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Earl Says...

Hard to believe it is the year 2020. And this issue begins our 20th year in publication. I want to thank you all for subscribing with us and trusting us to bring you the latest in wildlife management information. I know there are several of you who have been with us from the start when we were a black and white newsletter. There are a lot of places you can get advice and information to manage your property and we will continue to give you the unbiased, practical articles you require.

By the time you are reading this, most deer hunting seasons will have ended. This was by far one of the most trying hunting seasons I can think of personally. Lack of rain at planting time, broken equipment, flat tires and the heat we all experienced sure made this one for the ages for us. I only hope your season was better. But there's a bright light just ahead... Turkey Season! Maybe I can make up for this year with a successful bird hunt or two.



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Venues: Support Your Farming Habit With Country Style Hospitality

by Keith Summerour



The Entertainment Venue, Bramble Hall, Blackberry Farm, TN

As all of us involved in our land management decisions know, it costs a lot to run a farm. If it's not a tractor part it's more fuel, more seed, more labor, more, more and more! As I have pondered various schemes to support my outdoor addiction, I have turned my attention to one very happy, very fun and enjoyable business plan: weddings and retreats on the farm. Although not a new idea, it's taken the imagination of the urban and suburban dwelling public by storm.

My inspiration to create venues was sparked by a lovely old warehouse I updated in 2005. Previously home to Preston Rose Printing, the space has been in various uses since the 1920s. A wall of windows running the entire length of the warehouse frames a breathtaking skyline pan-

orama of Atlantic Station and Midtown. Careful, creative re-uses of industrial elements guarantee surprise and delight, and—as an unforgettable focal point—a hand-crafted wood replica of Michelangelo's Laurentian Library staircase sits grandly but quietly at the room's south wall. It was such an inspirational, joyful place I didn't want to keep it all to myself.

So, at first, I used my own studio space during off hours as a wedding and meeting venue. As a space used for business, people would come and go, meetings would be had, and everything was relatively quiet and sedate. But then people not accustomed to buildings like that would come in to see the space, or a bride would come in with family, and the atmosphere

Keith Summerour was born and raised in Alabama and graduated from Auburn University with a Bachelor of Architecture in 1987. Included in that five-year program was a year abroad studying the classical architecture in London, Paris, and Florence. Florence clearly made a huge impact on Summerour as he took an apartment and established a studio there in 2004 and spent numerous months in the city for years to come. Today he still visits Italy frequently, immersing himself in the architecture, food and with the people he has met along the way. He also serves on the Board of The Florence Academy of Art.

Summerour spends most of his free time on his farm in Gay, GA, Towerhouse Farm, where he keeps chickens and bees, raises sheep and grows his own vegetables. His focus has turned to a healthier, mindful way of living which extends into the firm's culture.

completely changes. It's fun to see people get excited about a place you helped create.

Over two years the venue became such a successful business that we're now booking two and a half years in advance. Summerour Studio is now the top venue of its size in Atlanta. My working office moved several miles away, and from there we have created buildings and designs for other owners around the South, including other farm owners. I also began thinking about offering a rural space for weddings, corporate retreats, health and wellness workshops in a peaceful, idyllic environment instead of an urban one.

Bramble Hall: Everything New is Old Again

Personal musings about retreat and event space happily coincided with my professional life when

Summerour Associates was selected to create event space at the renowned Blackberry Farm. We were tasked with marrying state-of-the-art culinary and winery hospitality with the feel and aesthetic of a long-established country estate.

Chris Jones, Principal of Design, is the lead architect for this project. "Kreis and Sandy Beall purchased some property in the Smoky Mountains with a farmhouse on it in the late 70s, and Kreis was inspired to create a mountain retreat where they could share good food and fun with family." Creators of the Ruby Tuesday Restaurant chain, it was a natural fit for the Bealls to host office retreats and different company events here as Blackberry Farm grew into a small country inn.

Its 4,200 acres have been a mountain haven and tranquil escape for

family, friends and guests for more than 25 years as it evolved into a luxurious resort of breathtaking scenery, gourmet cuisine and pleasurable pastimes. Private ownership, now available at Blackberry Farm, gives anyone in the world access to bespoke country mountain living and the Southern hospitality it made famous.

