

[Big Cottonwood, NC](#)

by **jamesrobertsmith** » Sun Mar 25, 2012 6:12 pm

I had heard that there was a very big cottonwood tree in a county park about 60 miles north of Charlotte. So I drove up there to see if it's true. The park is called Boone's Cave Park and was once a part of the North Carolina state park system. But the park's fate was based on it being the location of a home of Daniel Boone, but when there was nothing but circumstantial evidence that this was so, the state ceased to treat the property as a state park. In 2003 they finally sold the acreage to the county where it's located and it's now a county park.

I wanted to see the cave that is claimed was the temporary home of Boone, and I did that, but it wasn't the main reason I went. What I wanted to see what was billed by the county park service as the "tallest cottonwood in North Carolina". They claim that it's over 157 feet tall. My gut feeling is that it's not that tall, but I have no way of measuring it. It did seem to have lost part of its crown recently, but when I looked at the snag, which is still nearby, it didn't seem to me to have been higher than any of the limbs currently standing tall.

Still and all, it's an impressive tree. And I'm very glad that I got out to see it. The river was flooded, so I had to take an alternate route to reach the tree without having to get wet. The park supervisor had told me that the first route I wanted to take was probably so far underwater that trying it would have been dangerous. So I didn't even try. The other route was a little longer but a lot of fun.







James Robert Smith

[Re: Big Cottonwood, NC](#)

by **jamesrobertsmith** » Mon Mar 26, 2012 8:34 pm

Steve Galehouse wrote: *James, NTS- That's a really nice cottonwood, but I would be surprised if it really is its advertised height---there don't seem to be many tall trees nearby for it to compete with, and I think competition from other trees would be needed for a cottonwood to get to 157'.*

No, there are not a lot of other big trees near this one. There aren't very many big trees at all in the vicinity. There were some decent oaks nearby but they've fallen over. Looks like a lot of the more mature trees on the ridge leading down to the cottonwood were

lost in either a big windstorm or an ice storm. But there was nothing at all on the scale of the cottonwood. It would be really difficult to shoot with a rangefinder in there when the leaves finish budding out, I would think. The cottonwood is in bottomlands just above the Yadkin River.

Here was the lay of the land within a hundred yards or so of the cottonwood:



And about a half mile from the tree, this spring emerges from the side of a very steep hill leading up from the bottomlands.



James Robert Smith

[Re: Big Cottonwood, NC](#)

by **dbhguru** » Tue Mar 27, 2012 8:06 pm

Robert, Steve, et al.,

The eastern cottonwood is probably one of the most mis-measured trees in terms of height. The crowns of big cottonwoods are often very wide and it isn't obvious where the top is. Using the dumbed-down approach of applying the tangent method, we've see extremely large height errors coming from folks we would otherwise consider to be competent professionals. Poor measurements are published and republished in sources that are supposed to be authoritative and we end up with the situation we now have. An amateur comes along and mis-measures a tree without suspecting it, and if challenged, can turn to the assumed authoritative sources to justify the offending measurement. Outsiders have no way of knowing or reason to suspect that large errors exist in authoritative appearing sources. Alas, it is the measuring world in which we live.

One reason that Will Blozan, Dale Luthringer, and I have pushed tree measuring workshops at Cook Forest and MTSF in recent years is to try to bring forestry professionals who certify tree measurements for champion tree lists into the inner circle of competent measurers. But it has proven a tough sell for a variety of reasons including misplaced pride, lack of interest, lack of time, and inadequate math skills on the part of potential attendees.

Robert T. Leverett

[The Chaco forest in Paraguay being razed](#)

by **michael gatonska** » Sun Mar 25, 2012 7:45 am

I read this article in today's NY Times, and thought it might be of interest. There is a video as well...

A Forest Under Siege in Paraguay

Huge sections of the Chaco forest are being razed by local Mennonite farmers and Brazilian cattle ranchers amid a surge in the global demand for beef.

http://www.nytimes.com/2012/03/25/world/americas/paraguays-chaco-forest-being-cleared-by-ranchers.html?_r=1&hp#

[Re: The Chaco forest in Paraguay being razed](#)

by **Bart Bouricius** » Mon Mar 26, 2012 9:47 am

Bob and Robert,

James Robert Smith wrote: *There's nothing to be done for it. This kind of shit will only end with the extinction of the human race. If you want to see what remains of wilderness, you'd best hurry your ass and get there. Because tomorrow it will be freaking gone. This is why I have been spending as much time as possible in wild places, and will continue to do so until I croak. You can't stop the human race from raping Mother Earth.*

Robert Leverett wrote: *Tragically, paradoxically, and fatalistically you are right. Our species will never be the custodians of the Earth that we ought to be. We can blame it on religion, politics, greed, whatever, but the simple truth is that our evolutionary path has not predisposed us to think about the big picture and long term needs of the planet. And then there is the unbelievable ignorance factor. Here we are in 2012, having gone to the moon over 40 years ago, and we still have people in this country who are one step removed from believing that the Earth is flat. Go*

figure.

In the broad sense you are right about the demise of forests, and the proclivities of humanity, however, having worked on tropical deforestation issues for decades, I see some of the usual mythology being perpetuated in this story. As we saw in a previous post, the US and Canada are deforesting faster than Brazil and most Latin American Countries, I am not sure about Paraguay. The first myth is that the only tribe worth caring about is of course the least impacted by outsiders and hence one that is more noble and pure. This romanticisation does no one any good, but is a way of saying that, just like the forest, these people will fall rather than trying to do anything about either situation while not allowing or helping people to determine their own destiny. I remember a Brazilian shaman raging at a reporter who pointed out that he was wearing a modern watch that he needed to keep on schedule while at a conference on indigenous peoples land rights at Smith College. The reporter was implying that the shaman was tainted by modernity and hence impure and hypocritical because he owned a watch. It is obvious even from this story that relatives of people in this "uncontacted" tribe are clearly in contact with their own relatives in the forest. Though they were documented fairly recently, it is probable that they have had to be intentionally in hiding for for a long time to remain uncontacted. Fortunately this view was considered an option by the articles author.

Another myth is that the forests are being cut simply for cattle ranching which is actually secondary to the land speculation which is actually driving the push towards ranching. Often the ranching has not even profitable on it's own, however legally it shows that someone is "making use" of the land, and therefore allows the owner to hang on to it and initially lay claim to it. This process was extensively documented in the 1989 book *The Fate of the Forest* by Susanna Hecht and Cockburn. It is speculators around the globe who are making money off of this tragedy, probably some in the same wall street banks that brought us this wonderful economic situation and are now speculating in oil and gas and every other thing that can be glommed together to create a derivative security to trade in the global stock market casino. You will notice that while the article focuses on the

Mennonites who have, in my opinion, done serious environmental and cultural damage in the Central American country of Belize through missionary and deforestation activities there, are only part of the problem in Paraguay. Large Brazilian companies such as River Plate and others are very important in

the deforestation process, and both Mennonites and international companies are making money from the speculation and consequent increase in land prices in this region. Sorry I guess this was not a "quick reply".

Bart Bouricius



Landscape in the Chaco, Paraguay, May 2004. Photo by Ilosuna

['Hunger Games' forest scenes](#)

by **Steve Galehouse** » Mon Mar 26, 2012 7:57 pm

NTS- Saw the movie yesterday, I recommend it. Much of the film was shot in western North Carolina, and most of the action takes place in a forest.

Steve Galehouse

[Re: 'Hunger Games' forest scenes](#)

by **jamesrobertsmith** » Mon Mar 26, 2012 8:22 pm

One of the local stations did a piece about the forest scenes shot here. I think some of them were done in DuPont State Forest for the streams and waterfalls. Of course the forests there are not impressive at all. I think they went elsewhere to find mature forests. I didn't watch the piece, but my wife told me about it.

James Robert Smith

Cooper Creek WMA, GA

by eliahd24 » Mon Mar 26, 2012 7:39 pm

On Sunday, March 25th, I took advantage of the gorgeous spring weather by traveling the 2 hours from my home in Atlanta to Cooper Creek Wildlife Management Area in North Georgia's Chattahoochee National Forest. I had previously read about the area in one of the great online "Sherpa Guides" that cover many different natural areas in Georgia. I knew Jess Riddle had been to the area in the past, so I also was able to consult with him to devise a "plan of action" for the day. To say I was excited about the trip is a major understatement. The daily grind of full time work and full time grad school was getting to me and I very much needed some "forest time". I couldn't convince any other (human) friends to go with me, so alas it was just the puppy and me. All the better :)



Cooper Creek topo

Those who know Cooper Creek will tell you that there is a chunk "old growth" forest there. The more years I get under my belt as a naturalist, the less I know what those words actually mean. I expected a couple of remnant (old) trees and knew of some "huge" tuliptrees from online postings, but again, until I saw it for myself I wasn't fully convinced. Boy oh boy was I in for a wonderful surprise.

Cooper Creek is a classic rich mountain cove forest.

The area I explored is on a north facing slope above Cooper Creek at about 2500' elevation.

The trail system in this area is mostly old dirt logging roads, but thankfully those loggers left a good deal of this cove as God intended it. I should really call this trip report the "Day of the Tuliptrees" as that's where my focus was and that's mostly what I measured and gawked at the whole day. It was truly amazing. Now on to the data....

Liriodendron tulipifera (smallest to largest measured):

11'4.5"
 11'10"
 11'11"
 12'2.5"
 12'8" x 129.4'
 13'2" (huge fire cave)
 13'10"
 14'7"
 15'5" x 114.2' (blown out top)
 15'10"
 16'1"
 16'3.5" x 127.3' (blown out top, multiple reiterations)
 17'5.5" x 157.2' x 91' = **390 Big Tree Points**
 (GIANT! - I will nominate as new state co-champion)
 19'3" x 132.2 x 71' = **381 Big Tree Points** (I believe this is currently listed as state co-champion)

Tuliptree pictures:



my trusty companion



14'7" LiTu with blown out crown



381 pointer - gnarly giant



15'11" LiTu



midslope CBH of "biggest tuliptree"



as it is up the slope and a bit off trail from the "biggest". It's smaller in CBH (though 17'+ ain't nuthin' to sneeze at!), but much taller, with a crown that's still intact. I took very careful measurements of both Tulips to get accurate point totals with the suspicion that the "skinnier" one would outpoint the "biggest"... I was right :)

imagine all the past storms....



fattest LiTu with 5" tape for scale

Now the above tuliptree is the one many online sites (including Sherpa Guides) claims to be the "biggest in Georgia". It's not the tallest (not by far), it doesn't have the most total points (about 20-30 short), and I know Jess Riddle has documented a few Tulips around 20' CBH and over, so it's not the fattest... so it ain't the biggest, right?

