

green horizons

Growing tomorrow's future today.

May 2016

A newsletter from the Center for Agroforestry in
conjunction with the Forest and Woodland Association of Missouri
<http://agebb.missouri.edu/agforest/index.htm>

Volume 20 • Number 2
Mike Gold, Gene Garrett and Taylor Wanbaugh
editors

Future of Northern Forests

By STEVE SHIFLEY | *Research Forester, U.S. Forest Service*

In the latest Northern Forest Futures report, Future Forests of the Northern United States (<http://www.treesearch.fs.fed.us/pubs/50448>), scientists describe how past trends and today's choices might change the future forest landscape of the northern United States. The report published by the U.S. Forest Service Northern Research Station addresses themes relevant to sustainable forest management: biodiversity, productivity, health, water, biomass, carbon, timber products, non-timber products, recreation, social frameworks, legal frameworks, and urban forests. Findings are applicable to the 20 states bounded by Maine, Maryland, Missouri, and Minnesota. Anticipated changes in forest diversity and productivity are examined in detail for seven alternative future scenarios from the baseline year of 2010 to 2060. These trends can be readily examined by state and time period using the web-based Northern Forest Futures Data Dashboard (<http://www.nrs.fs.fed.us/futures/predict/>).

One of several issues highlighted by the Northern Forest Futures project is the lack of forest age-class diversity. About 55 percent of forest area in the North falls between 40 and 80 years old (Figure 1). The age class distribution for each of the 20 included states has a similar pattern, as does the age class distribution of each forest-type group except aspen-birch. This age class distribution is a product of forest history. In the 1800s and early 1900s, loggers moved from east to west across the region. The wave of exploitative harvesting was followed by decades of land clearing, farming, frequent human-set wildfires to increase forage, and widespread woods grazing by livestock. By the mid 1900s wildfire suppression improved, livestock were gradually removed from the woods, and unproductive farms were abandoned to revert back to forest. Forests recovered

remarkably, but one outcome is the clustered distribution of age classes we have today.

Forest diversity is crucial to forest sustainability. It is impossible to anticipate all the natural and human-caused disturbances that future forests will face. For example, there is broad consensus that the climate will change and affect forests, but details are lacking about when and by how much. Numerous invasive insect and plant species are spreading through Northern forests, and new ones are inevitable. In general, greater forest diversity makes forests more resilient and better able to absorb future disturbances while continuing to function as forests. Forest age class is one of the simplest indicators of forest diversity. Age class is a simple surrogate for stand size structure and function; young forests provide different habitat, products, and ecosystem services than do middle-aged or old forests.

It is hard to look at the current age-class distribution of northern forests and not be concerned about lack of diversity and therefore lack of resilience. Forest age-class diversity would increase with increases in the area of young and old forest habitat. At current rates of forest disturbance, the bell-shaped (unimodal) age class distribution is expected to gradually shift to the right, resulting in greater acreage of old forest habitat. It appears that creating more young forest habitat will require active management, and that process is often constrained by social, economic, and logistical barriers.

A century ago, many of the people living and working among forests were focused primarily on surviving another year. Unlike us, most people living in that era had little knowledge of how their actions would alter future forest diversity and resilience. But just as surely as their actions shaped the condition of today's forests, our actions and inactions will shape the condition of the forests for decades to come.

The information provided by the Northern Forest Futures Project is one resource to help guide discussion as forest owners, managers, and policy makers consider ways to sustain the health, productivity, diversity, and resilience of forests which provide for the well-being of the 125 million people who currently live in the 20 Northern States and for 32 million additional people

In this issue

Forest Management	2, 9
Forest Industry	3
Forest Science	4
Urban Forestry	5, 6, 8

Continues on page 10 >

Forest Management

Returning Fire to Forest Management Part 2: Balancing Challenges and Opportunities

BY MICHAEL C. STAMBAUGH | *Res. Asst. Prof., Forestry, University of Missouri*

DANIEL C. DEY | *Research Forester, U.S. Forest Service*

In Part 1 of the last issue of Green Horizons, we reviewed the history of fire in Midwestern forests and described “The Rub” when determining if burning is appropriate forest management. In this article, we further describe common challenges and opportunities that landowners face when deciding on the use of fire to manage their forests.

Challenges

There are many challenges with fire management of forests, but one of the greatest is fire damage to valuable timber—this is particularly true for hardwoods. Fire may injure trees when the living cambium located just under the bark is heated and killed. Tree susceptibility to fire injury varies widely. Trees with thin bark (maples, elms, dogwood) are injured more readily than trees with thicker bark (oaks, hickories, ash). Smaller trees are more readily injured than larger ones. Once injured, some tree species are better at healing and resisting decay. High value trees, like black walnut or veneer quality oak, have much greater potential for value loss than trees with lower value.