"Food is a big part of the culture at Blackberry Farm," Chris continues. "They have cottages and houses to rent, there's a brewery, an award-winning creamery, outdoor activities like fly fishing, horseback riding and hiking. They're rather well known for road bike racing, with several road rally events each year."

The gathering point for the Farm has always been the restaurant, housed in the barn. When more event space was needed, the owners called on Summerour Associates.



The Demo Kitchen, Bramble Hall, Blackberry Farm, TN

“Bramble Hall was built from scratch, evolving from the farm yard idea and the existing buildings, the barn and creamery,” Chris continues. The design team connected the new event space with the barn via an underground tunnel. “At the center of the farm yard is a cold frame, which is also a skylight into the tunnel wine-tasting room. So, guests enjoy a procession of events as they move from dinner at the barn across to the evening’s entertainment.

Our intention was to create a farm structure that ended up looking like it’d been there for a hundred years,” Chris says. “We achieved that in many ways, not only through the overall form and assemblage of forms but in material selections, like aged cypress siding.” Since its opening in 2016, Bramble Hall has hosted hundreds of events, including any number of dream weddings down on the farm with impeccable hospitality.

More Advantages for Hosting Events

My time is my most valuable asset, and that’s just one advantage to using my farm as an event venue.

It’s a great way to supplement my farm income because events are planned not to interfere with the real work of operating a farm. Depending on your farm and how much land you have, a little creativity can result in unforgettable events. An old barn on the property might take only minimal efforts to fix it up. The obvious trade-off is giving up an area of your property for others to rent and enjoy on occasion – as much or as little as you like – in exchange for farm income. I suggest finding a spot for weddings, either tented or permanent pavilion, far enough from your home to allow the revelers to have their space and not disturb you. I would also find a location that has easy access to utilities; noisy generators are not much fun at a party. A picturesque view for photographs with farm props, if available, is important too.

My own country retreat, Towerhouse Farm, quickly became a favorite location for office parties. Kristin Meredith, my assistant, was in charge of organizing parties, and they got bigger and better every year. “When the tower was finished

about ten years ago, we started having office happy hours, once a month, at the farm. Whether we’re riding four wheelers, just relaxing on the porch with its beautiful views, skeet shooting, having a bonfire or grilling, it’s a great gathering place,” Kristin says. “Since it’s not too far away from Atlanta people are always happy to make the trip.” Building camaraderie within a company, large or small, is one of many reasons event planning is a lucrative business. Providing the physical space to host events gives land owners additional income as well as the satisfaction of showcasing their property and creating wonderful memories.

“Keith has at least one big party annually, for designers and other architects, vendors and other consultants. One year we had a falconer at the Christmas party. Another year, we had tents set up across the property, it looked like the Italian countryside.” Keith and Kristin also take advantage of the natural splendor offered up on a farm. One year, that included a sea of bobbing sunflowers and the wildlife they attract.



The Pasture Hillside Amphitheatre, Bramble Hall, Blackberry Farm, TN

Some days, tens of thousands of blackbirds would come in big, swooping waves and descend on the sunflowers and trees. The setting inspired a memorable late-summer party and a ravishing tabletop, set with stoneware plates, rustic pottery, pewter glasses, natural linens and freshly picked figs. Towerhouse Farm has also hosted health and wellness retreats, weekend photography workshops, plein air painting sessions and corporate events including hunting.

Our most recent and exiting addition is our “farm house brewery” Towerhouse Farm Brewery, which was developed and is set in our old tobacco barn. We love to create unique experiences at the highest level for our guests and events. Implementing a farm to table beverage service to our existing platform seemed like a great next step for furthering our culinary interest; plus the beer is great!

There’s Nothing Complicated About Having a Good Time.

When you begin to plan operating as an event venue, don’t make it complicated. The public is coming to us and our farms because they are drawn to simple, natural beauty. The amenities you provide are only a framework for that.

I wish I had known how much money I could have been making if I’d started hosting events sooner. A steady stream of people to your farm is good cross-branding and increases name recognition; over the years you might have thousands of people visit. So, if your farm hosts quail hunters or you have bees and promote their products, events are a terrific way to expand another existing business without spending any additional money on marketing.