This next tree is likely overlooked by many visitors



17'5.5" x 157 x 91' = 390 Point LiTu



midslope CBH



390 pointer with Ophie for scale

Other tree species measured:

Betula lenta 4'0.5" x 85.7'

Betula lenta 11'1" x 102.8' x 56' ("walking" birch, exaggerated CBH)

Carya spp. 111.1'

Magnolia fraseri (probably) 2'9" x 85.3'

Oxydendron arboreum 3'8" x 82.2'

Oxydendron arboreum 5'0.5" x 94.9'

Pinus strobus 10'6"

Tilia spp. 111.9'

And more pictures...

Sourwood pictures:



Big sourwood2



Big Sourwood

Wildflowers and such:



Squawroot or "bear corn"



yellow violet



rue

This gnarly "walking tree" was a beauty. Now how would YOU measure the CBH? From the midslope at the ground it's 11'1" and total points = state champ



walking birch, roots exaggerate CBH



"walking birch"

This is *Betula lenta*, right?



Sweet (black) birch... right?

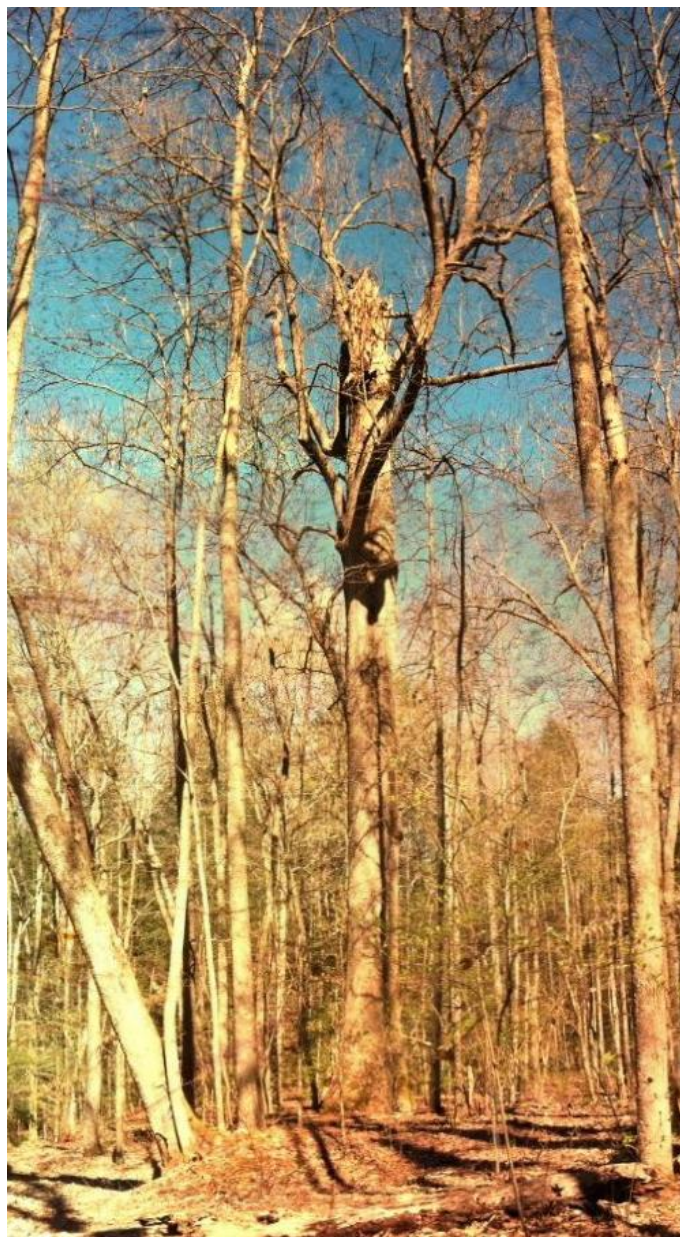
That is all for now. On my way out on Forest Service Road 33, I passed a nice double trunk hemlock (9'3" and 11'3" CBH's x 140') and a 4'5" x 100'+ double trunk Virginia pine as well... I'll post about those under my forthcoming Sosbee Cove report... also a fantastic site!

~Eli Dickerson

[Re: Cooper Creek WMA, GA](#)

by **Rand** » Mon Mar 26, 2012 9:02 pm

Made a stitch of one of the big tulips for you:



Rand Brown

Newberry National Monument, OR
(Re: Triple Twist Pine, Craters of the Moon, ID)

by **Rand** » Mon Mar 26, 2012 9:24 pm

I saw some similar dwarfed trees growing on the Big Obsidian flow in Newberry National Monument.

First a couple of dwarfed trees:



The lava flow is interesting in its own right.

Apparently when the cooling rate and silica content is just right you get obsidian. It tended to form in layers of varying thickness. So you get regular lava blocks shot through with glass. The thickest were ~2' thick.

(In November of 1990, Newberry National Volcanic Monument was created within the boundaries of Deschutes National Forest. Managed by the U.S. Forest Service, this monument provides a unique opportunity to view the Lava Lands of central Oregon. Newberry National Volcanic National Monument includes 50,000+ acres of lakes, lava flows, and spectacular geologic features in central Oregon. The highest point within the Monument is

the summit Paulina Peak (7,985 ft.), showcasing views of the Oregon Cascades and across the High Desert.

It is hard to fathom as you drive through the summit area that you are within a 17 square mile caldera at the summit of a 500 square mile volcano, a volcano that remains very active to this day. Newberry is both seismically and geothermally active. Geologists believe the caldera sits over a shallow magma body only 2 to 5 kilometers deep. Visitors see numerous cinder cones (over 400 throughout the area), miles of basalt flows, as well as rhyolite flows of obsidian.

<http://www.fs.usda.gov/recarea/centraloregon/recreation/recarea/?recid=66159>)





Sosbee Cove, Chattahoochee NF

by eliahd24 » Tue Mar 27, 2012 3:06 pm

On Sunday, March 25th after spending about 5 hours at the old growth of Cooper Creek, I headed towards Sosbee Cove for a quick stop on my way home. On the way two nice trees caught my eye on the side of USFS road 33.

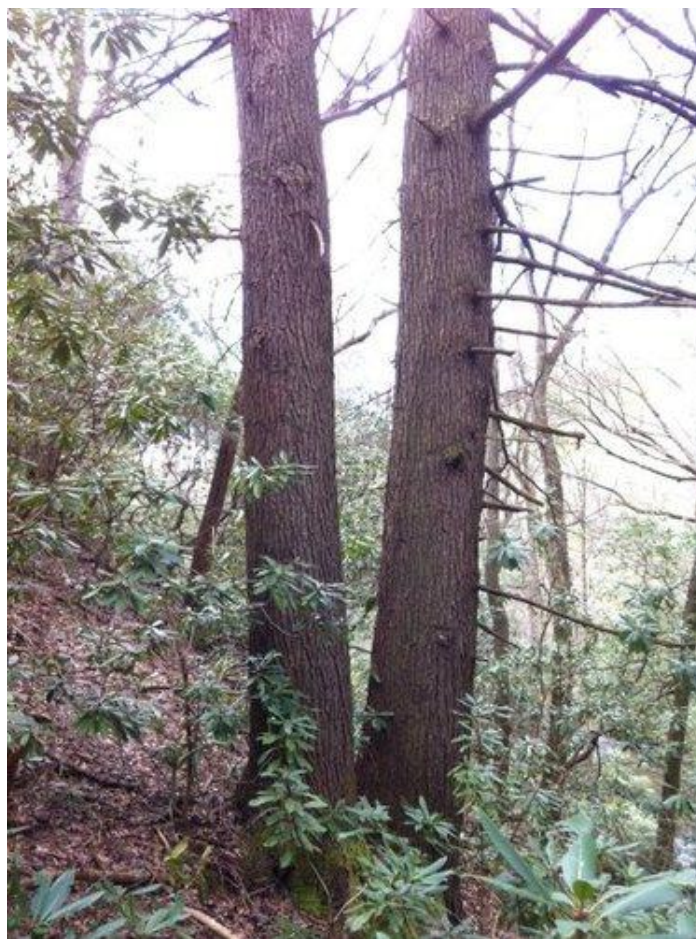
First- a double trunked hemlock. It was located down a steep slope from the dirt road along the banks of Cooper Creek.

From the road, this is what I saw:



9'3" x 140' hemlock on right

A quick scramble down the hill led me to this:



9'3" and 11'2" twin hemlocks



Twins and me

Sadly, most of the lower and middle branches were dead and leafless (needle-less?) from adelgids. I saw many adelgids all over the hemlocks in this area, though all the trees did seem to have some green needles and some looked rather healthy. It's probably just a matter of time until these trees fall victim like those in NC, however.

The next thing that caught my eye was the cinnamon-red bark of a tall double trunked 4'5" x 104.1' Virginia Pine in the campground area along Cooper Creek. By total points, this would qualify as a state champion, but I know that Jess Riddle and Will Blozan have found some bigger *Pinus virginiana* along Warwoman Rd in Clayton, GA.



4'5" x 104.1' VA pine

Now on to Sosbee Cove. This spot is perched just below hwy 180 near Vogel State Park and Blairsville, GA. It's a little over 3,000' elevation and faces due north. Classic cool, moist cove forest with the most rich herb layer I have ever seen. You CANNOT take a step without crushing dozens of wildflowers!

Simply stunning. Here resides 2 current GA state champion trees (Tuliptree and Yellow Buckeye) and 1 former champ (Northern Red Oak). My main goal was to find Georgia's first documented 170 foot Tuliptree. A previous (short) trip had resulted in a 164' specimen. With only an hour or so to spend, I knew I'd be hard pressed to do a thorough searching.

First, the data:

Prunus serotina 10'4" x 104.2'
Prunus serotina 107.0'
Liriodendron tulipifera 141.8'
Liriodendron tulipifera 142.8'
Liriodendron tulipifera 144.4'
Liriodendron tulipifera 153.2'
Liriodendron tulipifera 160.9*
Liriodendron tulipifera 163.4*
Liriodendron tulipifera 164.3*
Liriodendron tulipifera 11'5.5" x 164.6*

*note- all of the 160'+ trees were on the west side of the cove as viewed from the slope side trail

Well... I didn't break 160', but I did confirm multiple in the mid-160's. More searching is certainly necessary and deserving.

Next, the wildflowers:



solid wildflowers!



Trillium luteum (or a yellow cuneatum?)



spring-beauty, *Claytonia virginica*



trout lily



very pale *Trillium cuneatum*



Dutchman's breeches



bloodroot

A big black cherry - 10'4" x 104.2'... notice it's right beside the highway!