Fire-damaged trees are often deemed cull or worthless--this is not necessarily the case. For instance, fire injury that occurs within a very few years before harvesting, may have little or no effect on tree volume or value. Often, only the lowest portion of the tree is injured. For low intensity fires, injuries may be non-existent or confined to an area very low on the stump or butt log. Although the butt log typically contains most of a tree’s merchantable volume and is usually the most valuable log in the tree, defect and decay resulting from fire injury may be largely contained outside of the scaling cylinder and is removed in slabwood during milling. Time since fire injury is also important because wood decaying organisms cause most of the damage and loss, and it takes time for decay to progress in trees. When planning to burn a forest, important factors to consider are: What are the management objectives and can they be met with burning? What is the expected fire behavior given the fuels, topography, and weather, and will this fire behavior meet the objectives? What is the value of trees and, if injured, how much economic value may be lost, both in the near-term and distant future? Other challenges include managing smoke, assessing fire risks, having the expertise to conduct a burn safely, covering the liability should the fire escape and damage a neighbor’s property, and overcoming fears and historical paradigms (burning is bad).

Opportunities

Despite the challenges mentioned above, professional and private land managers are increasingly motivated to integrate fire into forest management due to the opportunities and benefits it provides. Often, the greatest opportunities relate to improving

wildlife habitat by promoting mast producing species such as oaks and hickories, desired vegetation structure and composition, and native diversity of plants while increasing the amount and quality of forage and browse. Prescribed fire is used to manage for many wildlife species including whitetail deer, turkey, quail, and even some species of bats and migratory birds. Throughout the eastern U.S., burning is commonly recommended with the shelterwood harvesting technique as a means to promote oak regeneration for sustaining oak forests. Moreover, multiple burns increase the amount of light reaching the forest floor. Many of our wildlife species prosper in these open, park-like forest conditions (known commonly as woodlands and savannas) that were once dominant in Midwestern landscapes before fire suppression. Today they are some of the rarest natural communities, having been replaced by dense, closed-canopied forests that have a heavy leaf litter and low plant diversity.

Balance

Fire management of forests, woodlands and savannas is an old practice that is receiving renewed interest, especially on lands with multiple use objectives. Often, decisions to burn forests are not just based upon the standing trees but instead, on multiple factors. Ultimately, the land management objectives determines the value of the use of fire.



White oak-dominated forest that has undergone two low intensity prescribed burns in last five years. Note the open conditions allowing distant views, abundant herbaceous ground cover, partial sunlight, and lack of leaf litter. Photo credit: M. Stambaugh

Forest Industry

Blocking Wood Products: Commonplace in the Ozarks But Not Statewide

BY JASON GREEN | *Pioneer Forest LLC*

To a forester, tree utilization is a very important aspect of a logging job. Better utilization of trees often equates to a cleaner looking logging job and potentially more stumpage for the landowner. In particular, any commercial use of low quality, small diameter trees should serve as an enhancement. In the Ozarks, blocking is sold on a daily basis. It is not in the northern and central part of the state and one might wonder why.

First of all, what is blocking and stumpage? Blocking, as it is called in the Ozarks, generally refers to using small diameter, low quality logs that typically are sawn into pallet lumber. Blocking is not used in such products as flooring or cabinets. Blocking products usually are harvested as individual trees that are less than 11 inches in diameter at breast height (DBH) or as logs that are cut out of the tops of more valuable sawlog trees. Blocking can be utilized down to a 4-inch small end diameter in some cases. Stumpage refers to the value of a tree on the “stump” (i.e., standing), that will be paid to the landowner. Stumpage is most often expressed in dollars per thousand board feet or in dollars per ton.

Selling blocking in the Ozarks is common. Most mills will saw blocking and they generally have good markets for their products. In fact, there are several mills that specialize in selling only pallet lumber from blocking logs. These specialty blocking mills, or “scrag” mills as they are often called, generally buy their logs by the tree length and pay on a per ton basis. General-

ly, landowners in the Ozarks can expect to get between \$8 and \$10 per ton stumpage for blocking. Depending on the size of the sale, the additional income can be significant. For example, let’s assume that a forester sold timber in which he estimated that there were 50,000 board feet (bf) in sawlogs (sawlogs are larger, higher quality logs that are used for cabinet lumber, flooring, and railroad ties and bring much higher prices than blocking). Upon the request of the forester, the logger is asked to sort and merchandize blocking

logs and sawlogs separately. The forester has negotiated a price for sawlogs at \$220 per thousand board feet (\$36.67 per ton) and blocking logs at \$60 per thousand board feet (\$10 per ton). The landowner receives \$11,000 for the sawlogs alone. While it might sound far-fetched, the blocking products from small logs and logs cut out of the tops of sawlog trees can easily increase

the total volume of the sale by as much as 40%. It all comes down to good tree utilization. In the case of the landowner above, he would get paid for an additional 20,000 board feet of blocking. Assuming the price of \$60 per thousand for 20,000 board feet, the landowner would receive an additional \$1200 ($\$0.06 \times 20,000 \text{ bf} = \1200).

