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Champion Big Trees of Virginia 2019-2020 Update

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Introduction

Big trees are natural wonders that inspire people and play important roles in forest ecosystems. The Virginia Big Tree Program documents, curates, and publicizes the largest trees known to exist in Virginia. Trees are scored and ranked using measurements of their physical dimensions. Records of past and present big trees are curated in the Virginia Big Tree Register, which is accessible as an online database at bigtree.cnre.vt.edu. Each year the Virginia Big Tree program accepts nominations for newly discovered trees and recertifies trees that were registered 10 or more years prior. Program staff and volunteers also host seminars and workshops about big tree conservation and their documentation of big trees for posterity. This publication provides background information about big trees and accomplishments of the Virginia Big Tree Program during the 2019 calendar year.

Image 1. Big Tree State Coordinator Dr. Eric Wiseman discusses the National Champion osage-orange (*Maclura pomifera*) in Charlotte county with a member of the national cadre of big tree measurers. Photo by Eric Wiseman, 2017.

History of the Virginia Big Tree Program

The Virginia Big Tree Program traces its origins to the spring of 1970 when Virginia Forests, Inc. (today known as the Virginia Forestry Association) partnered with Virginia Cooperative Extension to launch a new project known as the 'Big Tree Search'. The aim was to discover and document Virginia's biggest trees by encouraging youth members of FFA and 4-H to search for the largest trees in their communities. Charles Finley with Virginia Forests handled the record-keeping while William McElfresh with Virginia Cooperative Extension led 4-H youth education on how to locate,

Table 1. Virginia big trees recognized as National Champions by American Forests in 2019.

90	Total registered champions
57	Sole champions
33	Co-champions
79	Unique species
21	Newly crowned champions
12	Dethroned champions

Image 2. Then and now: the National Champion northern white-cedar (*Thuja occidentalis*) located in Nelson county in 1975 (left) and in 2015 (right). This tree became the national champion in 2019. People in photo from left to right: Arthur W. Ordel, John A. Carter, and George Walker, who all worked for the Hardwood Lumber Corporation of Virginia at the time that the tree was discovered.

identify, measure, and nominate big trees. Foresters with the Virginia Department of Forestry verified the identity and measurements of the big tree nominees before they were proclaimed champions and placed in the 'Register of Big Trees'. Over time, the pursuit of big trees spread to amateur naturalists, conservationists, and natural resource professionals. The big tree register was published annually in Virginia Forests magazine throughout the 1970s and 1980s.

In the 1990s, administration of the big tree register transitioned from the Virginia Forestry Association to Virginia Cooperative Extension. There to lead the effort was Dr. Jeffrey Kirwan, professor emeritus of forestry in the College of Natural Resources and Environment at Virginia Tech and Extension specialist for natural resources education. As state coordinator of the revived Virginia Big Tree Program, Jeff incorporated big trees into his youth education activities across the state. He also established a web presence for the program in the early 2000s when he created an online register of Virginia's big trees. Jeff's encounters with big trees around the state led him to co-author the highly acclaimed *Remarkable Trees of Virginia* book in 2008. Jeff also created a 'big tree internship' for students at Virginia Tech, made possible through funding from Trees Virginia, to employ a student each summer to assist with documenting big trees. Upon Dr. Kirwan's retirement, his colleague in the College of Natural Resources and Environment, associate professor of urban forestry Dr. Eric Wiseman, became state coordinator of the program. Since that time, Eric has made improvements to the program website to enhance the user experience and share broader information about not only documenting big trees, but also promoting their conservation and care. The Virginia Big Tree Program has endured for fifty years and remains popular as a source of credible and up-to-date information about champion big trees in Virginia.