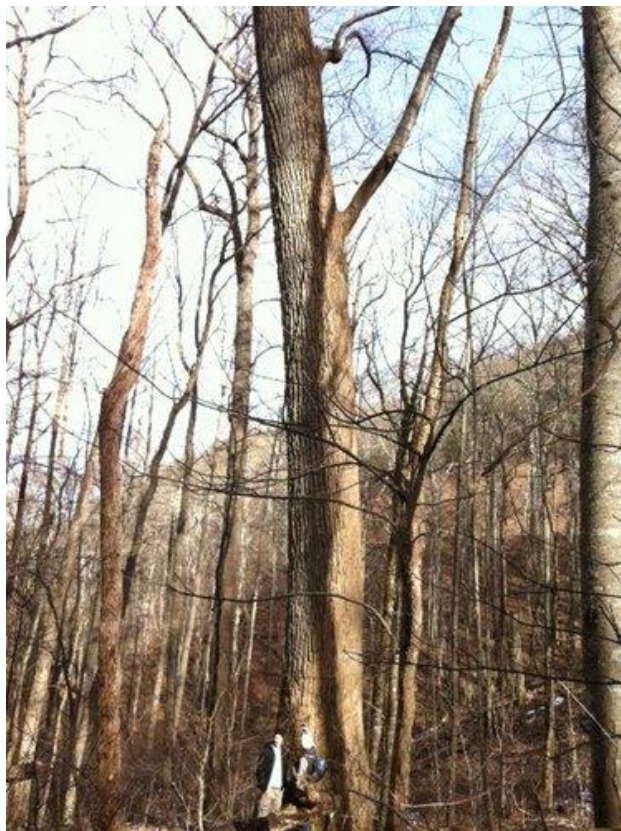


Sosbee black cherry - roadside old growth

This is the state co-champion *Liriodendron tulipifera*. I have visited and measured this tree multiple times. It sits on a slope and the CBH has been quite exaggerated by low tape wraps in the past. I tried very hard to get the midslope on my last measurement.

Right now it stands at 18'4" x 155' x 56' = **391 Total Points**

(these pictures were taken last winter):



GA co-champion LiTu from afar



GA co-champion LiTu

The incredible canopy at Sosbee:

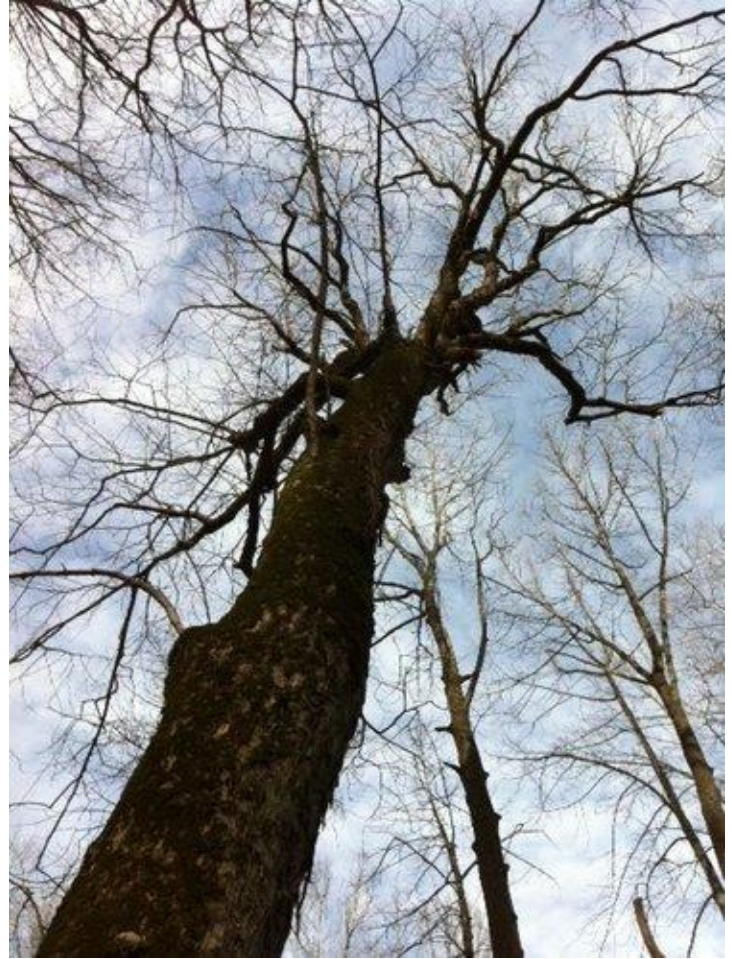


Sosbee winter canopy

Yellow Buckeye state champion- a truly magnificent giant! covered in moss and a full 5' in diameter!
Stats: 15'9" x 133.5' x 60' = **338 Total Points**



GA champion Yellow Buckeye



AeFl crown

Eli Dickerson



buckeye budburst

Re: *Pinus strobus* in Meshomasic State Forest

by **michael gatonska** » Wed Mar 28, 2012 4:25 pm

Hi Bob, Andrew, and Monica,

I would love to get up to the William Cullen Bryant Homestead! - in 2008 I wrote a work for chamber orchestra with baritone/tenor, and I used his great poem *Inscription fo the Entrance to a Wood*. The homestead sounds like the perfect spot to capture some audio, and for the reasons you mentioned. I hope there is still a possibilty, and Andrew and I in the process of setting a date to 's-cool' me in how to climb - very exciting

Monica, I have just posted a solo piano work of mine in the section on Music - it is an older piece, from when I was still a student titled *Thoughts on Fall Foliage and the Life of Colours*.

In the meantime, I am currently working on a composition for the Hartford Symphony's Violoncello Quartet that will be paired with my soundscape recording of hemlocks (the extended version, not the youtube version). This is my real 'pilot' into composing music with tree soundscapes, and the premier will be this coming May so i will keep everyone posted. Right now we are trying to figure out a good venue/location for the concert. Anyway, I plan on eventually composing a whole series of musical works using the soundscapes in combination with various instrumental combinations.

As you probably are aware, the first composer who made systematic compositional use of bird song was the French composer Oliver Messian. He was extensive, and he notated bird song directly onto manuscript paper while 'out in the field'. The material he collected was crucial in forming the shape and character of many of his pieces, the two most well-known being his *Catalogue d'oiseaux* and his *La fauvette des jardins*. He did not try to use bird song as a source of just melody, but he also tried to compsoe through sounds a portrait of each birds habitat as well.

Here is Messian:



<http://www.youtube.com/watch?v=xkKrD9knBvU>

Michael Gatonska

Pinus resinosa in Hebron, CT

by **michael gatonska** » Wed Mar 28, 2012 4:31 pm

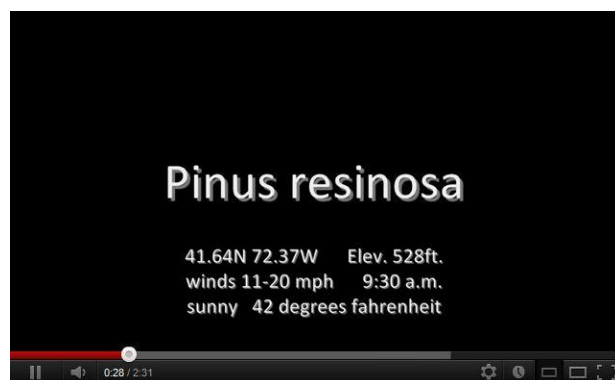
This red pine soundscape was captured in unusual conditions; the wind speeds ranged from 11-20 mph, with gusts reaching up to 37 mph. Typically, I have been capturing other tree songs in 3-10 mph winds.

However, today, I decided to head out and try to record anyway, particularly since the red pine is harder to capture in sound and it does not have the ebullient song that, for example, white pines will have in lesser winds. In the background of this audio, a huge roaring can be heard. This 'drama' was the sound of the wind moving through the naked tree branches of the surrounding forest (it is still only March in this part of the world, so there are still yet no leaves). Still, the melancholic swish of the red pine can be heard, with a distinctive somber crispness that pans in and out of this soundscape.

Here is a photo of the red pine, with the Eastern red cedars behind (I made a seperate recording of the cedars):



Here is the audio:



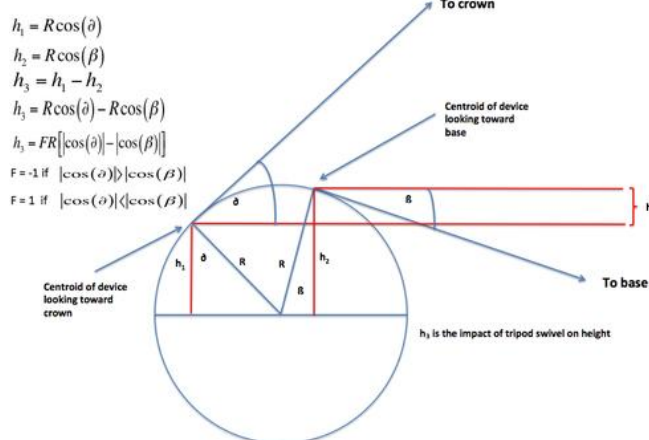
<http://www.youtube.com/watch?v=ngyDMGc9BhI>

Compensating for tripod arm swivel

by dbhguru » Wed Mar 28, 2012 4:38 pm

NTS, To achieve better accuracy, putting an instrument on a tripod to eliminate handshake is the preferred route. Most of the time, we don't worry about swiveling the tripod from pointing toward to crown to the base. But if we want to take the effect of moving the centroid of the measuring instrument, the following diagram shows how to make the calculation to adjust the height. In the diagram h_3 is the correction to total height. It is either added or subtracted based on whether the absolute value of the angle to crown is greater or lesser than the absolute value of the angle to the base. Note that the adjustment is made to the height calculation regardless of whether it is sine or tangent based.

Compensating for the impact of tripod swivel.



Robert T. Leverett

ID?

by **jamesrobertsmith** » Wed Mar 28, 2012 11:41 am

What is this stuff? The first photo there is some kind of orange slime on a vine (unknown vine) that I encountered in Boone's Cave Park:



maybe dormant) on one of the dogwoods in my mother-in-law's yard:



James Robert Smith

Re: ID?

by **Steve Galehouse** » Wed Mar 28, 2012 6:28 pm

Looks like slime flux, a bacterial disease that infests a number of different species:

http://aces.nmsu.edu/ces/plantclinic/do..._final.pdf

Steve Galehouse

Maple Leaves, a song from my Soft Echoes cycle

by **michael gatonska** » Thu Mar 15, 2012 4:50 pm

Hi ENTS;

I am finishing up a cycle of 8 songs for voice and piano that will be recorded this coming May 2012.

As part of the commission, I had to compose songs that echo the American sentimental song tradition, (Foster, Ives). The words of each song either celebrate or lament our natural world.

I don't know if any of the songs will make the Hit Parade, but I thought to include one here as a PDF attachment.

Anyone who feels like tickling the keys, or exercising the vocal chords may print out a copy and give it a try.