Most weddings take place on Saturdays, and you should plan for



The Event Granary, Towerhouse Farm, GA

load in either one or two days beforehand. This would include rental, food and beverage deliveries and set up. Load out is the day after or immediately after the wedding by the catering staff. Retreats are usually smaller groups of people, either family reunions or business parties and can be quite short or last several days.

Shorter retreats are a better option for most of us, because that reduces the need for onsite housing. But, if you already accommodate hunting parties, you may have housing already available.

How Profitable Can a Wedding Venue be?

Financial rewards for creating a wedding and retreat venue are varied with many caveats. Some basic rental rates can be discovered by researching similar locations – but bear in mind, your goals must be

similar. I have seen farm wedding rates from \$5,000 to \$150,000, so knowing the land and clientele you are catering to is paramount.

Generally speaking, you should seek to have a high level of picturesque farm beauty mixed with traditional farm architecture such as old barns and farm homes with porches. It falls into the difficult to define category of “you know it when you see it.”

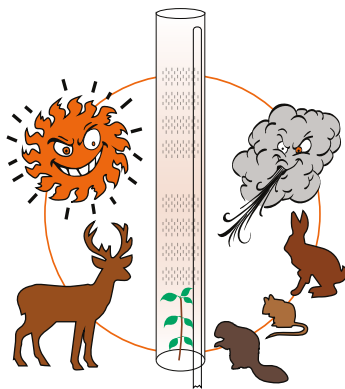
To me, a beautiful farm is rolling pastures, mature oak trees and wild flowers, hay bales in the field and old barns, great tractor and trucks, and a bass pond. But this description takes on many forms and covers a lot of territory. In other words, a low country plantation can be just as appealing as Tennessee foothill farmland outside Nashville.

The approach and setting are the most critical factors in venue success. I believe every property has its best and unique features for creating quiet enchantment. It could be a short view of a large pond or lake with a beautiful dock or a pastoral view of row crops with the event site under shade trees. It could be a repurposed barn and sharecropper cabins or a cypress grove at sunset.

The demographic trend of a rural economy shifting to urban dwelling has created an inherent desire to return (if only for a short time) to the ancestral bucolic land. For most folks, the farm is an exotic experience. For us who find our land anything but exotic, this is an opportunity to share our landed heaven for the assured conservation that we seek through this and other farm business ventures.

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The "Back Porch", Towerhouse Farm, GA



Entry Courtyard, Summerour Studios, Atlanta, GA

Pinus: The Biology and Ecology of Pines

by Ryan Shurette



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The Great Basin bristlecone pine holds the title of the world's oldest living individual tree. One tree in the Inyo National Forest in the eastern California Mountains was recorded as 5065 years old. Photo: Wikipedia commons

The year was 2833 BC. As the rising sun lit up the pale rocky hillsides of the White Mountains, on a piece of ground that would one day become the Inyo National Forest in eastern California, a Green-tailed

towhee (cousin to the Eastern towhee) began his morning ritual. Since it was early spring this towhee was intent on singing from the highest perch he could find, a sentry position from which he could attract

a female and warn other male Green-tailed towhees to stay out of his territory. His plot was situated in a sparsely scattered grove of gnarled Great Basin bristlecone pines (*Pinus longaeva*), and these are not tall

trees. The meager understory consisted only of clumps of dwarf paintbrush, wax current, and western yarrow sprinkled here and there among the mostly barren rocky slopes. This place is a harsh environment with poor dry soil and cold winters. But to the towhee it was home. During his morning chorus, however, there were no signs of other towhees; no rival males and no lonesome females. So from the tallest bristlecone on his turf (only about 25 feet high) he jadedly fluttered to the ground to scratch out a breakfast from whatever seeds or occasional insect he could find. A plump bristlecone pine seed, dropped from the parent tree above a few months earlier, lay helplessly on the dolomite rocks in front of the hungry towhee. He quickly spotted it and grabbed it up to swallow. Just as he plucked it from the rocks however he heard the soft call of a female a little ways down the slope, and in a nervous panic he took to the air, flying with high anxiety in her direction. In his frantic exodus he produced his best melodious song, and this allowed the lucky bristlecone seed to fall back to the ground and onto an open spot of loosely packed soil and slag fragments. The towhee pair went on to raise a family on that hillside, and in the meantime the pine seed germinated there in the poor desolate soil, with the assistance of a couple unseasonable rain showers. It grew at a respectable rate for the first few years and then slowed its development to a languishing crawl as it matured. Some 4848 years later, in the spring of 2015 I visited this grove of ancient trees with my family. I watched as Green-tailed towhees sang from the tip-tops of the old twisted bonsai-like relicts. There were young bristlecone seedlings and many juvenile (100-200 year old) “saplings” scattered around, as well as thousands of the old super-mature trees that have