Big Trees are Important to People and the Environment

People have an innate connection to trees. They provide us with renewable raw materials, clean air, and pure water. We take comfort in the tranquility of their dappled shade, swaying boughs, and rustling leaves. We commemorate notable events and honor special people by planting trees. Virginia has a heritage of bountiful forests as well as exceptional people and places. At the intersection of all three, we often find prominently situated in the landscape exceptionally large trees—those whose longevity and physical stature goes beyond the ordinary. Big trees reveal to us the upper bounds of the physical and biological limits of plant growth. They offer a glimpse of primeval forests and provide a living connection to our natural and cultural heritage. Their stalwart presence creates a sense of place while their longevity demonstrates fortitude and persistence. They are also a cornerstone of forest ecosystems (both rural and urban), storing large amounts of carbon and offering niche habitats to numerous species that rely on veteran trees for nourishment and refuge. Of course, a tree does not have to be exceptionally large to benefit people and the environment—we need trees of all sizes and ages to sustain us. But big trees are the ones that most often elicit a sense of awe and respect for nature. The goal of the Virginia Big Tree Program is to discover and document big trees, share their stories, and encourage conservation and stewardship of trees both big and small.

Image 3. It is common for veteran trees to lose height while gaining trunk girth and crown spread due to wear and tear from the environment. These changes give veteran trees a distinctive look and increase their value as wildlife habitat. Illustration by Brian French, with permission.

Big Tree Biology

Trees are perennial and long-lived, attaining the greatest size of any organism on Earth. Unlike animals, most of which have a determinate mature size, trees grow continually throughout their lives. This is necessary to replace tissues that make carbohydrates (leaves), distribute carbohydrates (phloem), and transport water and soil nutrients (xylem, roots). Growing large also factors into competing with neighboring trees for space and access to light. Not all tree species grow to gigantic proportions, but all species go through peroidic cycles of growing new tissues at the tips of branches and roots and around the girth of stems over the course of their lifespans.

As trees reach maturity, their growth rate typically slows in response to both their genetic blueprint and the physical limitations of their growing environment. In many tree species, the growth rate of veteran trees is so slow that it is almost imperceptible to the casual observer. This near-cessation of growth occurs predictably in most species; therefore, most trees end their lives within a typical mature size range for their species. Mature size can be quite variable for tree species occurring across large geographic areas with diverse climate and soil quality. For example, Virginia pine (*Pinus virginiana*) rarely exceeds 70-feet tall in mountainous areas, but specimens over 85-feet tall are not uncommon in the Piedmont and Coastal Plain.

Some trees reach extraordinary size for their species. How does this happen? To put it simply, extraordinary size is a product of good genes and a favorable

Image 4. Many big trees are found in urbanized settings, such as the National Champion honeylocust (*Gleditsia triacanthos*) in downtown Fincastle, Botetourt County. Photo by Jason Sprouls, August 2019.

Image 5. Not all tree species grow to be "big". Believe it or not, this tree is the National Champion American bladdernut (*Staphylea trifolia*) in Page county. Photo by Gary Williamson, June 2015.

growing environment. It is unclear to scientists what specific role genes play in the maximum size of trees and how much of the variability observed in tree size is attributable to genetics alone. Factors in the growing environment are probably a stronger predictor of mature tree size, especially in species that attain gigantic proportions. Arguably the most important environmental factor is moisture, especially when it comes to tree height. Gravitational force counteracts the suction within xylem cells of stems that pulls water from the soil, making it in increasingly difficult to deliver water to leaves as trees grow taller. For this reason, areas where rainfall is sporadic or the soil dries quickly do not favor extremely tall trees. Gravity also affects trunk growth and crown spread, but in slightly different ways. As trees add height and bulk, gravity causes the tree to strain under its own weight. To support that weight, wood fibers thicken noticeably around the trunk base, creating a buttressed appearance in large trees. Large spreading branches likewise feel the strain of gravity and thicken to support their weight, often shaped in cross-section like a vertical ellipse, akin to a steel I-beam used in construction.