Maple Leaves for voice & piano, composed in February 2012:

 MGatonska Songs Maple Leaves March 2012.pdf

Thoughts on Fall Foliage and the Life of Colours, for Piano

by **michael gatonska** » Wed Mar 28, 2012 4:35 pm

Here is a score of my short 4' solo piano piece *Thoughts on Fall Foliage and the Life of Colours*, which I composed while still a student in 1999.

 Colours for piano MGatonska 1999.pdf

Walker Calhoun has crossed over

by **edfrank** » Wed Mar 28, 2012 8:40 pm

From Sky Davis: Walker Calhoun, Eastern Band Cherokee Elder, who participated in ceremony with Jani Leverett, Robert T. Leverett and Will Blozan in 1996 has crossed over. Please keep his community, family and friends in your thoughts and prayers. This is a monumental loss for those of us who knew and loved him.



Standing Giants of Cataloochie

<http://www.ncnatural.com/NCNatural/trees/bigtrees.html>

CATALOOCHEE VALLEY - Mother Nature may have trimmed its crown by 35 feet, but at 170 feet, the white pine in Cataloochee Valley is still a majestic sight to behold.... (continued)

Here is a link to a biography and some other links about Walker Calhoun:

http://www.nea.gov/honors/heritage/fellows/fellow.php?id=1992_03&type=bio

Some other notes about Walker:

http://www.ncarts.org/artist_page.cfm?ser=13591&num=13091&

<http://ncartstrails.org/cherokeeheritage/featuredstories/walkercalhoun.aspx>

<http://www.cherokeeheritagetrails.org/elderart/eld02.html>

<http://digitalheritage.org/2010/08/walker-calhoun/>

<http://www.blueridgeheritage.com/traditional-artist-directory/walker-calhoun>

Re: Walker Calhoun has crossed over

by sky » Wed Mar 28, 2012 9:02 pm

He passed away this morning. Ceremony is ongoing until burial on Saturday. I'm making a donation to the Cherokee Trail Project in Walker's memory on behalf of Native Tree Society. Personally I would like the funds to go toward the continued documentation of the marker/thong trees.

<http://www.cherokeepreservationfdn.org/cultural-preservation-connect/success-stories/97-mapping-ancient-choerokee-trails>

Founding Giants - Pennsylvania's Champion Trees

by edfrank » Wed Mar 28, 2012 9:15 pm

Founding Giants

Pennsylvania's Champion Trees

<http://www.americanforests.org/our-programs/bigtree/coordinator-of-month/pennsylvania/>



Pennsylvania State Coordinator, Scott Wade

From being one of the original 13 colonies and the site of the Battle of Gettysburg to becoming an industrial powerhouse in the 20th century, Pennsylvania has played a key role in shaping America's story. It's no wonder that Scott Wade enjoys studying genealogy and the history of the commonwealth.

As a stay-at-home dad and a certified arborist, he finds time to balance his family life with working part time at Longwood Gardens and running Pennsylvania's Champion Tree Program. Scott has been the state coordinator of the program since 2006 and works diligently in recognizing the state's biggest and culturally significant trees....

(Continued)

Jabba the Hutt Oak, CT

by **RyanLeClair** » Thu Mar 29, 2012 9:36 am

Here are two shots of an exceptionally gnarly oak Bart and I found in Newtown, CT. It was 22'3" around @ breast height, and 19'3" around at its skinniest point. Measuring at ground level probably would have gotten us a 30' circumference. The height was unexceptional, maybe 70'. The spread was around the same.



[Richmond: Hollywood Cemetery](#)

by **Barry Caselli** » Thu Mar 29, 2012 1:36 am

My father and brother and I just came home from a 5 day trip down to Greeneville, Tennessee and back. We went to a funeral in Tennessee, but made several stops along the way down and on the way back to see big trees and historic places. The last stop on the way home was this cemetery. All through this cemetery there are giant American Hollies and Southern Magnolias. Plus there are a few giant Tuliptrees, Bald Cypresses, White Oaks and Willow Oaks. All except the white oaks were the biggest I had ever seen of each species. I will try and post some photos later, maybe tomorrow. I will also post about our other stops later. But I couldn't let this one wait.

If any of you is ever in or near Richmond, you must visit this cemetery! Some of the trees were mind-blowing, to me. I think my brother read about the cemetery in the Remarkable Trees book (which I think is an awesome book).

P.S.- none of us brought any tapes to measure with. We never gave it a thought. But as far as I know all the big trees in this cemetery are inventoried, and who knows, maybe they have been measured. I don't know.

Barry Caselli

[Re: Richmond: Hollywood Cemetery](#)

by **edfrank** » Thu Mar 29, 2012 11:13 am

NTS, from Wikipedia:

http://en.wikipedia.org/wiki/Hollywood_Cemetery_%28Richmond,_Virginia%29

Hollywood Cemetery is a large, sprawling cemetery located at 412 South Cherry Street in Richmond, Virginia. Characterized by rolling hills and winding paths overlooking the James River, it is the resting place of two United States Presidents, James Monroe and John Tyler, as well as the only Confederate States President, Jefferson Davis. It is also the resting place of 25 Confederate generals, more than any

other cemetery in the country. Included are George Pickett and J.E.B. Stuart.

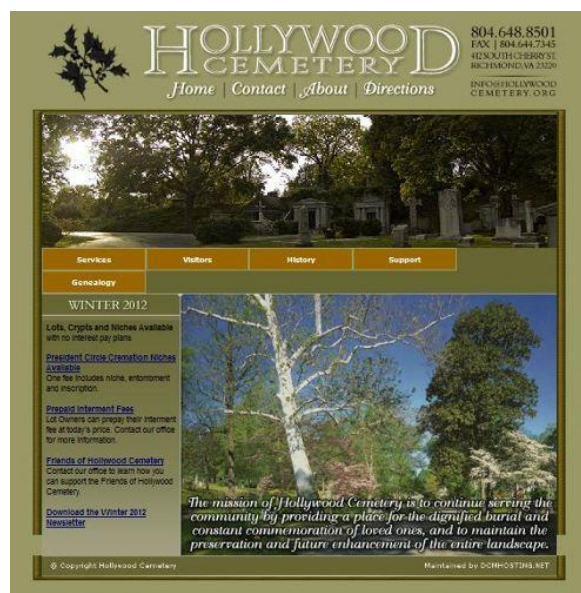


Hollywood Cemetery was opened in 1849, constructed on land known as "Harvie's Woods" that was once owned by William Byrd II. It was designed in the rural garden style, with its name, "Hollywood," coming from the holly trees dotting the hills of the property.



See also:

<http://www.hollywoodcemetery.org/index.html>



Edward Frank

[Re: Jabba the Hutt Oak, CT](#)

by **Larry Tucei** » Thu Mar 29, 2012 5:01 pm

Ryan, Super cool tree, I love the name. The road for sure played an important role in the trees disfiguration. Soil compaction, water runoff, chemicals in the asphalt etc. Years ago when it was a wagon trail I bet everyone stopped under that great tree and had a picnic, party whatever. So many times I see roads right up to the roots of trees no buffer zone. I've seen Live Oaks with the same type of characteristics. Also the tree could have been damaged by something- maybe road construction.

Trees with burls all over the trunk are unusual but I have seen them. I was wondering if those types of figures were caused by a Cancer or Disease. I really like Jabba its got lots of Character. A live Oak example. :) Larry

Attachments



Seal Ave Live Oak Biloxi Ms.

Larry Tucei

[Re: Jabba the Hutt Oak, CT](#)

by **tomhoward** » Sat Mar 31, 2012 3:26 pm

The Northern Red Oak at North Syracuse Cemetery that Elijah refers to is actually a double, and a very impressive one at that. It's a gnarly, burly combination of 2 trees that I think are about 150 years old or so. One of the trunks loses its leaves later than the other half. The lower trunks of both of these trees are among the gnarliest I've ever seen. Both trees are open-grown and not more than 55 ft. tall. Here is a photo of the double Red Oak. I don't have a closeup of the huge burls on the lower trunk.



Tom Howard

Bulletin of the ENTS, Volume 7, No. 1, Winter 2012

by **DonCBragg** » Fri Mar 30, 2012 11:06 am

http://www.nativetreesociety.org/bulletin/b7_1/B_ENTS_v07_01.pdf

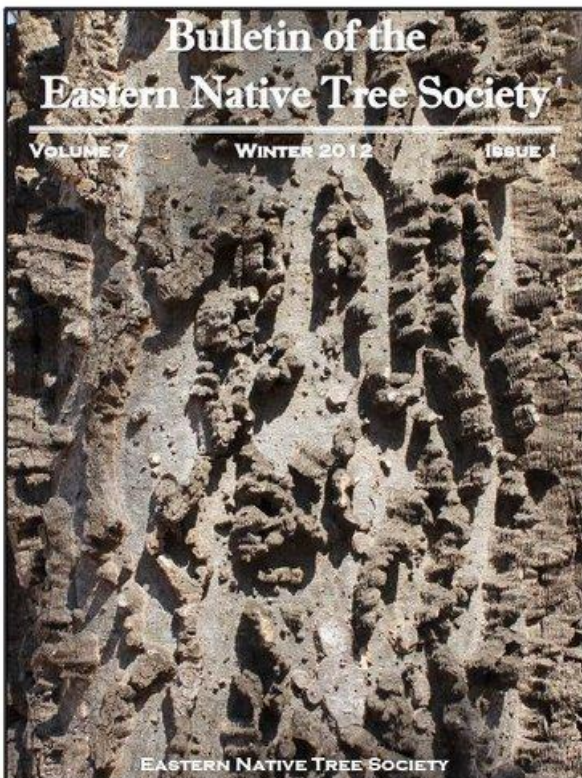


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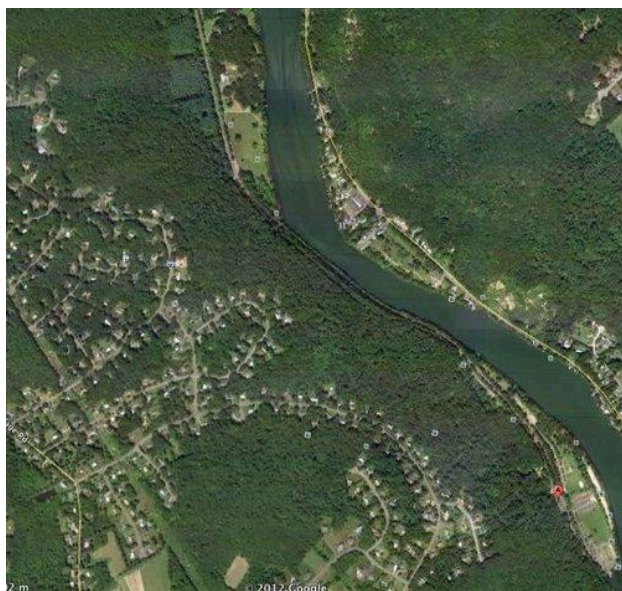
I want to encourage NTS Members to submit more formal site descriptions and scientific research reports to Don C. Bragg for consideration for inclusion in future issues of the Bulletin of the Eastern Native Tree Society. This is a wonderful resource for our group and we should be giving it our fullest support and effort.