So why doesn’t this work outside of the Ozarks in other parts of the state? There are likely several reasons. One is the availability of timber resources. The Ozarks has the highest density of timberland in the state of Missouri. Loggers don’t have to go far to find timber to buy. In other parts of the state, timberland is



Small diameter blocking logs loaded and ready to be delivered to a “scrag” mill. Photo credit: Jason Green

What Can Tree Rings Tell Us?

BY RICH GUYETTE | MU Department of Forestry

When I was a young artist drawing trees, I ended up on a steep limestone bluff looking for some twisted forms of red cedar to draw. Distorted wood was everywhere along the ledge. I took some curious pieces home, sawed them and examined their rings. Wow, there were hundreds of them! At first it seemed unbelievable that these trees could be growing so slow and still be alive. I hardly could believe it was possible. My interest got me into the Wood Science Department at the University of Missouri and into Dendrochronology. This brought me to studying tree rings, the centuries-long perspective trees can give us compared to our own decades-long, short human view of the world around us.

What is Dendrochronology? What can we do with the growth rings of trees? How can we date a cabin or fire scar in the woods by using tree rings? The growth of woody plants leaves a record in their annual rings that allows us to determine their age and what has affected their very existence. Like a history book, each ring is a page of what happened at that place, in that year. Trees can't move around and they only care about water and light, but foresters learn to read their rings like it is a book made for them. The language of the tree ring is read through a forester's knowledge of tree physiology, wood anatomy, and the tree's response to the climate. Indeed, the common climate within a region leaves them with similar patterns in their rings like they are all playing the same symphony!

Dendrochronology or tree-ring dating uses these common patterns in tree growth to date wood of an unknown age, whether in an old house, a forest or from a supply boat that sank in the Missouri River in the 1800's on its voyage from St. Louis to the Western Front. Patterns in tree-rings are created by annual weather conditions, the environment and forest dynamics. Regional climate causes similar growth patterns in the early wood and latewood of an annual ring—an annual ring lays down wood in the spring and summer that can be differentiated. However, this can only happen where there are seasonal annual variations in precipitation and temperature.

The scientific method of analyzing tree ring patterns is called Dendrochronology. It is recognized and used around the world and you can go to court with it. There are many fields of tree-ring science. Tree-ring techniques are used in forestry, ecology, soil

and atmospheric chemistry, archaeology, geology and forensics.

One of the oldest and most extensively studied areas of Dendrochronology is Dendroclimatology which uses tree rings to study the history of past climates. Trees can give us a much longer look into past climates by our using their growth as an indicator of growing season conditions. Books, many journal publications and websites (International Tree Ring Data Bank (ITRDB), NOAA) have been developed on this subject. The ITRDB has thousands of tree-ring chronologies available that can be downloaded. The Missouri Tree Ring Laboratory (MTRL), located at the University of Missouri, has contributed many tree-ring chronologies of shortleaf pine and oak species to ITRDB. Climate and fire occurrence (fire scars) are very important subjects that have been studied in detail by the Missouri Tree Ring Laboratory. How tree species respond to variation in annual climate, from cork oak

in Spain to white oak and sugar maple in Missouri and the eastern US is well documented. However, in the plant world, bur oak tends to be the master recorder of ecosystem growing season climates—its growth has even been found to be significantly correlated with hay crop yields. A thousand-year bur oak chronology from more than 200 overlapping tree-ring series found buried in North Missouri streams, tells a tale of long-term drought variability at several cycles in Missouri. Past droughts in Missouri and the Midwest from 1229-1248, 1368-1384, and 1849-1880 were more se-

vere than anything we have seen in the last 100 years. In contrast, our recent annual precipitation is increasing and becoming more variable (61 inches in 2015, St. Louis instrumental data). This variability will result in conditions that influence tree growth and the tree's annual rings will record it, just as they did in those years of severe drought. Moreover, there will always be another young man who becomes fascinated with the unusual growth pattern of some tree species and will become inspired to study Dendrochronology!