Another environmental factor that influences mature tree size is exposure to inclement weather. Trees on steep, upland slopes or expansive open areas experience greater wind forces that might uproot them or break their trunks. These trees are also more vulnerable to lightning strikes, a common cause of death for veteran trees. It is for these reasons that we typically find the largest trees in bottomlands and deep mountain valleys where the soil is deep and moist and neighboring trees and ridgelines provide protection from wind and lightning. Trees in urban areas can similarly benefit from the sheltering of large buildings and structures nearby.

Perhaps the most important factor for trees getting big is avoiding natural or man-made disturbances that would shorten their lifespan. Unlike animals, trees cannot escape or migrate to avoid harm, but they are not defenseless either. Trees possess physical

and chemical adaptations that enable them to tolerate all sorts of trauma—pests, fire, drought, wind. These adaptations arose in response to the natural disturbances that repeatedly challenged multiple generations of a tree species over millennia in a given ecosystem. In our urbanizing landscapes, man-made disturbances often supplant natural disturbances as the cause of big tree mortality. Large trees are often removed because they are incompatible with the land use changes that come with urbanization. They may conflict with overhead or underground utilities, block transportation corridors, or pose a hazard for buildings or outdoor activities. Yet we find many of our biggest trees persisting in urban areas. By intention or by serendipity, big trees come to occupy urban spaces where they either avoid enumerable causes of harm or receive preventive care through concerted efforts of owners and community stewards. As a result, big trees are commonly found in historic districts, parks, college campuses, cemeteries, and urban nature preserves.

The Virginia Big Tree Register

The Virginia Big Tree Register documents the largest specimens—past and present—of tree species found in Virginia. The state coordinator of the Virginia Big Tree Program maintains the register—archiving historical documentation of big trees, reviewing nominations of big trees, and orchestrating 10-year recertifications of big trees. The state coordinator works closely with diverse stakeholders to maintain the register and fulfill the outreach mission of the program. A key partner is the Virginia Department of Forestry, whose county foresters often assist with verifying big tree nominations and recertifying big trees in the register. Another key partner is Trees Virginia, which provides annual funding to hire a student intern at Virginia Tech whom assists the state coordinator with recertifying big trees. Discovering big trees and keeping the big tree register accurate and up-to-date would not be possible without numerous volunteers around the state whom work closely with the big tree program and its partners. For many of them, big tree 'hunting' has become a favorite past-time that allows them to enjoy the outdoors and hone their skills in tree identification, measurements, and orienteering.

The Virginia Big Tree Register is available online as a searchable database. The register curates the three largest living specimens of over 400 native and non-native tree species. Historical documentation of some species includes up to ten living or dead specimens. Trees

