three toothed cinquefoil's flowers made them conspicuous as we traversed the summit. Labrador tea, white meadowsweet, and bog laurel, all species also occurring in wetlands, also flowered in the interface between the krummholz and the alpine zone, an area that also provided habitat for several shrubs restricted to the mountaintops.

From the summit of Marcy, we followed trails along the crest of the Great Range and away from the steady stream of people intent on reaching the state's highest point. The popularity of the trails, the easily eroded soils, and routing of trails straight up and down the slopes have combined to reduce sections of trail to a series of boulders; hence, hiking the trails often involves much more rock-hopping than walking. On the steepest peaks, the trails also include stretches on bedrock inclined up to 45 degrees (100% slope) to take hikers from the deep gaps back up to the peaks. The peaks' rock outcrops and stunted vegetation permit broad views of the surrounding mountains and glimpses of the lakes nestled between them. Most of the higher summits feature large areas of exposed light colored rock running down their slopes that contrast with the dark green of the surrounding conifer forest. On a few peaks, long linear vegetated but not forested streaks extend down from the rock outcrops, probably scars from avalanches. On the forested slopes, the dominance of balsam fir is apparent in the sea of well-formed conical crowns pierced only by scattered red spruce and interrupted by the lighter green domes of paper birch.



A Cladonia and a darker unidentified lichen intermingle on the edge of the krummholz zone. Photo by Jess Riddle.

We started passing under more spruce and paper birch crowns as we left the spine of the Great Range and descended along Wolf Jaw Branch. Many of the paper birch appeared fairly young, but the forest still contained relatively large red spruce, around two feet DBH, that would have been targeted by loggers. Yellow birch were shorter than the spruce, but reached larger diameters, especially on broad gentle slopes, which also supported the largest balsam firs we saw, around 75 ft tall. The lower canopy layers also changed as we reached more productive gentle topography with thickets of conifer saplings

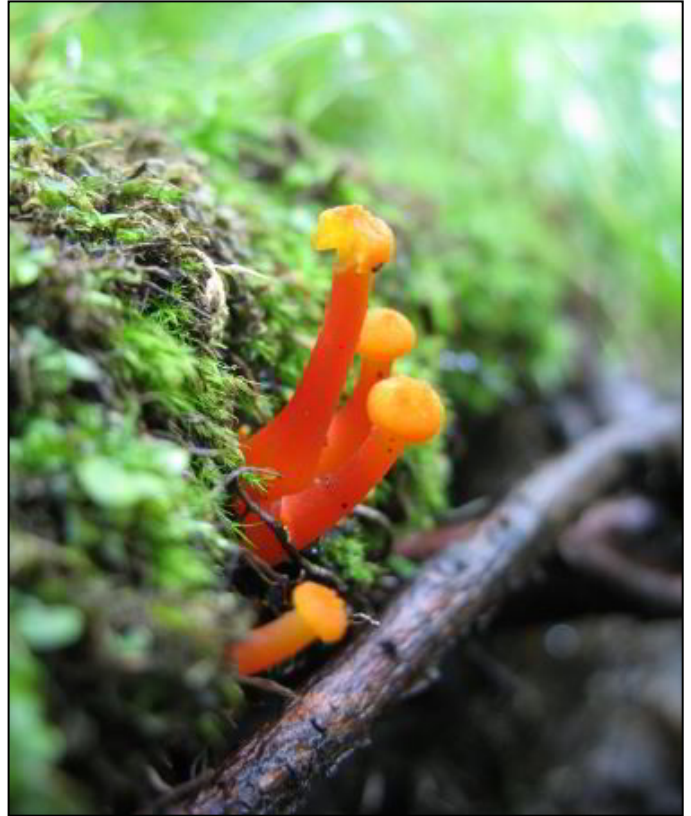
and large colonies of bunchberry giving way to a sparser mix of conifer saplings and striped maple and a thick layer of wood fern or mountain wood fern. As we continued down into warmer climates, conifer abundance declined and sugar maple and yellow birch became the dominant species; the latter were among the largest trees we saw on the trip with diameters approaching three feet. Conifers returned to dominance after we crossed Johns Brook and began ascending Black Brook towards Klondike Notch, but yellow birch remained a major canopy component and quaking aspen occurred in scattered groves.