Edward Frank

Indian Well, CT - New Tuliptree Site

by **dbhguru** » Fri Mar 30, 2012 8:23 pm

NTS, Today Bart Bouricius and I went Indian Well State Park in Shelton, CT. The park borders the Housatonic River. Here is an aerial view of the part of the park. It is the green strip following the river.



Our quarry was tuliptrees and they are there in numbers. Here is a look at a beauty along the first trail we took. Its stats are girth = 10.6 feet, height = 144.2 feet.



The next to shots are to give a feel for the abundance and dominance of the tuliptrees in Indian Well SP.



All together, we confirmed at least 8 tulips over 140 feet. There are more, but not a lot more. However, the prize of the day was this beauty.



This tuliptree measures 10.0 feet around and is 152.5 feet tall. Yes, another Connecticut site with 150s. We were understandably pleased. Bart located the tree with his eagle eye and I went up slope and worked to find the top. He got a 50-yard bounce from beneath, lying on the ground and looking up. I confirmed 152.5 as the tip top.

We measured other species and got some decent numbers. Here is a look at a double-stem sycamore measuring 14.75 feet around and 122.0 feet in height. We will return and do justice to the other species.



Near the end of our trek, we saw several trees that looked like sassafras. Here are three views. Any ideas?





We tried to find leaves in the leaf layer, but couldn't make a positive identification.

I believe that Indian Well SP has an RHI of around 115. We'll see. It definitely justifies several return trips. Thanks, Ryan, for your prior scouting. We would have no clue about this location were it not for Ryan LeClair.

Robert T. Leverett

[Re: Indian Well, CT - New Tuliptree Site](#)

by **edfrank** » Fri Mar 30, 2012 10:11 pm

Bob, Bart, Looks like a great site. Tuliptrees continue to surprise in terms of size. For what it is worth, I think the tree in question is a sassafras.

Generally you can scratch the bark in the grooves between plates and get that sassafras smell even on older specimens and get that sassafras smell.

FYI: Here is a fossil of a sassafras leaf (*Sassafras hesperia*) from the Eocene Period 36-55 million years ago) from the Klondike Mountain Formation of Washington and British Columbia:



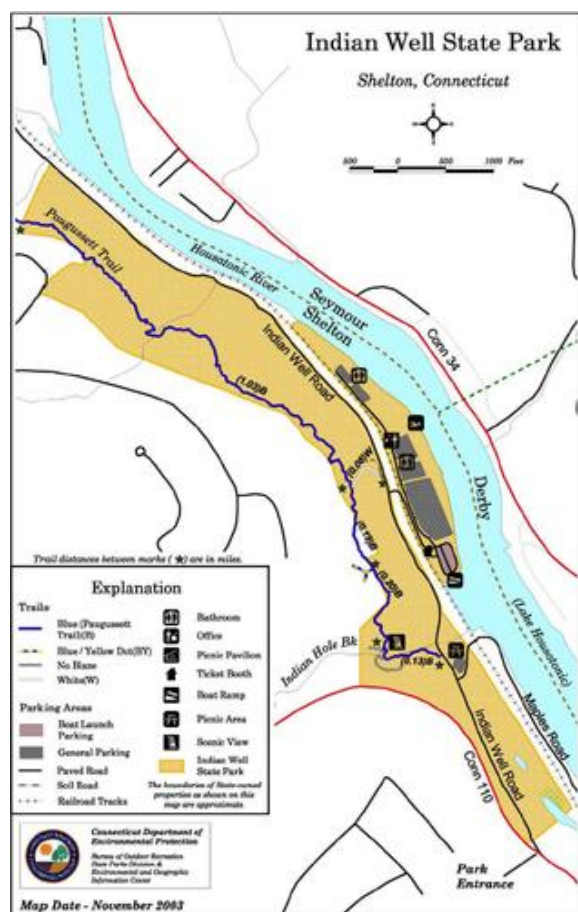
http://en.wikipedia.org/wiki/Sassafras_hesperia

Edward Frank

Re: Indian Well, CT - New Tuliptree Site

by dbhguru » Sat Mar 31, 2012 9:47 am

NTS, I neglected to mention that in the Google image of Indian Well State Park, the park is on the left side of the river. Here is a map of Indian Well.



There are other Connecticut state parks to explore. Is there a 160-foot tuliptree out there? I sort of doubt it. There won't be a stand with a number of 160s. That's virtually guaranteed, although I'd love to have to eat my words. Maybe Ryan can find a stand with multiple 160s, but in the meantime, I'm happy to settle for one or two more sites with 150s. Here is another look at the new 150.



Robert T. Leverett

Introduction – Joe Reynolds

by joeyjoejoe » Sat Mar 31, 2012 11:28 am

hello to all,
I would like to introduce myself as I am new to this site. My name is Joe Reynolds and I live in North Western Ontario very close to the Minnesota Border. I am 44 years old, married, and have two children. I have a degree in forestry and work at a mill in Fort Frances Ontario. I am currently working toward obtaining my ISA arborist certification and it is this pursuit that led me here through internet searches. I am pleased to be here and thank you all for providing this opportunity and opening. Thank You

Joe Reynolds

The Don Bragg Papers

by **edfrank** » Sat Mar 31, 2012 4:44 pm

Dr. Don Bragg is a research forester and longtime NTS member. He also serves as editor of the Bulletin of the Eastern Native Tree Society. He works at the US Forest Service, Southern Research Station, PO Box 3516, University of Arkansas at Monticello, Monticello, AR 71656.

Don submitted for inclusion on the NTS website and the BBS six papers he has authored or co-authored with other NTS members to be included as part of our Special Publication Series. He writes: "Because I am a federal employee and have written these materials on official time, they become part of the public domain and hence can't be copyrighted, even by the private journals that publish them."

The NTS Publication Series will contain both peer reviewed and non-peer reviewed papers. We will make every effort to ensure the scientific, technical, and editorial quality of all of the papers being distributed. Papers marked as peer reviewed have undergone a review process in the strictest scientific sense of the word including the use of anonymous reviewers on paper with a realistic chance of being rejected for publication is considered the scientific standard.

Sine Method as a More Accurate Height Predictor for Hardwood

by **DonCBragg** » Sat Mar 31, 2012 3:38 pm

Peer Reviewed Publication

The Sine Method as a More Accurate Height Predictor for Hardwoods

by Don C. Bragg, In: Buckley, David S.; Clatterbuck, Wayne K. (eds.). Proceedings of the 15th Central Hardwood Forest Conference. General Technical Report SRS-101. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research

Station: 23-32. Published in April 2007.

In: Buckley, David S.; Clatterbuck, Wayne K. (eds.). Proceedings of the 15th Central Hardwood Forest Conference. General Technical Report SRS-101. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 23-32. Published in April 2007.

THE SINE METHOD AS A MORE ACCURATE HEIGHT PREDICTOR FOR HARDWOODS

Don C. Bragg¹

Abstract—Most hypsometers apply a mathematical technique that utilizes the tangent of angles and a horizontal distance to deliver the exact height of a tree under idealized circumstances. Unfortunately, these conditions are rarely met for hardwoods in the field. A "new" predictor based on sine and slope distance and discussed here does not require the same assumptions for accurate height determination. Case studies using a sycamore (*Platanus occidentalis* L.), a water oak (*Quercus nigra* L.), and a southern red oak (*Q. falcata* Michx.) from southern Arkansas are presented to emphasize the sensitivity of the tangent method to erroneous measurement procedures. When heights were measured properly and under favorable circumstances, the results obtained by the tangent and sine methods differed only by about 2 percent. Under more challenging conditions, however, errors ranged from 8 to 42 percent. These examples also highlight a number of distinct advantages of using the sine method, especially when exact tree height is required.

INTRODUCTION

Tree height is one of the most conventional attributes of forest mensuration. Equipment and methods specifically designed to enumerate the vertical dimension of individual trees have been available since the earliest years of forestry (for example, Noyes 1916; Schlich 1911). Few people have questioned the application of these techniques because they are based on fundamental geometric or trigonometric principles. Given textbook definitions of tree height measurement under idealized circumstances, there seemed little need for criticism.

Unfortunately, the accuracy of height measurement has for too long been taken for granted. If carefully applied, the conventional method of height determination is prone to significant errors. Even subtle violations of the assumptions of this technique (for example, an almost imperceptible lean in a tall tree) can produce noticeably departures from the exact height. In all fairness, it has only been in recent years that technology has caught up to the science behind tree height measurement, making it possible to control or eliminate this error (Blizzen, W. 2004. Tree measuring guidelines of the Eastern Native Tree Society. Unpublished report. http://www.nark.edu/nats/ents/naentree/measuring_guidelines.htm. [Date accessed: August 20, 2005].

This paper briefly reviews the basic assumptions behind the traditional height measurement technique, including some that can lead to significant errors in height estimation. I will also describe a "new" estimator of height that uses a set of trigonometric relationships that is not sensitive to the same assumptions. Differences between the tangent and sine methods are illustrated in case studies of height measurements of hardwoods in southern Arkansas.

METHODS

Basic Height Measuring Principles

Mathematically speaking, hypsometers typically apply a technique that utilizes the tangents of angles and a horizontal distance to determine tree height. Figure 1 illustrates the basic principles of height determination. With accurate distance and angle measurements, tangent-based hypsometers determine total tree height (TanHT) as follows:

$$\text{TanHT} = [\tan(A) \times h] + [\tan(A') \times h] \quad (1)$$

¹ Research Forester, USDA Forest Service, Southern Research Station, Monticello, AR 71656.

<http://www.nativetreesociety.org/specialreports/bragg/Bragg2007b.pdf>

Abstract—Most hypsometers apply a mathematical technique that utilizes the tangent of angles and a horizontal distance to deliver the exact height of a tree under idealized circumstances. Unfortunately, these conditions are rarely met for hardwoods in the field. A "new" predictor based on sine and slope distance and discussed here does not require the same assumptions for accurate height determination. Case studies using a sycamore (*Platanus occidentalis* L.), a water oak (*Quercus nigra* L.), and a southern red oak (*Q. falcata* Michx.) from southern Arkansas are presented to emphasize the sensitivity of the tangent method to erroneous measurement procedures. When heights were measured properly and under favorable circumstances, the results obtained by the tangent and sine methods differed only by about 2 percent. Under more challenging conditions, however, errors ranged from 8 to 42 percent. These examples also highlight a number of distinct advantages of using the sine

method, especially when exact tree height is required.