A cross section of a shortleaf pine showing annual rings and fire scars dating back to the year 1586. Photo credit: Rich Guyette

Urban Forestry

Planting a Tree: A Feel Good Thing to Do!

BY BO YOUNG | MU Center for Agroforestry

KIM YOUNG | Forrest Keeling Nursery, Elsberry, Mo.

I was asked to write an article about why planting trees make us feel so good. Just knowing all the benefits derived from planting a tree is enough motivation to get us out there planting this spring! The obvious beauty, the environment, habitat and creating a cool retreat from the hot summer sun is what motivates many of us to plant trees. That, and the sincere hope and belief that the tree will be here for many generations to follow.

I then began to recall all the fun I had as a child playing in and around trees. While raising my children, I made sure we spent a great deal of our days out-of-doors, and I was always so delighted to see them playing under some of the very trees I played under, and even helped plant, as a child. I asked my son to share his thoughts and experiences on the value of a childhood spent growing up and playing amongst trees.

In Bo's words:

I can remember growing up in Elsberry, a rural farm town no more than a hop, skip, and a jump from the mighty Mississippi, just north of St. Louis. Growing up on an orchard, I was surrounded by trees of all kinds but not yet able to understand their purpose, or their significance. I can remember my sister and I climbing a mighty oak tree, whose branches neither broke nor buckled under us. I can remember us running through our 'tickle tree', a weeping willow of considerable age with

descending limbs that would brush against us and make us laugh. I remember a black walnut tree adjacent to our driveway, and my curiosity being aroused by the unique smell and color of the walnuts when I tried to gather them.

I can remember understanding, for the first time, the concept of the plant nursery, where I was raised throughout middle and high school. I was intrigued with the cultivation of trees as crops, and the preservation of natural resources through them. I will always proclaim that most of what I have learned about agriculture, and the conservation of natural resources, came from my grandfather. Through his guidance, I learned the importance of trees, and the role they play in our daily lives.

A grove of sugar maple trees that sit adjacent to my home in Elsberry gave us sap from which we made maple syrup as an FFA project. We would bring out the boiler early in the morning on a Saturday in late February, and be there all day with friends and family that would come and go until the syrup was ready to be bottled. These are moments that helped shape my life. But it doesn't take hundreds of trees to create fond memories in a child's life. By planting a single tree in your yard with your children's help, you can begin growing memories that will last a lifetime.

Something as simple as a tree in your yard can create a new world for your family, just like the tickle

tree did for my son and his sister. Some of the greatest childhood memories happen in the company of trees. So let's get out there this spring and plant a tree with our family. Engage the children in the process.

Trees come in lots of shapes and sizes with varying needs of sun, shade and water. Make sure you choose a tree that will thrive on your site but not outgrow the location where it is placed. Regardless of the tree you select, preparing for the planting is very important. You should dig the hole at least twice as big as the container from which the tree is being removed. However, it is even more important that the tree not be planted too deeply. It should remain at the same height as it was in the container. After filling in the soil and tamping the ground gently around the roots, it is a good idea to layer a 3-4' ring of mulch about 2 inches deep around the perimeter of the tree. Apply a good slow release fertilizer and keep your tree watered throughout the summer and fall—you have just started creating fond memories for your children.



Urban Forestry

Living on the Edge

By LYNN BARNICKOL | *Outreach Project Coordinator, Missouri SAF*

The Missouri Society of American Foresters believes that we all can have a positive effect on trees, wildlife, and insects. Even if you live in an apartment, on a neighborhood lot, or on a farm there are plenty of things you can do. Planting trees, shrubs and flowers provides food for insects and wildlife species, nesting and roosting habitat for birds and at the same time, provides summer shade for our homes. Here are some examples of how I am approaching care of my trees, wildlife, and insect habitat.

The main feature of our home, positioned on less than an acre of ground but nestled into the woods, is the trees; mainly short-bodied post oaks, a couple of taller black oaks, and shagbark hickories. By looking at the vegetation when we moved in, we identified several habitats. Part of the yard was shaded, part was dappled shade, and on another part full sunlight. We thought we had the beginning of interesting habitats. We get a nice variety of birds at our feeders, especially during the migration periods.

As a forester, I knew the best use of these trees was shade for the house and dens for squirrels and woodpeckers. Trees create a lot of leaves, but they get collected, providing exercise and compost. Basically we have a wooded lot with three ages of trees; post oaks 90 years, the black oaks at about 60 years, and some oak seedlings. Openings created by thinning the oaks provide more open space between the remaining trees and helps the surrounding trees remain healthy. We also have a steep, south-facing slope, receiving lots of sunlight that behaves like a glade. Rather than mow, we decided to make a woodland and glade area with native, flowering plants.