Second-growth paper birch-dominated forest along Klondike Brook. Photo by Jess Riddle.

The forest changed dramatically after we passed through the notch. Gentle topography, relatively productive soils, and easy access from the flat lands south of Lake Placid, made the Klondike Brook watershed an obvious target for early logging operation. The disturbance produced an opportunity for balsam fir and paper birch to dominate the west facing slopes at the upper end of the watershed and for paper birch and smaller numbers of yellow birch to dominate most of the gentle northeast facing slopes farther down the drainage. Mountain maple and striped maple form a relatively dense understory beneath the birches and either intermediate woodfern or mountain woodfern hide the forest floor. However, scattered herbs characteristic of richer site including red baneberry, rosy twisted stalk, and plantain leaved sedge grew amongst the ferns and sugar maple entered the overstory at lower elevations.

We left those hardwood and rich site species behind as we exited the Klondike Brook watershed and completed our loop by traversing flat lands covered in conifer plantations. The regular rows of red pine and Norway spruce would have made that final leg monotonous if a beaver flow had not obliterated the abandoned trail we were following. Instead, we found ourselves wading through clumps of beaked hazelnut, scrambling through a balsam fir forest on an isolated steep-sided ridge, and ducking through speckled alder thickets along Marcy Brook.



*Mushrooms growing beside the trail in a sugar maple and yellow birch stand. They are probably waxy caps in the genus *Hygrocybe*. Photo by Jess Riddle.*

Throughout the trip, mushrooms added color to the forest floor. By far the most common were aminitas, russulas, and boletes, all very common genera capable of forming mycorrhizae with spruce, fir, and birch. Descriptions of birch in the region include both the common paper birch, which probably made up the second-growth stands, and mountain or heartleaf paper birch, which was probably common at high elevations. Similarly, both American mountain-ash and showy mountain-ash are known from the area, with the latter occurring more often at high elevations (Ketchledge 1996). The largest mountain-ash were American mountain-ash, and we measured three at 3.5 ft CBH by 51.4 ft tall, 3.0 ft by 54.3 ft, and 2.5 ft x 55.4 ft. Those heights fall just short of the greatest confirmed height for the species, 56.1 ft for a tree in Great Smoky Mountains National Park, and all three grow around 3,000 ft elevation. The transition between hardwood and conifer dominance also generally occurred between 2,500 and 3,000 ft in elevation although balsam fir, red spruce, and paper birch grew across all elevations.

Ketchledge, E.H. 1996. Forest and trees of the Adirondacks High Peaks Region. Adirondack Mountain Club, Lake George, NY. 166 p.

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OLD-GROWTH VALUES

Robert T. Leverett

Founder, Eastern Native Tree Society

Recently, Joe Zorzin proposed a new topic to ENTs for discussion, namely that of the value of old-growth forests and how some of the values that we Ents perceive in old-growth ecosystems might be captured and retained by management strategies that seek to create near-old-growth conditions. Joe has presented the challenge. I will start the ball rolling with this communication, hopefully to be followed by input from wiser heads and deeper thinkers. Before commencing, though, I want to emphasize that the opinions and feelings I am about to express are strictly my own. In this first message, I will not try to cover the spectrum of considerations inherent in a conceptual framework of value. I don't feel myself qualified to speak to all potential values of old-growth. However, with no false modesty, I believe myself qualified to speak on both the tangibles and intangibles that lie along an approach that draws on the historical, is partly scientific, always aesthetic, and includes an all-important personal spiritual component. The above ingredients create a kind of old-growth value potpourri, and each of us has the power to blend these ingredients to create a personalized old-growth value stew. For some Ents, value will lie in the uniqueness of a blend. However, it is toward the largely spiritual nature of old-growth that I will initially speak.