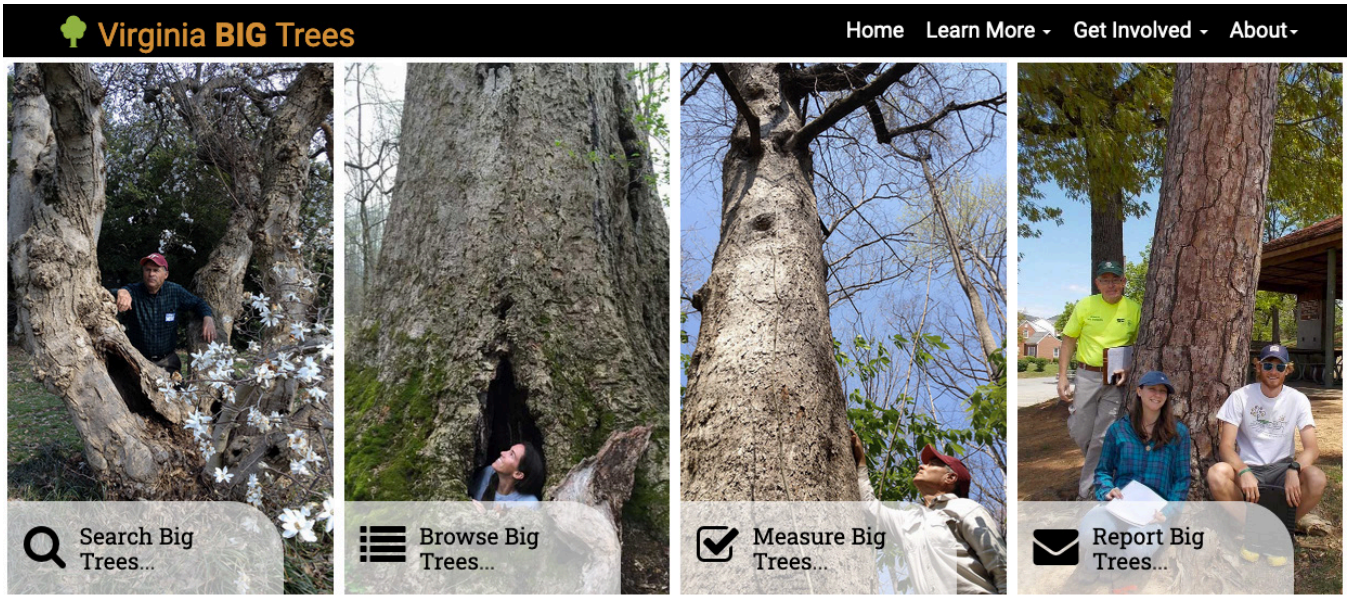

Image 6. A screenshot of the Virginia Big Trees website, accessible at bigtree.cnre.vt.edu.

that exceed their 10-year recertification timeframe can remain in the register, but are given a legacy tree status and cannot be recognized as state or national champion until their measurements are updated. Each tree record in the register includes photos and information about tree size, location, ownership, and historical or ecological significance. A web map is available for many public and private trees, allowing navigation to the tree using an internet-enabled mobile device. An advanced search feature allows filtered searches by tree location, status, nominator, measurer, or owner. The online register also includes a browse feature for lists of the national champion trees residing in Virginia and the state champions of common native species.

Scoring and Ranking Big Trees

Like many states, Virginia's big tree register is aligned with the National Register of Champion Trees curated by American Forests, a nationwide forest conservation organization. The state and national registers rank trees using a scoring system based on tree height, trunk girth, and crown spread. Points are awarded as follows:

- 1 point per foot of tree height
- 1 point per inch of trunk girth
- 1/4 point per foot of average crown spread

These points are summed to calculate the big tree score. Trees are ranked based on comparison of scores within a species. At the national level, only certain tree species are eligible for registration. Virginia does not currently restrict species eligibility, but all trees must be at least 13-feet tall and 9.5-inches trunk girth to be eligible for both the state and national registers. Assistance with tree measurements is often available from Extension agents, county foresters, and big tree program volunteers. Details about measuring and scoring big trees are available here.

Anyone may nominate a tree for the state big tree register. A big tree nomination requires tree measurements, photographs, location information, and authorization of the tree owner to register the big tree. Nominations are reviewed by the state coordinator verify the species identification and validate the measurements and

Table 2. 2019 Website activity (bigtree.cnre.vt.edu).

135,344 Page views
15,553 Users
22,139 Sessions

Top-five user origins in Virginia:

city	*count*	*% of total users*
Virginia Beach	974	15
Blacksburg	448	7
Charlottesville	434	7
Midlothian	385	6
Richmond	301	5%

Image 7. These dedicated big tree hunters trudge through swamp to measure the crown spread of this National Champion water tupelo (*Nyssa aquatica*) in Greensville county. Photo by Gary Williamson, November 2017.

scoring. The state coordinator will also nominate state champion trees for national champion consideration on behalf of the nominator. Nominations for the state register are accepted year-round through an online reporting form. Rankings in the register are updated annually based on new nominations and reports of recent tree deaths. A registered big tree must be recertified at least once every ten years to verify it is still living and update its measurements and scoring. Details about nominating and registering big trees are available here.