To make life interesting, we have replaced a collapsed retaining wall and corrected some

drainage issues. By adding a dry creek, a shallow trench lined with a weed barrier fabric and coarse rock, water is directed away from the house. We replaced the timbered wall with a rock wall. To expand an existing garden pool, we added a wet creek, a shallow trench about 30 feet long that's lined with rubberized pond liner and gravel. Water is pumped through a tube buried in the gravel to the upper end of the creek where it tumbles and eddies back down a gradual slope.

Our wooded lot is taking shape. We have four miniature habitats with trees as the dominant feature. The north side of the house is a moist shade garden featuring native plants. The openings in the woods feature native plants that attract birds and bees, the south-facing slope features native grasses and flowering plants that are unique to glade habitat and beneficial to birds. The wet creek, shaded and lined with native plants and shrubs, was a surprise to us. During a spring morning, we had 20 species of birds using the wet creek.

To sum it up, we do some typical yard maintenance like mowing and leaf raking and the wet creek will require some maintenance. However, it's worth it to be able to watch the birds frolic in the wet creek. Located at the edge of town, the benefits of our wooded lot include shade for the house, reducing cooling bills, and enjoying the relaxing atmosphere.

If you would like to take action to care for your trees, plants, animals, and insects here's a link for habitat information: <http://mdc.mo.gov/your-property/wildlife-your-property/backyard-wildlife>. Additionally, the Forest and Woodland Association of Missouri provides an informational web site for anyone interested in our forests and woodlands: <http://www.forestandwoodland.org/>.



'Living on the Edge'

Continued from page 6

If you do not use a computer please call your local Missouri Department of Conservation office, or the State Forester at 573-751-4115.

About MOSAF

MOSAF is the Missouri state unit of the Society of American Foresters, a professional society with the following objectives:

- to advance the science, education, technology, and practice of forestry;
 - to enhance the competency of its members;
 - to establish professional excellency;
 - and to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society.
- For more information about MOSAF see <http://www.mosaf.net/>

The Bid Box By HANK STELZER | MU Forestry Extension

SHELBY COUNTY, MO

110 forested acres

Doyle tree scale used, 270,000 bd. ft.

114,000 bd. ft. white oak

11,000 bd. ft. red oak

10,000 bd. ft. hickory

3,800 bd. ft. walnut

21,000 bd. ft. dead

114,000 bd. ft. mixed species (shingle oak, black oak, ash, sycamore, cottonwood)

Forester valued sale: \$52,000

2 bids:

\$60,150

\$51,152

Landowner took high bid

Return: \$547/acre

BOLLINGER COUNTY, MO

38 forested acres, 631 trees

International 1/4 Scale used, 150,780 bd. ft.

65,065 bd. ft. black oak

23,463 bd. ft. white oak

18,969 bd. ft. yellow-poplar

9,368 bd. ft. hickory

7,893 bd. ft. sweetgum

7,050 bd. ft. scarlet oak

5,854 bd. ft. northern red oak

4,725 bd. ft. sugar maple

2,451 bd. ft. ash

5,942 bd. ft. mixed hardwood species

Forester valued sale: \$35,000

3 bids:

\$42,300

\$41,000

\$28,504

Landowner took high bid

Return: \$1,113/acre

In this installment of The Bid Box, it is North versus South and selling DEAD trees! One timber sale is in Shelby County (North) and the other in Bollinger County (South). I did this to highlight the two log scales used to buy and sell timber in Missouri. And the dead trees inventoried in the Shelby county sale show the possibility of recovering some value from a dead tree if it has not been dead too long. All of this points to the importance of employing a professional forester who knows the conditions of your trees and the markets in your area.

Some trees in this sale died in 2014/15. The logger has not begun harvesting, but typically they will harvest the larger trees even if the sapwood (the outer ring of wood beneath the bark) is gone. If the heartwood is still sound and unchecked they will buy it. The smaller the tree and the longer it has been dead, the less likely it will be harvested.

If a tree doesn't have paint on it (marked for sale), a logger will not cut it. So, your forester will mark the dead timber and let the logger decide if it has value. That's the beauty of competitive bidding; the 'beauty' is in the eye of the buyer! The forester who marked this sale told me he once had a sale where a large dead burr oak was harvested and the veneer company tagged it for their mill. The sapwood was gone but the heartwood looked like it was still a live tree when cut.