The Dawning

To the best of my recollection, the earliest stirring of feelings for old-growth forests occurred in my youth while living a couple of years in Knoxville, Tennessee. As I literally stared for the first time at the cloud-capped heights and timeless forests of the Great Smoky Mountains, something stirred inside me. I was 11 years old at the time and infatuated with mountains. I was also a tree aficionado, but in those days, I was most attracted to the West Coast giants. Redwoods, sequoias, and Douglas-fir were the species that held my attention and that I longed to see. Other than feeling admiration for individual trees, and playing in local woodlands, eastern forests served mainly as a break to the surrounding fields outside of Knoxville, and more significantly, as a covering for the ancient ridges of the Cumberlands and Blue Ridge.

On that initial trip, gazing at the distant Smokies and their carpet of dense forests, it was as if I was unconsciously acknowledging a familiar form from a source deep within my greater self. As I recall, we were heading to the Smokies from Knoxville to stay a few days in a cabin my rich uncle from Florida had rented for us. The Smokies were magical. I immediately fell in love with them. There were bears, Indians, mountains, and fine forests. I found myself having a new forest experience. My West Coast preferences notwithstanding, the shaggy tree covering of the Great Smoky Mountains that

surrounded us created in me a nascent yearning, a yearning that my young mind could not readily understand. There was something especially primitive and majestic looking in the red spruce spires I observed high on the ridges. The spruce and fir distinguished the skyline of the Great Smoky Mountains in a way completely new to me.

Once we reached the interior of the Smokies, forest-clad high peaks surrounded us on all sides, but one scene especially imprinted itself. For countless visitors, the peaks of the Chimneys make an indelible impression. They did no less for me and the Chimney impact was greatly enhanced by the red spruce spires on the ridge connecting the heath-choked tops of the Chimneys with the main ridgeline of the Smokies. The forests of that connecting ridge presented an image distinctly unlike the woodlands of the Tennessee lowlands with which I was accustomed. The red spruce spires seemed to call to me in some distant way as if I were recalling a past memory grown so dim that all the details were missing, with just a shadowy shape remaining. Little did I realize then that the Smokies would launch a many-years-delayed search for ancient eastern forests in the forests of the Northeast as well as in the southern Appalachians—but the Smokies remained my forest icon.

In later years, the giant “poplars” along the lowland trails helped quench my ever-present thirst for the sight of big trees. I knew that had not seen anything in the East quite like those columnar forms of giant tulip poplars rising through the dense thickets of rhododendron. In the 1950s, most of the southern forests were young second-growth, nondescript, and wimpy. Old-growth was not even a concept in the southern mind. Yet, I do believe that at a deep subconscious level, an awareness was developing, an image was forming in my synapses of what a real eastern forest should look like. I was ultimately to come to understand that a forest was not just an assembly of tree trunks. For certain, big trees helped, but a complete forest they do not make—that takes a gestalt of forms. One must be able to gaze up into large fan-shaped crowns of emergent forms. Big limbs aloft must fill space high above one's head and provide diverse habitat for an abundance of tree-dwelling plants and animals—a village in the tree tops. At ground level, extensive root structures must speak to nesting and den sites. In real old-growth, one feels that one is in the domain of hobbits, elves, and other forest divas.

The Maturing of the Vision

With a forest past deeply rooted in the southern Appalachians, I can finally articulate, from my current New England perch, what distinguishes old-growth for me and what values I associate with our remnant ancient eastern forests. But, I'm

getting ahead of myself... In the mid-1980s, I was searching the ravines and ridge sides of the Berkshires for old-growth remnants. The thrill of discovery fueled my passions but the appeal went far beyond the emotional high of discovery. When I encountered an old-growth specimen of exceptional proportions, I increasingly saw the forest elders of the Berkshires as living connectors to both an ecological and historical past. The trees served as historical time and place markers, and as one with a nostalgic streak, the old trees gave me a palpable link to the colonial and pre-colonial New England past. I never get that in sterile museum displays presented in glass enclosures or even the most artistic recreations of early forests. But the connection goes far beyond historical connections. Most importantly, when in the presence of old-growth, I feel a deeper connection to the Earth and its twisted evolutionary path that I do not experience in post-colonial woodlands, even second-growth with large trees.