Pines date back to the pre-Mesozoic Era, although a great deal of speciation has occurred since then. Within the genus Pinus itself, there are approximately 120 species (including trees and shrubs) and they are the most abundant type of conifer. Pines are found almost entirely in the Northern Hemisphere, especially in seasonally cool and cold climates. Photo: R. Shurette

stood the test of time. The seedling from 2833 BC is still there somewhere too, and it is still alive! The exact location of the tree (named Methuselah) is kept secret since it once held the biologically significant title of the oldest non-clonal organism known to man. The new champion (5065 years old) was discovered somewhere in the same mountain system and it also remains anonymous for its protection.

Bristlecone pines certainly don't get in any hurry and the same can be said of many of our other North American pine species, including the ponderosa (~700 years), white (~500 years), longleaf (~400 years), lodgepole (~400 years), and shortleaf (~250 years) pines. Each spe-

cies has its own unique characteristics, physiology, and niche in the regions it occupies. In this article we will examine some of the most common pine species and discuss their ecology and management with regards to native plant and wildlife communities.

First things first. A “pine” is technically a coniferous tree in the genus *Pinus*, within the family Pinaceae. The family contains about 250 species worldwide, including cedars, spruces, and firs. Many in this group date back to the pre-Mesozoic Era, although a great deal of speciation has occurred since then. Within the genus *Pinus* itself, there are approximately 120 species (including trees and shrubs). Pines are found almost



Open fire-maintained shortleaf pine stands can provide the same high quality wildlife habitat as longleaf stands. This is directly related to the herbaceous understory associated with these systems. Bobwhite quail as well as many of the longleaf pine associates are just as content in these systems as they are in longleaf. Photo: R. Shurette

entirely in the Northern Hemisphere, especially in seasonally cool and cold climates. Pines are evergreen and resinous, and they are among the most commercially significant tree species in North America, as they are prized for their timber and wood pulp value. In warmer regions like the Southeast, pines are typically fast-growing softwoods (at least for the first few decades of their lives) in nutrient rich soils. However they can be very slow growing on poorer sites. Many pines are often managed in short rotation artificially stocked plantations, primarily for pulp production and the paper making industry.

Thirty six species of native pines occur in North America. They are the most abundant conifer in the United States, and in many regions,

they are the most abundant tree type. Pines are gymnosperms, as opposed to flowering plants (angiosperms), and therefore they typically do not rely on bees and other traditional pollinators for their survival. Instead, they are mainly wind pollinated. The Greek word “gymnosperm” means “naked seed”. Pines, like all gymnosperms, have two types of cones. Smaller male cones are generally produced on new growth shoots and they are partly responsible for the copious clouds of yellow pollen each spring. The larger female cones are usually attached directly to heavier limbs and produce the winged seeds (originating between each scale) that spiral to the ground when the time is right for their dispersal. In some species, seeds are held until after a fire event. The fragrant res-

inous leaves, or needles, persist for two years and new needles are produced each year, allowing pines to remain evergreen. Pines typically have thick protective bark that offers protection from fire and other elements, but this varies also depending on species.

As we established earlier, the species of pines one may expect to find in a particular region will vary depending on soil type and climate. And so will the plant and wildlife species associated with the certain kinds of pine forests. One of the best known ecosystems in the southeastern US is the Longleaf pine (*Pinus palustris*) forest system, which historically extended from Virginia to Texas. As a species, the longleaf pine has three needles per fascicle that average 10-16 inches long. Female cones are large, rang-

ing from 6-10 inches long. Due to the drastic reduction in its native extent, many now-rare species are tied to this tree species and its ecology. Lots of articles and research papers have been written about the importance of longleaf pine ecosystems, especially those forests found in the coastal plain regions. This species is indeed most common in low elevation, sandy soils. In fact the species epithet (*palustris*) actually means “swampy”. This name is a little misleading however since longleaf actually thrives in dry and well-drained soil types, even sometimes growing in seemingly solid rock. There are actually significant forests of longleaf pine in the mountains of the Ridge and Valley ecoregion and throughout the hills of the Piedmont. These longleaf systems are sometimes referred to as “montane longleaf pine” forests. Montane longleaf pine is typically very slow growing due to poor site

indices and harsh conditions. Studies have shown that montane longleaf also produces more abundant and frequent cone crops than the flatwoods longleaf pines.