Harvesting Tip: Make sure your timber sale contract restricts wet weather logging. Wet soils are more easily compacted, and rutting of skid trails and haul roads is more likely to occur as well. This is especially true in north Missouri where glacial till soils predominate. But, it can happen on the flatwood sites of southern Missouri, too. Simply have a clause in the contract prohibiting logging during wet weather. But, to be fair to the logger, make sure the clause allows for a contract extension should this occur.

This wet weather clause and other items for you to consider in a timber sale contract can be found in the MU Forestry Extension Guide, G5057 - Basic Elements of a Timber Sale Contract. And, if you have never sold timber before, check out MU Guide, G5051 - Selling Timber: What the Landowner Needs to Know. Lastly, Guide, G5056 - Managing Your Timber Sale Tax, will show you a professional forester and your accountant can reduce your tax liability. Until next time, stay safe and enjoy your woodland!

Urban Forestry

Bradford Pear: Beautiful Flowers, Few Pests, Grows Anywhere... What Could Go Wrong

By ANASTASIA BECKER | *Missouri Dept. of Agriculture*

Ornamental pears (Bradford' and other cultivars) had an extended bloom period this spring due to the weather. It was very obvious that many trees have escaped cultivation and have been thriving in open, disturbed habitats, especially in urban areas. What happened? Weren't these ornamental pears supposed to be sterile cultivars?

It is a tale of unintended consequences, starting in the early 1900s with the introduction of fire blight-resistant Callery pear from China as rootstock in breeding programs for common pear. At the time, common pear yields were down by more than 80% due to fire blight. Using resistant Chinese Callery pear rootstock gave our common pear crop much needed protection. Then, in 1952, a particularly vigorous, thornless Callery pear with abundant flowers was observed in an experimental breeding field. The tree was propagated with cuttings and tested as an ornamental street tree. The cultivar was named 'Bradford' and the rest is horticultural history.

Since the early 1960s, the Bradford pear cultivar has become one of the most widely planted trees in urban landscapes because it tolerates diverse environmental conditions, is relatively pest free, grows rapidly and flowers profusely, yet rarely produces fruit since it can't self-pollinate. Its major drawback is weak branch crotches which make it prone to splitting in storms. This led to the development of other cultivars with better branching, fall color and disease resistance. All of the ornamental pear cultivars are self-incompatible, meaning they can't produce seed with self-pollination, so they were considered to have little potential to become invasive.

However, a perfect storm developed and in recent years, abundant fruits have been found on many cultivars grown in urban settings. The theory on why fruits with viable seeds are now being produced can be traced back to genetics. All of the ornamental pear cultivars are grafted or budded onto rootstock of the Chinese Callery pear. While each cultivar is self-incompatible, cross pollination can occur between different cultivars in close proximity or if sprouts from the rootstock flower, since they differ genetically from the grafted scion. This results in the formation of larger fruits with viable seeds. Birds, especially starlings, took advantage of this new food source and naturally deposited the seeds.

When these seeds sprout, these wild, naturalized plants tend to

have the upright form and many develop thorns on branch ends like the original Callery pears used in earlier breeding efforts. Some of the traits that make ornamental pear desirable in our landscapes (rapid growth, abundant flowers, few pests and highly adaptable to various conditions) are the same characteristics that make these trees invasive when they escape cultivation. Once established, these wild Callery pears can form a sizeable patch in several years that competes with native early succession trees in hedgerows, forest edges and old fields. Currently, wild Callery pear has been found in natural areas in more than 25 states.

What can be done if you have a patch of these undesirable trees? Seedlings and shallow-rooted trees can be pulled if the soil is moist. Trees can be cut and systemic herbicide applied immediately to the stump to prevent sprouting. Basal bark treatment is another option and is faster than cutting and treating. For larger trees, girdle them in spring and summer and consider applying an appropriate herbicide immediately to the girdled area. Optimal times for herbicide uptake are late winter to early spring, or during the summer. For specifics, consult Missouri Department of Conservation's Callery Pear publication, which is part of their invasive species series. Repeated treatments will be needed for several years

since trees can resprout and there is a seed bank in the soil.

Instead of planting more ornamental pears in our landscapes, consider instead some of the attractive alternative native trees such as American plum, Mexican plum, flowering dogwood (our state tree), eastern redbud, green hawthorn (almost thornless and resists cedar rust diseases), American smoke tree, Carolina buckthorn, rusty (southern) black haw and serviceberry.