From their auspicious beginning in 1993, the Eastern Old-Growth Conferences piled up, and I came to increasingly think along scientific lines—I thought of the old-growth survivors that we were documenting as living scientific laboratories with many mysteries left to unravel. Perhaps that was their greatest value. My research interests were expanding, but there were plenty of highly accomplished scientists to build the case for retaining old-growth remnants as baselines for evaluating environmental changes and to decoding their many mysteries. Other than my growing appetite for forest and tree quantifications and listening to what distinguished scientists were learning about old-growth ecosystems, I left it up to the hardcore scientific community to build the case for value along scientific lines. I continue to feel a strong need to statistically document what I see, but it is not a zero-sum game for me. I have remained keenly aware that I am pulled toward individual trees and sites more than others—I suspect the answer almost assuredly lies in the nonphysical realm.

There is an undistilled forest elixir at work in my favorite old-growth sites. The elixir allows me to transcend the purely visual content of the assemblages of trees, shrubs, herbs, mosses, and the animal citizenry. The old-growth spots distill and concentrate a special woodland elixir of the greatest potency—one when partaken induces mental images of a distant past, of a slow, but inexorable march of the species, of life forms becoming all they can be. It is a thirst for this transcendental experience that repeatedly sends me back into the forest. Although I may express myself publicly and on our ENTS list through tree measurements and mathematical formulae, there is far more subsurface to the subject.

Through Older Eyes

As the years have slipped by, I often think of putting my thoughts about the old-growth down onto paper. I want to assure myself as well as others that the appeal of eastern old-growth forests has not diminished for me. I still get an uplifted feeling from my walks through corridors of centuries old trees. I still pause to sense their antiquity, and yes, measure their heights. I am inclined to want to more frequently express in public my deep appreciation for being lucky enough to

experience old-growth elixir in undiluted form. I have also come to a sense of peace about forest processes. I have no desire to change the old woods. I want to let them be. I know that my favored stands will always be in a state of passing and that insects and blights will relentlessly attack them. The older woods will always be replaced by younger woods that possess potential and carry the genetic heritage of their ancestors, but not yet of age or forest wisdom. That role will remain with the elders. Younger trees cannot match the timeless wisdom of the elders. Each new woodland must first prove itself and from among them merge the giants. Not all are destined to become a Congaree, a Cataloochee, a Hartwick Pines, a Cook Forest, or even a Mohawk Trail State Forest.

But whether a site is a declared old-growth icon or a place of no special public significance, it takes time for the old-growth elixir to coalesce, and while that is happening many life and death cycles occur. Storms, dry and wet spells, fire, insect invasions, and blights all leave their marks. So do sunrises and sunsets. The old-growth tests survival of the fittest, but it is also nurturing and all events leave an imprint. So, passage into the old-growth state is a special event whether the trees are large or small.

Another way of making the point—each old-growth site that I have visited distills some of the old-growth elixir and provides a glimpse of what once was ubiquitous. There is reason to value all the sites. This acknowledges certain sites always call to me. This point was reinforced years ago. Walking beneath the crowns of the venerable white pine elders of Cook Forest, gazing upward into weather-sculpted forms on a somber October day in 1994, put me and my dear past wife Jani into a reflective mood. Afterward, she wrote a poem to the “standing people” that spoke to the forest from a Native person’s perspective. In a visit to Cook a couple of years ago, I watched as my dear present wife Monica sat at the base of a centuries old hemlock engulfed in its energy field. I sensed that she was experiencing its power, its forest wisdom. I have seen her in communion with special trees many times. Jani didn’t, nor does Monica, ask me for tree heights or girths. Jani was not, nor is Monica now, in need of that kind of information. Their spirits are in direct communication with the spirits of the trees, great gentle, sustaining life forms that cast long shadows. As I have contemplated on the subject of value and connection, no purer ties from the human to the forest can one make than the unions that Monica and Jani have made.