2019 Accomplishments

Ongoing activities of the Virginia Big Tree Program include processing big tree reports and making periodic updates to the Virginia Big Tree Register as new trees are nominated, existing trees are recertified, and old trees die out. The program coordinator works with statewide partners and the student intern to conduct annual recertifications of big trees last measured ten or more years prior. The program coordinator also works closely with American Forests to document Virginia trees as national champions. Seminars and workshops are held throughout the year by the program coordinator and statewide partners to educate the public about big trees and train volunteers to assist with big tree nominations and recertifications. Below are highlights of the accomplishments of the Virginia Big Tree Program in 2019.

Table 3. Big Tree reports during the 2019 calendar year.

323 Total big tree reports
- 122 New nominations
- 123 Recertifications
- 78 Dead trees

299 Total updates to register
- 101 New nominations
- 122 Recertifications
- 76 Dead trees

202 Unique species reports

194 Unique species registrations

Table 4. Big Tree reporters during the 2019 calendar year.

51 Unique tree reporters

84 Tree reports by interns

40 Tree reports by coordinator

Top-three volunteer reporters
- 48 Ben Blankenship
- 37 Byron Carmean & Gary Williamson
- 25 Greg Zell & Davis Camalier

Table 5. List of 2019 National Champions located in Virginia.

Common Name	Latin Name	City or County	Total Points
Fraser fir	*Abies fraseri*	City of Harrisonburg	223
Florida maple	*Acer floridanum*	Southampton	277
Amur maple	*Acer ginnala*	Montgomery	100
Boxelder	*Acer negundo*	Essex	307
Striped maple	*Acer pensylvanicum*	Grayson	94
Trilobum red maple	*Acer rubrum var. trilobum*	Isle of Wight	242
Trilobum red maple	*Acer rubrum var. trilobum*	Isle of Wight	238
Silver maple	*Acer saccharinum*	Fairfax	412
Sugar maple	*Acer saccharum*	Giles	363
Yellow buckeye	*Aesculus flava*	Alleghany	390
Painted buckeye	*Aesculus sylvatica*	Sussex	122
Mimosa	*Albizia julibrissin*	City of Virginia Beach	221
Alleghany serviceberry	*Amelanchier laevis*	Floyd	162
Devil's walking stick	*Aralia spinosa*	Isle of Wight	61
Eastern baccharis	*Baccharis halimifolia*	City of Chesapeake	61
Sweet birch	*Betula lenta*	Giles	247
Virginia round-leaf birch	*Betula uber*	Smyth	97
Paper mulberry	*Broussonetia papyrifera*	City of Williamsburg	212
Water hickory	*Carya aquatica*	Southampton	319
Bitternut hickory	*Carya cordiformis*	Brunswick	332
Pecan	*Carya illinoinensis*	Isle of Wight	417
Shellbark hickory	*Carya laciniosa*	Culpeper	327
Northern catalpa	*Catalpa speciosa*	Rockbridge	327
Dwarf hackberry	*Celtis tenuifolia*	City of Alexandria	121
Dwarf hackberry	*Celtis tenuifolia*	Arlington	121
Eastern redbud	*Cercis canadensis*	Loudoun	177
Eastern redbud	*Cercis canadensis*	Fairfax	172
Swamp dogwood	*Cornus foemina*	Isle of Wight	59
Pear hawthorn	*Crataegus calpodendron*	City of Alexandria	50
Parsley hawthorn	*Crataegus marshallii*	Southampton	53

(continued)