Available for download as part of the Native Tree Society Special Publication Series: NTS SP #17

[An Improved Tree Height Measurement Technique Tested On Mature Southern Pines.](http://www.nativetreesociety.org/specialreports/bragg/Bragg2008A.pdf)

by DonCBragg » Sat Mar 31, 2012 3:45 pm

Peer Reviewed Publication

An Improved Tree Height Measurement Technique Tested on Mature Southern Pines
by Don C. Bragg. SOUTH. J. APPL. FOR. 32(1)
2008, pp. 38-43.

TECHNICAL NOTE

An Improved Tree Height Measurement Technique Tested on Mature Southern Pines

Don C. Bragg

ABSTRACT
Virtually all techniques for tree height determination follow one of two principles: similar triangles or the tangent method. Most people apply the latter approach, which uses the tangents of the angles to the top and bottom and a true horizontal distance to the subject tree. However, few adjust this method for ground slope, tree lean, crown shape, and crown configuration, making errors commonplace. Given documented discrepancies exceeding 30% with current methods, a reevaluation of height measurement is in order. The sine method is an alternative that measures a real point in the crown. Hence, it is not subject to the same assumptions as the similar triangle and tangent approaches. In addition, the sine method is insensitive to distance from tree or observer position and can not overestimate tree height. The advantages of the sine approach are shown with mature southern pines from Arkansas.

Keywords: hypotenuse, sine method, tangent method

Foresters have measured height in many ways since the earliest years of the profession (e.g., Schlich 1911). One technique, direct measurement, is commonly done using a height pole for small- to medium-sized trees, and rarely with a tape dropped from the top of tall trees. Direct measurement, however, typically requires the observer to carry a bulky height pole or be skilled in the hazardous art of tree climbing. Most other height measurement techniques use mathematics as their basis. For example, some have used a pole or rod of known length as the basis for comparison with a standing tree (e.g., Curtis and Emce 1968, Bell and Gouley 1980). This proportionality approach reduces the size of the pole needed to determine height but provides only an approximation of height. Hypsometers also have been developed with more sophisticated optically based mathematics or digital image processing using other proportional formulations for height determination (Amuchin 1971, Clark et al. 2000).

None of these approaches, however, have supplanted the most popular height measuring techniques. One of the oldest applies the geometry of similar triangles, which operates on the principle that triangles of the exact same configuration are direct scales of each other. The most common height determination approach can be called the "tangent method" and multiplies the tangent of the angles to the top and bottom of the crown with a true horizontal baseline distance from the observer to the tree. Under idealized circumstances, both similar triangles and the tangent method will yield the exact height of a tree. However, rarely are the assumptions of either satisfied, and the resultant measurement errors can be significant. For instance, the Eastern Native Tree Society (ENTS) has documented numerous cases of national champion-sized trees measured with these techniques being overestimated by 5-20 m (ENTS 2006).

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Don Bragg (dbragg@fsl.us), U.S. Forest Service, Southern Research Station, PO Box 5116, University of Arkansas at Fayetteville, Fayetteville, AR 72716. The author thanks Will Brown, Sharon Butler (U.S. Forest Service), Mike Chisholm (U.S. Forest Service), Jim Galtier (U.S. Forest Service), Nancy Kneib (U.S. Forest Service), Robert Lamm (Arkansas Native Tree Society), Mike Skahan (U.S. Forest Service), and Emily Stead (U.S. Forest Service) for their contributions in this effort. This article was written by a U.S. Government employee on official time and is therefore in the public domain.

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38 SOUTH. J. APPL. FOR. 32(1) 2008

Fortunately, the increasing availability of inexpensive and accurate distance measuring devices has provided a unique solution for most measurement problems. A "new" trigonometric approach to height determination uses the product of the size of the angles to the top and bottom of a tree and their respective slope distances to determine height. The "sine method" was developed originally to improve height estimates of very large individual trees and has been repeatedly validated using direct measurements with tapes lowered from very tall (>50 m) specimens (Brazner 2006). In this article, advantages of the sine method with these mature pines from southern Arkansas are shown.

Methods and Materials

The Tangent and Sine Height Determination Methods

Any height comparative technique assumes that all angles and distances are measured without error and that the observer can identify the highest part of the crown. The best means to differentiate between the sine and tangent methods of height determination is to display the techniques graphically. The tangent method must either meet some very precise assumptions or be correctly adjusted to produce the exact height of a tree. Specifically, these assumptions are the tree must be truly vertical (i.e., perpendicular to a level horizontal plane), the diameter of a tree can be ignored, and the highest point of the live crown is located directly over the base of the stem. The tangent method shown in Figure 1a can be expressed as

$$HT = d \times \tan(A) + B' \times \tan(A'), \quad (1)$$

where the baseline lengths (d and B' , identical in this case) are true horizontal distances and the angles A and A' are of the true top and bottom of the tree, respectively. Note that under these same circum-

<http://www.nativetreesociety.org/specialreports/bragg/Bragg2008A.pdf>

Virtually all techniques for tree height determination follow one of two principles: similar triangles or the tangent method. Most people apply the latter approach, which uses the tangents of the angles to the top and bottom and a true horizontal distance to the subject tree. However, few adjust this method for ground slope, tree lean, crown shape, and crown configuration, making errors commonplace. Given documented discrepancies exceeding 30% with current methods, a reevaluation of height measurement is in order. The sine method is an alternative that measures a real point in the crown. Hence, it is not subject to the same assumptions as the similar triangle and tangent approaches. In addition, the sine method is insensitive to distance from tree or observer position and can not overestimate tree height. The advantages of the sine approach are shown with mature southern pines from Arkansas.

Available for download as part of the Native Tree Society Special Publication Series: NTS SP #18

[Practical Extension of a Lake States Tree Height Model](http://www.nativetreesociety.org/specialreports/bragg/Bragg2008E.pdf)

by DonCBragg » Sat Mar 31, 2012 3:48 pm

Peer Reviewed Publication

Practical Extension of a Lake States Tree Height Model

by Don C. Bragg, NORTH. J. APPL. FOR. 25(4)
2008, pp. 186- 194

<http://www.nativetreesociety.org/specialreports/bragg/Bragg2008E.pdf>

Practical Extension of a Lake States Tree Height Model

Don C. Bragg

ABSTRACT By adapting data from national and state champion lists and the predictions of an existing height model, an exponential function was developed to improve tree height estimation. As a case study, comparisons between the original and redesigned model were made with eastern white pine (*Pinus strobus* L.). For example, the heights predicted by the new design varied by centimeters from the original until the pines were more than 25 cm dbh, after which the differences increased notably. On a very good site (50-year base age site index [SI₅₀] = 27.4 m) at the upper end of the range of basal area (BA; 68.9 m²/ha) for the region, the redesigned model predicted a champion-sized eastern white pine (actual measurements: 97.0 cm dbh, 50.9 m tall) to be 51.3 m tall, compared with 38.8 m using the original formulation under the same conditions. The NORTHWDS Individual Response Model (NIRM) individual tree model further highlighted the influence of these differences with long-term simulations of eastern white pine height. On a moderate site (SI₅₀ = 18.7 m) with intermediate (BA = 15 m²/ha) stand density, NIRM results show that the original model consistently predicts heights to be 20–30% lower for mature white pine.

Keywords: champion trees, eastern white pine, NIRM, nonlinear model

The desire to predict some future state or to more readily anticipate certain biophysical attributes has long driven modelers in many fields, including forestry. As a result, allometric relationships between easily measured tree attributes and those not as readily acquired have been developed for decades. For example, dbh is one of the most commonly used characteristics of trees because it is easy to accurately measure and generally serves as a good predictor of other attributes such as height, bole volume, and crown width (Cibulka et al. 2002). Accurate portrayal of allometry is increasingly important because of a growing trend to model rather than measure certain tree characteristics in large-scale inventories to save time and money (e.g., Bechtold et al. 2002, Barrett 2006).

Models of tree height based on diameter have been generated with considerable success, and most published height-diameter equations explain a large proportion of the variation in the data from which they were derived. However, a truly successful height model depends on more than just a high coefficient of determination (Häme and Monserud 1997). It should also conform to the biology of the species across the range of possible sites (Lei and Parnell 2001). Genetics, competitive dynamics, hydraulics, and bole loading all help constrain trees from maintaining a strictly linear rise in height with increasing diameter (King 1990, Ryan and Yoder 1997, Becker et al. 2000, Koch et al. 2004). Exponentialism suggests that there is an absolute upper tree height (e.g., Koch et al. 2004, Woodruff et al. 2004, Burgess and Dawson 2007, Donnet et al. 2008), but for most species, this is considerably greater than what is seen in nature. Because height increment gradually uppers off compared with diameter, models of height-diameter relationships should reflect this property. However, it is possible to fit the maximum height asymptote too low, thereby unconsciously constraining predictions, resulting in a gradually increasing bias that propagates as error. There is evidence that many height-diameter models systematically underestimate height for larger trees. For instance, Peng

et al. (2001) reported that all the functions they tested underestimated height for six of the nine species considered.

Height prediction errors can be further accentuated when regression models are extended outside the range of data from which they were derived (e.g., Payandeh and Wang 1994). This statistically questionable practice, although undesirable, is often driven by the needs of the user and the lack of a more appropriate model (Shiffley and Brand 1984). Given that many users apply tree height models regardless of their statistical limits, it behooves model developers to ensure reasonable behavior of these models beyond their original source data. This can be shown with a commonly applied height-diameter model. Using data from forest survey plots in Michigan, Minnesota, and Wisconsin, Ek et al. (1986) fit the function,

$$H_0 = 4.5 + b_1(1 - e^{-0.0015(SI^{0.5})})^{0.5} + b_2(BA^0.5), \quad (1)$$

where H_0 is the predicted height (in feet), b_1 and b_2 are fitted regression coefficients, SI is site index (SI in feet at 50 years), BA is stand basal area (in square feet per acre), and T is a simple upper stem taper expansion for total tree height. Because most of their inventory data were less than 60 cm in dbh and the vast majority of trees in Lake States forests are less than this diameter, predictions from Equation 1 are probably as reliable as any other model for small- to moderate-sized trees.

Some species, however, grow considerably larger than this on a regular basis. In the northern Lake States, eastern white pine (*Pinus strobus* L.) often grows to 75–100 cm dbh and between 40 and 50 m tall (e.g., American Forests 2000, Eastern Native Tree Society [ENTTS] 2004). D.C. Bragg, unpublished data, 2008) and historically may have exceeded 180 cm dbh and 60 m tall (Leach 1939, Reeder 2004). The original data of Ek et al. (1986) included a maximum eastern white pine dbh of 91.2 cm. With this as an upper diameter threshold, Equation 1 produces a distinctive height-diameter curve. Given a high stand density (68.9 m²/ha) and a very good site quality (50-year base age, SI₅₀ = 27.4 m), Equation 1 predicts a

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Don Bragg (dbagg@fsl.fed.us), US Forest Service, Southern Research Station, PO Box 3516 UARK, Monticello, AR 71366.