In Summary

Despite the pull of the old-growth, years of searching for remnants can create a kind of apathy in one. What difference will the discovery of one more stand make? Ah, but growth in the number of sites is not the point. Each old-growth stand has its uniqueness, its spirit gestalt, and harbors the separate spirits of its many denizens. Each site is an individual deserving of our respect. Comparisons to other sites in some kind of value hierarchy are not necessary.

Given their individual uniqueness, in aggregate, old-growth forests are an important signature of the Earth, showing us

how life forms have evolved and work together. Taken individually or collectively, the value and appeal of the old-growth can be developed along many lines of thought, but for me, spiritual essence will always form the base of the value pyramid. If spiritual essence sounds elusive, it is. Many will want to stay in the physical arena, least the pathway become too indistinct. I respect those who feel that a spiritual approach to old-growth is best experienced in the privacy of one's strolls into the woods. Words and essays may get in the way.

I will conclude with the following thoughts. Perhaps to be able to know and fully value an old-growth forest, one must first get in touch with one's own spiritual essence and its relation to all creation. This cannot be accomplished by relying on the five

physical senses to show us the way. A spiritual journey into old-growth requires us to let go, and in doing, each path becomes personal and unique, but no richer trip can be made. In the end, perhaps, the highest value of the remaining old-growth forests is in their power to induce such a spiritual search in each of us for meaning, a soul journey to recapture our Earth roots. If this is the case, I cannot imagine a greater test of value for the Earth's remaining primary forests than their power to return us to the bosom of the Earth in a celebration of the diversity of life on the planet and in inherent value of individual species.

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The majestic Senator Baldcypress inspires everyone who truly sees it. Photo by Kathie Wyatt Blozan.



PERCHED YELLOW BIRCH

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Porcupine Mountains State Wilderness Park, in the far western corner of Michigan's Upper Peninsula, is a land of many fascinating things, from intact virgin forest to pristine beaches and waterfalls. To me, few are more curious than the "perched" root systems that form with a number of tree species, especially yellow birch (Figure 1). This phenomenon is easily explained—a long dead, heavily decayed tree provides abundant moisture, nutrients, and germination locations for the seed of the live trees in the stand surrounding it. The demise of the original tree may have also been needed to open the canopy and let sunlight strike the forest floor.

Perhaps the most interesting aspect of this regeneration pattern lies in the many abstract, twisted shapes the roots will pattern themselves into. So long as the dead log that the tree has rooted in stays relatively intact, the roots are not that apparent. However, as the log crumbles to dust, its role in this process is permanently recorded in the support structure of these now stilted trees. Stumps can also serve this ecological function, so long as they are adequately decayed so that the tree is able to extend its roots from the top of its perch to the forest floor below.

Figure 1. A maturing yellow birch growing on the highly decayed remains of a fallen tree. Photo by Don C. Bragg.





Figure 2. Close-up of a yellow birch's stilted root system. Photo by Don C. Bragg.

Trees with perched root systems offer habitat to many different kinds of fauna—the cavity and shelter provided by these vacated log channels is obvious (Figure 2). These trees are put under additional pressure, however, to thoroughly reinforce their root systems, since they lack the support of the soil (Figure 3). However, it is not unusual to see an almost perfectly straight line of ancient yellow birch or hemlock stilted in an old-growth stand, a testament to the durability of these opportunistic trees.

This article is in the public domain.

Figure 3. A young yellow birch intertwined with the rapidly decaying remains of a log—this small tree must continue to bulk-up its roots to avoid a premature demise due to blow-down or snow loading. Photo by Don C. Bragg.



A DAY IN BRYANT WOODS

Robert T. Leverett

Founder, Eastern Native Tree Society

Recently, my wife Monica and I took a stroll through the woodlands of the William Cullen Bryant homestead, located in the small hill community of Cummington, Massachusetts. Bryant Woods is familiar territory, as all who read my posts will recognize. I have written about the site on many previous occasions. I usually focus on new measurements taken of special trees such as Monica's black cherry or an exceptional red maple that I always point out, and of course, I routinely report on the great white pines, trees for which the Bryant Woods are becoming increasingly famous. However, today, I am going to suspend my numerical ramblings, give the ciphers a chance to rest, as it were, and share thoughts more of a contemplative nature.