The Red-cockaded woodpecker, Northern bobwhite, Eastern fox squirrel, Brown headed nuthatch, Eastern cottontail, Bachman’s sparrow, Henslow’s sparrow, Eastern diamondback rattlesnake, Eastern indigo snake, and Gopher tortoise, are all associates of healthy longleaf pine forest systems, with the latter three species restricted to the coastal plain regions. Healthy longleaf systems are generally those that are regularly exposed to, or maintained with, consistent fire. Longleaf pines are obviously very tolerant of fire. They have insulating bark and long insulating needles that protect meristem shoots from mortality during a burn event. In fact, many other pine species are

also dependent on periodic fires for their long-term survival and reproduction, whether by promoting successful germination of seed, controlling competing vegetation, or both. As a seedling, the longleaf pine patiently sits in a low stature grass stage, typically for two to five years, building the carbohydrate energy reserves in its main tap root. Then when fire or some other disturbance comes along it bolts upward to take advantage of the available sunlight. Longleaf needles are resinous and very flammable and therefore can increase the likelihood that a lightning strike will ignite the stand. Any pine forest system (not just longleaf) that is fire adapted typically has abundant fine fuel understories. A grassy understory is made possible by the fire’s control and/or elimination of the woody midstory (saplings and mid-canopy sized trees), thus allowing ample sunlight to reach the ground.

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Longleaf pine systems are known for their extremely high grass, forb, and legume diversity, and some rare plant species (such as several pitcher plant species, Venus' flytrap, Panhandle lily, American chaffseed, Hairy wild indigo, and Barbara's buttons) also rely on these habitats. Therefore, one of the most effective and cost-efficient treatments in longleaf pine forests is prescribed fire. Once heavily utilized in the naval stores industry, longleaf pine is also highly prized for its timber value. Although it can be relatively slow starting on some sites, it is a prime timber species, and is important in the pole market in some

regions. It has excellent structural timber quality and is moderately to very rot resistant at maturity when there is significant heartwood in the lumber. Although there were challenges in restocking longleaf up until a couple of decades ago, the high survival realized through containerized seedlings, as well as a better understanding of site preparation techniques, has made longleaf a much safer investment for managers. Due to its longevity most longleaf stands are managed at relatively long rotations (for financial and wildlife reasons) as compared to species like loblolly pine.

Shortleaf pine (*P. echinata*) is somewhat similar in its biology to longleaf pine. Shortleaf, however, is easily distinguished by its short (3-4 inch) needles in bundles of 2 or 3 per fascicle. They typically have numerous small (around 2 inches long) cones. With a historic range of 22 states, its habitat is similar to the longleaf. Shortleaf occurs on several acidic soil types including well drained sandy loams to rocky sites, and also sometimes on clay soil types. Like the longleaf ecosystem, shortleaf systems were also shaped largely by periodic fire on the landscape. It is believed that Shortleaf pine systems evolved with a fire return interval of 2-18 years (Pickens, 2019). As a larger sapling and a mature tree it can tolerate fire fairly well. However, small seedlings and saplings are not as fire-proof as longleaf and typically do get top-killed during a burn. However, shortleaf is a re-sprouting species. Therefore, when regenerating shortleaf, fire is often excluded for a few years so that the seedlings can establish a significant root system from which to re-sprout, or until they can withstand the thermal stresses of the fire. From a timber management perspective, shortleaf is very similar in its quality and form to longleaf when mature (in the sawtimber market). Planting shortleaf is not nearly as popular as planting longleaf or loblolly, however. This trend is partly due to forest health concerns, particularly concerns from "littleleaf disease". Littleleaf disease is prevalent on the erodible clay soils of the Piedmont ecoregion and is often caused by stresses due to these soils and their nutrient deficiency, poor drainage, and variable moisture content (Campbell and Copeland, 1954). These stresses often lead to fungal (primarily *Phytophthora cinnamomi*) as well as nematode infections and ultimately cause death in the tree after a few years in most