Link for the MDC Callery Pear pub: <http://mdc.mo.gov/sites/default/files/resources/2012/05/callerypearinvasive.pdf>

If interested in an in-depth read check out *The Beginning of a New Invasive Plant: A History of the Ornamental Callery Pear in the United States* by Theresa Culley and Nicole Hardiman, *BioScience*, Dec. 2007, Vol. 57 No. 11



Bradford pears that have escaped from a yard and are thriving in a disturbed habitat. Photo credit: Anastasia Becker

Forest Management

By the Numbers: The National Woodland Owner Survey in Missouri, Part II

By STEVE WESTIN | *Missouri Department of Conservation*

This article continues our look at the Missouri results from the National Woodland Owner Survey of 2013. The first of this series of articles was published in the Fall 2015 issue of Green Horizons and primarily covered how many owners of forested land Missouri has, and the size of their woodlands. In this article we will explore more about why Missouri's woodland owners own their land, the recent management activities they have carried out, and what they plan to do in the next five years.

Before we delve further into the Survey results, a quick word about why we place so much emphasis on privately owned woodlands. Though individuals are often surrounded by privately owned woods, many think that Missouri's forests are mostly owned by some government agency such as the U.S. Forest Service (Mark Twain National Forest), or the Missouri Department of Conservation (Conservation Areas across the state) because they have big signs and are open for public use. In fact, 83% of Missouri's wooded lands are in private ownership and most of that land is owned by individuals and families.

These private woodlands provide benefits for all Missourians, including: protecting and enhancing soil resources, and filtering and regulating the flow of water running into our streams and rivers which provide habitat for aquatic life of all kinds, as well as drinking water for many people. They also clean the air we breathe, provide wildlife habitat, and finally serve as a source of raw materials, furnishing our forest products industry with the wood to create all the things our society uses on a daily basis that are made of wood. In short, private forests provide public benefits!

Why do forest landowners with more than 10 acres say they own their land? According to the survey:

- 77% enjoy beauty or scenery**
- 72% protect or improve wildlife habitat**
- 71% for privacy**
- 68% protect nature/biological diversity**
- 62% pass land to children/heirs**
- 61% part of their home site**
- 59% protect water resources**
- 48% for hunting**
- 29% as a source of firewood**
- 18% to sell timber products**

What activities have Missouri's woodland owners done in the past five years, and what are they planning to do in the next five years? The survey says:

	Past 5 Years	Next 5 Years
Cut trees for personal use	52%	56%
Livestock grazing	26%	32%
Reducing invasive plants	26%	39%
Improve wildlife habitat	34%	58%
Trail construction	18%	30%
Non-timber forest prods.	17%	22%
Controlled burn	14%	17%
Cut trees for sale	14%	12%

‘Blocking Wood Products’

Continued from page 3

more widely spread and loggers often must travel farther to find it. Another reason is likely economics. The central and northern parts of the state have far fewer sawmills than are found in the Ozarks. So when a logger buys timber, he may have to haul it farther which increases his logging costs. There are real limits on what is economical for a logger to cut and haul. Furthermore, there are very few pallet lumber mills in other regions of the state, so hauling blocking becomes a major issue for loggers in those regions. A final reason is culture and tradition. Small diameter timber is very difficult and, in many cases, impossible to sell in the northern and central parts of the state. Part of the problem could be related to the tradition of using the Doyle scale (vs International ¼ Inch in the Ozarks) which tends to give poorer volume estimates on small diameter timber. The Doyle and International scales are rules used to estimate the number of board feet in logs based upon their diameter and length. Selling blocking by weight, however, could alleviate this issue. Cutting and hauling blocking in the Ozarks has been on-going for decades, but the Ozarks has a different forestry culture and tradition from other areas of the state.

There are probably opportunities for blocking mills in some locations in the northern and central parts of Missouri. Individuals thinking about beginning a blocking mill will undoubtedly have some challenges and will need to be especially strategic in their location of operation. However, establishment of a few mills would provide landowners, loggers, and foresters with more options for utilizing the timber resource and would increase the income from landowner’s sales.

‘Northern Forests’

Continued from page 1

expected by 2060.

For more information about this and many other topics covered by the Northern Forest Futures Project, please see <http://www.nrs.fs.fed.us/futures/>.