186 NORTH. J. ARK. FOR. 29(4) 2008

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A Comparison of Pine Height Models for the Crossett Experimental Forest

by DonCBragg » Sat Mar 31, 2012 3:52 pm

Peer Reviewed Publication

A Comparison of Pine Height Models for the Crossett Experimental Forest

by D. Bragg. Journal of the Arkansas Academy of Science, Vol. 62, 2008, pp. 24-31

A Comparison of Pine Height Models for the Crossett Experimental Forest

D. Bragg

Southern Research Station, USDA Forest Service, P.O. Box 3516 UARK, Monticello, AR 71366

Correspondence: dbagg@fsl.fed.us

Abstract

Many models to predict tree height from diameter have been developed, but not all are equally useful. This study compared a set of height-diameter models for loblolly (*Pinus rostrata*) and shortleaf (*Pinus echinata*) pines from Ashley County, Arkansas. Almost 500 trees ranging in diameter at breast height (DBH) from 0.3 cm (both species) to 91.9 cm (for shortleaf) or 108.2 cm (for loblolly) were chosen for measurement. Height equations were then fit to four different functions (Chapman-Richards, modified logistic, exponential, and Curtis-Arney) with weighted nonlinear least squares regression using DBH as the only predictor. Models were evaluated using a series of goodness-of-fit measures, including fit index (R^2), root mean square error (RMSE), bias, and corrected Akaike information criterion (AICc). All of the models fit the data very well, with 96 to 99% of the variation explained for loblolly pine, and 96 to 97% explained for shortleaf pine. Similarly, few differences were apparent in RMSE, bias, and AICc, although it was clear that the Curtis-Arney function fit both pine species slightly less well across the upper range of the diameters. Only subtle differences appeared in curve shape for small- to moderate-sized pines, with increasing departures predicted above 75 cm DBH. Given their overall similarity in performance, the modified logistic function was the preferred height-diameter model because of its more intuitive allometry at the upper extreme of pine size, especially when compared to the original FVS height doubling equation. A unified height-diameter model capable of predicting total tree height for either pine taxa was also developed with a modified logistic function.

Introduction

Tree height is one of the most important measures used to describe forests, as it directly relates to the competitive interactions between plants, fiber yield, stand structural complexity, and habitat suitability for many organisms. As valuable as this information is, this metric is often neglected because the determination of total tree height is a time-consuming process prone to error if improperly done. As an example, those conducting large-scale forest inventories often choose

to predict tree height as a function of a much easier to assess attribute (bole diameter) rather than measuring it directly (Bechtold et al. 1998, Barrett 2006). Modeling height may not optimally fit any given tree, but over the course of a large inventory, it often proves an economic balance of measurement efficiency and accuracy (Barrett 2006).

Unfortunately, our need to reliably measure tree height often exceeds our capacity to accurately forecast this variable. It is not because we lack the tools to do so—there are many models to predict tree height from diameter. Rather, choosing the appropriate model using the best measurement technique has not been done for most species in most locations. This is true even for commercially important taxa at major research locations. For instance, we have no local height equations for loblolly (*Pinus rostrata*) or shortleaf (*Pinus echinata*) pine on the Crossett Experimental Forest in Ashley County, Arkansas, even though scientists have studied these taxa there since the mid 1900s.

Local height equations are particularly valuable in that they are derived using specimens found in the immediate study area. Thus, these equations better reflect nuances in tree allometry attributable to local conditions. Theoretically, such a model is preferable to ones developed for individual stands, or even the entire southeastern United States (e.g., Bechtold et al. 1998, FVS Staff 2008). Hence, this study was initiated with the objective of developing the most accurate height-diameter model possible given a sample of loblolly and shortleaf pines taken from the Crossett Experimental Forest and surrounding areas.

Materials and Methods

Study areas

The Crossett Experimental Forest (CEF) covers 680 ha in the extreme southern portion of Ashley County, 11 km south of the city of Crossett. The CEF landscape is dominated by upland forests of loblolly and shortleaf pine, with a minor and varying hardwood component. Most of the soils on the CEF are silt loams, and are considered to be of good quality for growing pine, with loblolly site index of 25 to 30 m (50-year base age) (Gill et al. 1979). Virtually all of the pines on the CEF are of natural origin (i.e., naturally regenerated from local seed sources). Pine

Journal of the Arkansas Academy of Science, Vol. 62, 2008

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By adapting data from national and state champion lists and the predictions of an existing height model, an exponential function was developed to improve tree height estimation. As a case study, comparisons between the original and redesigned model were made with eastern white pine (*Pinus strobus* L.). For example, the heights predicted by the new design varied by centimeters from the original until the pines were more than 25 cm dbh, after which the differences increased notably. On a very good site (50-year base age site index [SI₅₀] 27.4 m) at the upper end of the range of basal area (BA; 68.9 m²/ha) for the region, the redesigned model predicted a champion-sized eastern white pine (actual measurements: 97.0 cm dbh, 50.9 m tall) to be 51.3 m tall, compared with 38.8 m using the original formulation under the same conditions. The NORTHWDS Individual Response Model (NIRM) individual tree model further highlighted the influence of these differences with long-term simulations of eastern white pine height. On a moderate site (SI₅₀ 18.7 m) with intermediate (BA 15 m²/ha) stand density, NIRM results show that the original model consistently predicts heights to be 20–30% lower for mature white pine.

Many models to predict tree height from diameter have been developed, but not all are equally useful. This study compared a set of height-diameter models

for loblolly (*Pinus taeda*) and shortleaf (*Pinus echinata*) pines from Ashley County, Arkansas. Almost 560 trees ranging in diameter at breast height (DBH) from 0.3 cm (both species) to 91.9 cm (for shortleaf) or 108.2 cm (for loblolly) were chosen for measurement. Height equations were then fit to four different functions (Chapman-Richards, modified logistic, exponential, and Curtis-Arney) with weighted nonlinear least squares regression using DBH as the only predictor. Models were evaluated using a series of goodness-of-fit measures, including fit index (R²), root mean square error (RMSE), bias, and corrected Akaike information criterion (AICc). All of the models fit the data very well, with 96 to 98% of the variation explained for loblolly pine, and 96 to 97% explained for shortleaf pine. Similarly, few differences were apparent in RMSE, bias, and AICc, although it was clear that the Curtis-Arney function fit both pine species slightly less well across the upper range of the diameters. Only subtle differences appeared in curve shape for small- to moderate-sized pines, with increasing departures predicted above 75 cm DBH. Given their overall similarity in performance, the modified logistic function was the preferred height-diameter model because of its more intuitive allometry at the upper extreme of pine size, especially when compared to the original FVS height-diameter equation. A unified height-diameter model capable of predicting total tree height for either pine taxa was also developed with a modified logistic function.

Available for download as part of the Native Tree Society Special Publication Series: NTS SP #20

3-Point Derivation of Dominant Tree Height Equations

by DonCBragg » Sat Mar 31, 2012 3:54 pm

Peer Reviewed Publication

A 3-Point Derivation of Dominant Tree Height Equations

by Don C. Bragg, In: Fei, Songlin; Lhotka, John M.; Stringer, Jeffrey W.; Gottschalk, Kurt W.; Miller,

Gary W., eds. 2011. Proceedings, 17th Central Hardwood Forest Conference; 2010 April 5-7; Lexington, KY; Gen. Tech. Rep. NRS-P-78. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 678 p. CD-ROM. pp. 41-50.

<http://www.nativetreesociety.org/specialreports/bragg/Bragg2011A.pdf>

In: Fei, Songlin; Lhotka, John M.; Stringer, Jeffrey W.; Gottschalk, Kurt W.; Miller, Gary W., eds. 2011. Proceedings, 17th Central Hardwood Forest Conference, 2010 April 5-7; Lexington, KY; Gen. Tech. Rep. NRS-P-78. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 678 p. CD-ROM.

A 3-POINT DERIVATION OF DOMINANT TREE HEIGHT EQUATIONS

Don C. Bragg¹

Abstract.—This paper describes a new approach for deriving height-diameter (H-D) equations from limited information and a few assumptions about tree heights. Only three data points are required to fit this model, which can be based on virtually any nonlinear function. These points are the height of a tree at diameter at breast height (d.b.h.), the predicted height of a 10-inch d.b.h. tree from an existing H-D model, and the height at species maximum d.b.h., estimated from a linear regression of big trees. Dominant sweetgum (*Liquidambar styraciflua* L.) from the Arkansas region and yellow-poplar (*Liriodendron tulipifera* L.) from across the southeastern United States were used to estimate heights at species maximum d.b.h. A composite of these field-measured heights and site index trees from the U.S. Forest Service's Forest Inventory and Analysis (FIA) database were used to compare the 3-point equations fit to the Chapman-Richards model with the Forest Vegetation Simulator (FVS) default H-D models. Because of the limited range of diameters in the FIA site trees, the Chapman-Richards equations developed from site trees under-predicted large tree heights for both species. For the sweetgum, the 3-point equation was virtually identical to the FVS default model. However, the 3-point equation noticeably improved dominant height predictions for yellow-poplar.

INTRODUCTION

Simulation models are increasingly used to project forest dynamics over large spatial and temporal scales. The Forest Vegetation Simulator (FVS), for example, now encompasses virtually the entire continental United States, as well as parts of Alaska and Canada (Dixon 2009). Most of these models incorporate several mathematical relationships to define the nature of simulated trees and stands, usually in the form of regression equations derived from field-sampled data. One of the best examples of these models can be found in height-diameter (H-D) models, which use any of a number of functions to describe the trend between total tree height and (typically) diameter at breast height (d.b.h.).

Numerous H-D models have been developed for North American tree species (for example, Huang and others 1992, 2000; Loosten and others 2007; Zhang 1997). However, it is unusual for H-D models to be derived across the size range of a given taxon, primarily because few data sets include very large trees. Centuries of lumbering, land clearing, and catastrophic disturbance have greatly reduced the number of big trees, making their presence rare in most inventories. Some have sought to improve upon existing allometric relationships by expanding the range of data via the incorporation of champion-sized trees (for instance, Bragg 2008b, Skelly and Brand 1984). This approach has some limitations, including sensitivity to the individual chosen as the champion tree and the possibility that the specimen selected may not adequately represent the maximal expression of height and diameter, especially for open-grown champions (Bragg 2008b).

¹Research Forester, Southern Research Station, U.S. Forest Service, P.O. Box 3516 UAM, Monticello, AR 71656. To contact, call (870) 567-3464 or email at dbragg@fs.fed.us.