Common Name	Latin Name	City or County	Total Points
Dotted hawthorn	*Crataegus punctata*	Grayson	111
Dotted hawthorn	*Crataegus punctata*	Grayson	110
Common persimmon	*Diospyros virginiana*	City of Suffolk	254
American beech	*Fagus grandifolia*	New Kent	342
Chinese parasoltree	*Firmiana simplex*	City of Norfolk	87
Glossy buckthorn	*Frangula alnus*	City of Lynchburg	130
Honeylocust	*Gleditsia triacanthos*	Botetourt	378
Silverbell	*Halesia tetraptera var. tetraptera*	Goochland	143
Witch-hazel	*Hamamelis virginiana*	Russell	75
Rose of Sharon	*Hibiscus syriacus*	Cumberland	55
Winterberry holly	*Ilex verticillata*	City of Chesapeake	44
Black walnut	*Juglans nigra*	Westmoreland	364
Oval-leaved privet	*Ligustrum ovalifolium*	Roanoke	109
Sweetgum	*Liquidambar styraciflua*	Southampton	366
Tulip-poplar	*Liriodendron tulipifera*	City of Chesapeake	511
Osage-orange	*Maclura pomifera*	Charlotte	416
Fraser magnolia	*Magnolia fraseri*	Carroll	225
Chinaberry	*Melia azedarach*	City of Petersburg	251
Evergreen bayberry	*Morella caroliniensis*	City of Newport News	24
Evergreen bayberry	*Morella caroliniensis*	City of Newport News	24
White mulberry	*Morus alba*	Albemarle	349
Water tupelo	*Nyssa aquatica*	Greensville	584
Swamp black tupelo	*Nyssa biflora*	City of Chesapeake	336
Hophornbeam	*Ostrya virginiana*	City of Chesapeake	140
Royal paulownia	*Paulownia tomentosa*	Arlington	286
Swampbay	*Persea palustris*	City of Virginia Beach	204
Red spruce	*Picea rubens*	Giles	292
Pond pine	*Pinus serotina*	City of Virginia Beach	228
Virginia pine	*Pinus virginiana*	Fairfax	210
Virginia pine	*Pinus virginiana*	Caroline	203
Chickasaw plum	*Prunus angustifolia*	Southampton	66

(continued)

Common Name	Latin Name	City or County	Total Points
Sweet cherry	*Prunus avium*	Fairfax	275
Peach	*Prunus persica*	Powhatan	67
White oak	*Quercus alba*	Brunswick	451
Southern red oak	*Quercus falcata*	Sussex	442
Darlington oak	*Quercus hemisphaerica*	City of Richmond	378
Laurel oak	*Quercus laurifolia*	City of Chesapeake	425
Laurel oak	*Quercus laurifolia*	City of Chesapeake	418
Overcup oak	*Quercus lyrata*	Isle of Wight	464
Swamp chestnut oak	*Quercus michauxii*	City of Virginia Beach	426
Chinkapin oak	*Quercus muehlenbergii*	Rockingham	381
Cherrybark oak	*Quercus pagoda*	City of Portsmouth	480
Willow oak	*Quercus phellos*	Northampton	467
Willow oak	*Quercus phellos*	Mathews	459
Willow oak	*Quercus phellos*	City of Chesapeake	454
Northern red oak	*Quercus rubra*	Washington	446
Weeping willow	*Salix babylonica*	Tazewell	411
Pussy willow	*Salix discolor*	Page	161
Buckthorn bumelia	*Sideroxylon lycioides*	City of Norfolk	104
American bladdernut	*Staphylea trifolia*	Page	41
Common sweetleaf	*Symplocos tinctoria*	City of Chesapeake	102
Japanese tree lilac	*Syringa reticulata*	City of Richmond	175
Northern white-cedar	*Thuja occidentalis*	Nelson	312
White basswood	*Tilia americana var. heterophylla*	City of Radford	296
Winged elm	*Ulmus alata*	City of Hopewell	296
Blackhaw	*Viburnum prunifolium*	Charlotte	120
Blackhaw	*Viburnum prunifolium*	Albemarle	119
Hercules' club	*Zanthoxylum clava-herculis*	Northampton	77
Jujube	*Ziziphus jujuba*	City of Williamsburg	101
Jujube	*Ziziphus jujuba*	City of Norfolk	101

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