I'll begin by acknowledging a two-decade long love affair with the Bryant Woods. I also must acknowledge that I have, for just as long, been challenged to describe these woodlands to others beyond customary site descriptions, sprinkled with journeyman adjectives, which we use to describe woodland sites that inspire us. With the exception of the great white pines, by any ENTs numerical measure, the Bryant Woods are not overpowering. One experiences big-looking trees, but never huge ones, except for a few pines. However, once on the ambling Rivulet Trail, individual tree size or height does not matter. The focus shifts to more subtle aspects of the woodlands. Poetic thoughts materialize as desires for arboreal champions fade into insignificance. For a big tree aficionado, this pronouncement may seem strange, but Bryant Woods are not about contests. Those woods harbor gentle forest spirits, and most importantly, the enduring essence of the great man himself, William Cullen Bryant.

When strolling through the Bryant Woods, my thoughts periodically turn to famous people of letters who, while living in New England, enthusiastically embraced nature. Ralph Waldo Emerson always comes to mind. Then there is the naturalist Henry David Thoreau whose insights are timeless. Bryant's impact is also timeless, on a slightly different path. He was the poet. As I walked along the pathway that Bryant used as inspiration for some of his better-known poems, I marveled at what manifested as an ability to gear down from the fast, human-generated pace of New York City to the natural cadence of the bucolic Berkshire countryside. While others might have babbled about investments, he turned his keen eye

to wild flowers and the earliness or lateness of a bloom. It is apparent to me that Bryant was able to enter an elevated spiritual state when in his woodland domain. He always recognized the importance of untrammelled woodlands and expounded on his awareness through his romantic cadences. Today Bryant's poetry is anachronistic and ornate, yet it continues to communicate purity of feeling, connections to the land, and resonance with the natural harmony.



As Monica and I walked slowly back along the Pine Loop and Rivulet trails, I thought about what attracted me so much to the Bryant Woods. The pieces of the puzzle gradually assembled themselves to form a picture of balance. The woods possessed a kind of serenity, serenity connected to a gentle power to calm and sooth. Woodland features appear at just the right places: large spreading roots of mature yellow birches, shaggy old red maples, stately hemlocks that have endured a couple centuries of cold winters, black cherries that provide color contrast to the other species, a ground cover that speaks to long periods of development free from trampling feet. The list goes on, but these attributes could equally apply to other New England woodlands. I still hadn't nailed down the essence of the Bryant Woods. To do that one must leave the realm of the purely physical and its artistic extensions. One must enter the realm of spirit. To that end, I'm no closer to defining the elixir of Bryant's haunt, but then perhaps I just said it.

I have often wondered what Bryant would say or feel were he able to come back in physical garb, for just a day, and walk through the woods of his youth, the woods of his senior years. Would he marvel at the splendid Bryant Pine grown so tall, be compelled to write verse in honor of the aging hemlocks, reconnect with the mesmerizing babble of the Rivulet that inspired his poem of the same name? I wonder. Maybe that is the way it is meant to be, to be left in a state of wondering. At the simplest level of the human communication with a great natural feature such as a mountain or lake or a prairie sky, one can experience palpable feelings of appreciation and enjoyment. At one time or another, everybody engages in the appreciation-enjoyment level of communing with a natural feature, even if the feeling is masked. For the more receptive, the result can be expressed in words, art, photography—or even height measurements!

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:

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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.



The Presque Isle River flows from northern Wisconsin through the Upper Peninsula of Michigan into Lake Superior on the western end of the Porcupine Mountains State Park. Eastern white pines tower above a dense canopy of eastern hemlock, scattered yellow birch, sugar maple, northern white-cedar, and a number of other species. Some of these trees are over 400 years old, and have weathered many brutal winter storms from nearby Lake Superior. Future threats from pests such as the hemlock woolly adelgid and emerald ash borer may some day drastically change this largely pristine environment. Picture by Don C. Bragg.