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GTR-NRS-P-78 (2011)

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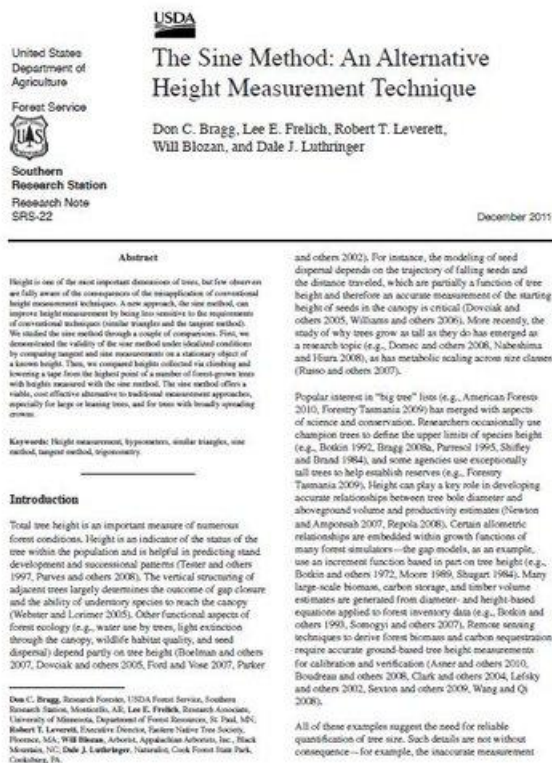
Abstract.—This paper describes a new approach for deriving height-diameter (H-D) equations from limited information and a few assumptions about tree height. Only three data points are required to fit this model, which can be based on virtually any nonlinear function. These points are the height of a tree at diameter at breast height (d.b.h.), the predicted height of a 10-inch d.b.h. tree from an existing H-D model, and the height at species maximum d.b.h., estimated from a linear regression of big trees. Dominant sweetgum (*Liquidambar styraciflua* L.) from the Arkansas region and yellow-poplar (*Liriodendron tulipifera* L.) from across the southeastern United States were used to estimate height at species

maximum d.b.h. A composite of these field-measured heights and site index trees from the U.S. Forest Service's Forest Inventory and Analysis (FIA) database were used to compare the 3-point equations (fit to the Chapman-Richards model) with the Forest Vegetation Simulator (FVS) default H-D models. Because of the limited range of diameters in the FIA site trees, the Chapman-Richards equations developed from site trees underpredicted large tree heights for both species. For the sweetgum, the 3-point equation was virtually identical to the FVS default model. However, the 3-point equation noticeably improved dominant height predictions for yellow-poplar.

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[The Sine Method: An Alternative Height Measurement Technique](#)

by **DonCBragg** » Sat Mar 31, 2012 3:56 pm



The Sine Method: An Alternative Height Measurement Technique

by Don C. Bragg, Lee E. Frelich, Robert T. Leverett, Will Blozan, and Dale J. Luthringer. United States Department of Agriculture Forest Service, Southern Research Station Research Note SRS-22, December 2011, 12 p.

Height is one of the most important dimensions of trees, but few observers are fully aware of the consequences of the misapplication of conventional height measurement techniques. A new approach, the sine method, can improve height measurement by being less sensitive to the requirements of conventional techniques (similar triangles and the tangent method). We studied the sine method through a couple of comparisons. First, we demonstrated the validity of the sine method under idealized conditions by comparing tangent and sine measurements on a stationary object of a known height. Then, we compared heights collected via climbing and lowering a tape from the highest point of a number of forest-grown trees with heights measured with the sine method. The sine method offers a viable, cost effective alternative to traditional measurement approaches, especially for large or leaning trees, and for trees with broadly spreading crowns.

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[North Syracuse Cemetery Oak Grove Mar. 2012](#)

by **tomhoward** » Sat Mar 31, 2012 3:46 pm

NTS, the North Syracuse Cemetery Oak Grove has many of the characteristics of old trees as documented in Neil Pederson, External Characteristics of Old Trees in the Eastern Deciduous Forest. The old trees of this small and extremely dense grove have the following characteristics referenced by Neil Pederson: spiral grain, balding bark, loss of apical dominance (on some trees), crown dieback (on some trees), crowns with few large crooked limbs, low stem taper, high stem

sinuosity (on several of the old White Oaks and especially on Black Gum #34), low crown volume, low ratio of leaf to trunk volume. No other site in this area has so many trees with all these characteristics. Many of the older trees are over 200 years old and the oldest could be 300 years old. I am enclosing 2 pictures that illustrate some of these characteristics.



White Oaks #25 (left), #23 taken Dec. 10, 2011



Black Gum #34 from north, showing stem sinuosity, taken Dec. 10, 2011

The huge gnarled crowned tree to the right of Black Gum #34 is White Oak #33, 38.5" dbh, 89 ft. tall, est. 250 years old (it is one of the trees cored in 1996 and the age is an extrapolation from an incomplete core).

Tom Howard

External Links:

Earthworms to Blame for Decline of Ovenbirds in Northern Midwest Forests

<http://www.sciencedaily.com/releases/2012/02/120229142225.htm>

Sturdy Scandinavian Conifers Survived Ice Age

<http://www.sciencedaily.com/releases/2012/03/120311143737.htm>

**A land lost to time is big find for museum
Scientists say world's oldest forest in Gilboa predates dinosaurs**

<http://www.timesunion.com/local/article/A-land-lost-to-time-is-big-find-for-museum-3370898.php#photo-2565966>

Tree Council of Ireland

<http://www.youtube.com/watch?v=tJ2X5bLqx7A>

Dardanelle, Arkansas is Home of the Biggest Arkansas Trees

<http://www.youtube.com/watch?v=sBkg4gdXy6Q>

AR State Historic Tree Program

<http://www.arhistorictrees.org/>

Kerry McLeod Memorial Mug Tree

http://www.arhistorictrees.org/historic_trees_details.php?id=45

Video: The Art of Okeechobee

<http://www.audubonmagazine.org/articles/nature/video-art-okeechobee>

Forestwatch - Ancient Trees with Sarah Rees

<http://www.youtube.com/watch?v=YQH0cwF82As>

Weakley's Flora

<http://www.herbarium.unc.edu>

10 World Famous Trees

<http://www.care2.com/greenliving/10-world-famous-trees.html?page=1>

My Own Hands

<http://vimeo.com/38103421>

TEDxJacksonHole - David Milarch - Ancient Trees For The Future

<http://www.youtube.com/watch?v=y069UFbk11s>

TEDxNASA@SiliconValley - David Milarch - Ancient Trees Archive

http://www.youtube.com/watch?v=3DsHHfu4_co

Lyme Disease Surge Predicted for Northeastern US: Due to Acorns and Mice, Not Mild Winter

<http://www.sciencedaily.com/releases/2009/04/0904452.htm>

Culture Aspects of the Tree in Selected European Countries

http://www.shl.bfh.ch/fileadmin/docs/Forschung/Forschung_Entwicklung/FF_Oekosyst._Naturg._Erholungsraum/COST_E42-Cultural_values_book_final_2_.pdf

The 5 Most Spectacular Landscapes on Earth (That Murder You)

http://www.cracked.com/article_19705_the-5-most-spectacular-landscapes-earth-that-murder-you.html

Saguaro National Park Using New Technology to Deter Cactus Rustlers

<http://www.nationalparkstraveler.com/2012/03/saguaro-national-park-using-new-technology-deter-cactus-rustlers9569>

CanopyMeg on Community - The TV Show - Feb, 3, 2012

<http://www.youtube.com/watch?v=DrvfngooT9A>

Adirondack Almanack: State Law Would Ban, Regulate Invasives Species

<http://www.adirondackalmanack.com/2012/03/state-law-would-ban-regulate-invasives.html?spref=fb>

Charismatic Megaflora: What do Old Trees Look Like? by Neil Pederson

<http://blogs.ei.columbia.edu/2012/03/18/charismatic-megaflora-what-do-old-trees-look-like/>

400 -Year-Old Bonsai Survived Hiroshima Bombing

<http://www.youtube.com/watch?v=NYPeNcnyZ6g>

Reading Between the Tree Rings (Guatemala) by Kevin Ananchukaitis

<http://scientistatwork.blogs.nytimes.com/2012/03/13/reading-between-the-tree-rings/>

The Tools of Tree-Ring Research (Guatemala) by

Kevin Ananchukaitis

<http://scientistatwork.blogs.nytimes.com/2012/03/15/the-tools-of-tree-ring-research/>

Climbing a Volcano in Search of Old Trees

(Guatemala) by Kevin Ananchukaitis

<http://scientistatwork.blogs.nytimes.com/2012/03/20/climbing-a-volcano-in-search-of-old-trees/?smid=tw-nytimescience&seid=auto>

Atop a Volcano, the Ages of Red Pines

(Guatemala) by Kevin Ananchukaitis

<http://scientistatwork.blogs.nytimes.com/2012/03/21/atop-a-volcano-the-ages-of-red-pines/?ref=science>

Our Philippine Trees: Flowering Dipterocarp!

<http://pinoytrees.blogspot.com/2010/08/flowering-dipterocarp.html>

Symphony of Science - The Greatest Show on Earth!

<http://www.youtube.com/watch?v=wxDOpAM2FrQ>

A Forest Under Siege in Paraguay

Huge sections of the Chaco forest are being razed by local Mennonite farmers and Brazilian cattle ranchers amid a surge in the global demand for beef.

http://www.nytimes.com/2012/03/25/world/americas/paraguays-chaco-forest-being-cleared-by-ranchers.html?_r=1&hp#

REI Blog: My 30-Year Plan to Hike the John Muir Trail by CK Cragg

http://findout.rei.com/blog_detail/?contentid=7447658904675425031

Manmade Noise Affects Plant Dispersal and Flower Pollination, by Anna Sanders, 03/20/2012.

<http://magblog.audubon.org/study-suggests-manmade-noise-affects-plant-dispersal-and-flower-pollination>

Patrick Dougherty – Installations

<http://www.stickwork.net/installations3.php>

About: eNTS: The Magazine of the Native Tree Society

This magazine is published monthly and contain materials that are compiled from posts made to the NTS BBS <http://www.ents-bbs.org>. It features notable trip reports, site descriptions and essays posted to the BBS by NTS members. The purpose of the magazine is to have an easily readable and distributable magazine of posts available for download for those interested in the Native Tree Society and in the work that is being conducted by its members.

This magazine serves as a companion to the more formal science-oriented *Bulletin of the Eastern Native Tree Society* and will help the group reach potential new members. To submit materials for inclusion in the next issue, post to the BBS. Members are welcome to suggest specific articles that you might want to see included in future issues of the magazine, or point out materials that were left from a particular month's compilation that should have been included. Older articles can always be added as necessary to the magazine. The magazine will focus on the first post on a subject and provide a link to the discussion on the website. Where warranted later posts in a thread may also be selected for inclusion.

Edward Frank – Editor-in-Chief



Indian Well State Park, CT waterfall – photo by Robert Leverett