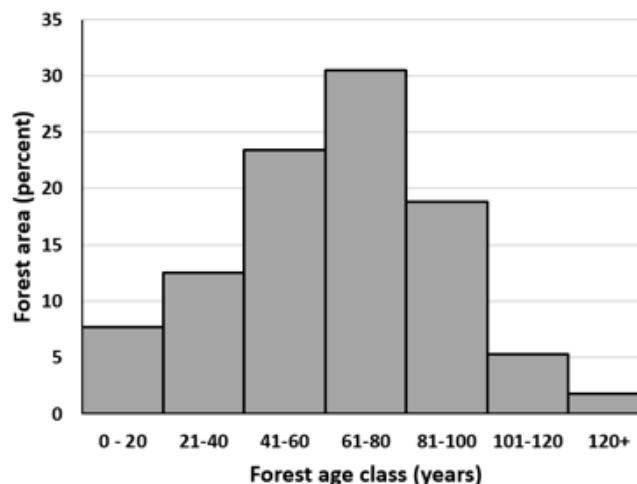


Figure 1. Forest area by age class for the 20 states in the U.S. North.



green horizons

editorial board

Mike Gold, Research Prof., co-editor
MU Center for Agroforestry

Gene Garrett, Emeritus Professor, co-editor
MU Center for Agroforestry

Taylor Wanbaugh co-editor
MU Center for Agroforestry

Joe Alley, Resource Conservationist
NRCS, MO SAF

Scott Brundage, Consulting Forester

Eugene L. Brunk, MDC Retiree

Donna Coble, Executive Director
Forest ReLeaf of Missouri

Lynn Barnickol, Executive Director,
Missouri Consulting Foresters Association

Shibu Jose, Professor, Director,
MU Center for Agroforestry

Rebecca Landewe, Current River Project
Manager
The Nature Conservancy – Missouri

Francis Main, chair,
Missouri Tree Farm Committee

Dennis Evans, chair,
Missouri Walnut Council

Steven Westin,
MDC Private Land Forestry Programs

Clell Solomon,
Mo. Christmas Tree Producers Association

Hank Stelzer, Professor
MU Forestry Extension

Robert Stout
Mo. Department of Natural Resources

Kim Young, Vice President/General Manager
Forrest Keeling Nursery

Bob Ball, Woodland Landowner

CONTRIBUTORS



Missouri Chapter
Walnut Council



MISSOURI
CHRISTMAS TREE
ASSOCIATION



MU School of Natural Resources
College of Agriculture, Food and Natural Resources

Contact Green Horizons

Send story ideas, address
changes and subscription requests
for Green Horizons to:

Mike Gold, Gene Garrett
Green Horizons

University of Missouri
203 ABNR

Columbia, MO 65211

goldm@missouri.edu | (573) 884-1448

garretth@missouri.edu | (573) 882-3647

Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Dr. Michael Ouart, Vice Provost and Director, Cooperative Extension, University of Missouri, Columbia, MO 65211. University of Missouri Extension does not discriminate on the basis of race, color, national origin, sex, sexual orientation, religion, age, disability or status as a Vietnam era veteran in employment or programs. If you have special needs as addressed by the Americans with Disabilities Act and need this publication in an alternative format, write ADA Officer, Extension and Agricultural Information, 1-98 Agriculture Building, Columbia, MO 65211, or call (573) 882-7216. Reasonable efforts will be made to accommodate your special needs.



The Center for Agroforestry
University of Missouri

A Global Center for Agroforestry, Entrepreneurship and the Environment

green horizons

The Center for Agroforestry at the University of Missouri
203 Anheuser-Busch Natural Resources Bldg.
Columbia, MO 65211

Calendar of Events

Chestnut Growers of America Conference

June 10-12, 2016

MU Anheuser-Busch Natural Resources Building, Columbia, Mo. Registration deadline Tuesday, May 31

Questions -- Contact CGA: CGA@ChestnutsOnLine.com

<http://www.chestnutgrowers.org/2016registration.pdf>

MOSAF Summer Workshop

Field Tour - June 14-15; Workshop - June 16, 2016

Multiple-use Forest Management in the Presence of Invasive Plants

Rockwoods Reservation, Wildwood, Mo.

Registration deadline, Tuesday May 31

Questions -- Frances Main, MOSAF Treasurer, 417-895-6880

<http://www.mosaf.net/> -- <http://www.tposfirescience.org/case-studies-of-fire-ia-mo>

Elderberry Workshop & Field Tour

June 16-18, 2016

MU Bradford Research Center, Columbia, Mo. Early registration ends May 15th

<https://elderberryworkshopfieldtour.wordpress.com/>

4th Annual Agroforestry Academy

July 25-29, 2016

Columbia, Mo.

Registration ends June 1. Limited scholarships available for military veterans.

Questions -- Contact: Caroline Todd: toddcs@missouri.edu

<http://www.centerforagroforestry.org/academy/2016/RegistrationBrochure.pdf>

Ecosystem Services of Cover Crops

August 3, 2016

Salisbury, MO

Registration ends July 27, 2016

Questions -- Contact: Caroline Todd: toddcs@missouri.edu 573-884-2874