Loblolly has been used extensively throughout its native range for paper pulp production and currently exists in densely stocked plantations on millions of acres. Typically these shaded plantations have relatively low value when it comes to wildlife habitat quality. Photo: R. Shurette

cases. While other pines in the Southeast are also susceptible to littleleaf disease, shortleaf pine is the most commonly affected species. Open fire-maintained shortleaf pine stands can provide the same high quality wildlife habitat as longleaf stands. Again, this has to do with the herbaceous understory associated with these systems. Bobwhite quail as well as many of the longleaf pine associates are often just as content in these systems as in longleaf.

The most common tree in many parts of the Southeast today is the Loblolly pine (*P. taeda*). The native range of loblolly pine extends through the eastern United States from southern New Jersey south to central Florida and west to eastern Texas. This range includes the Gulf and Atlantic Coastal Plains, the Piedmont, the Cumberland Plateau, and the Ridge and Valley ecoregions. Loblolly has bundles

of 3 needles (5-8 inches long) per fascicle and female cones of about 4 inches long. It commonly reaches heights of 80 feet. This pine can be very fast growing on high quality sites and typically prefers more mesic sites than the former two species of Southeastern pines.

However, it can grow on a variety of acidic soil types. Loblolly has been used extensively throughout its native range for paper pulp production and currently exists in densely stocked plantations on millions of acres. Typically these plantations have lesser relative value when it comes to wildlife (both game and non-game species) habitat quality. This is due to the tight, closed canopy conditions and little to no herbaceous understory on the forest floor. While dense plantations do offer good cover for deer and some other species, a common management prescription is to thin these plantations if wildlife is a priority. Loblolly is not as fire tolerant

at an early age as longleaf or shortleaf but in areas that are not burned on a short rotation it is an excellent pioneer tree species. Loblolly is generally a more efficient seeder than longleaf as evidenced by the rapid colonization seen in old fields, when mature seed source loblolly trees are present. After it persists to a few years old however, a loblolly pine can tolerate periodic fire and it can be managed with most of the same understory benefits of shortleaf and longleaf systems. In these cases, loblolly is sometimes referred to as a surrogate pine, taking the place of historically occurring pine forests (longleaf and shortleaf) that have been lost due to fire suppression and other land use changes. Loblolly has similar wood quality traits as longleaf and shortleaf and is still the most commonly planted pine in the southeastern region. One forest health concern that managers sometimes face with lob-

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Jack pine is ecologically important because it is the key habitat feature for breeding Kirtland's warblers, one of the rarest birds in the United States. This bird breeds only in large stands of young Jack pine in a very small area of Michigan. Photo: USFWS



Healthy longleaf systems are generally those that are regularly exposed to, or maintained with, consistent fire. The Red-cockaded woodpecker (shown here) is an associate of healthy longleaf pine forest systems. Photo: R. Shurette

lolly is that it reaches its peak rather quickly (when compared to longleaf and shortleaf) on some dry nutrient-poor upland sites, some-

times as early as 30-40 years old. Loblolly decline can occur when it occurs on these soils for which it is not well-suited, and as a result the

stands become stressed. In a weakened state they are attacked by bark beetles and root weevils, and are commonly infected in the process by one or more species of fungus (most commonly *Leptographium* sp.). On richer, more mesic sites this disease is not too much of a concern and the tree can live to be well over 130 years. Poor soils and overstocking (and other stressors such as injury) can also lead to infestation by Southern pine beetles, especially in Loblolly pine. These tiny beetles can wipe out thousands of acres of pine forests in a single season. Thinning in overstocked loblolly stands is often prescribed as a preventative treatment to defend against Southern pine beetle epidemics. Thinning improves the vigor of the remaining individual trees and helps to break the reproduction cycle of the beetle by exceeding their flight distance from tree to tree. Fusiform rust (caused by the fungus *Cronartium quercuum*) is another very important disease in Loblolly pine and it is recommended that managers use "improved", rust-resistant, seedlings when purchasing from nurseries for replanting stands.

With a range that extends from southern South Carolina to eastern Texas and south throughout Florida, in many wetter areas of the coastal plain, Slash pine (*P. elliottii*) becomes the dominant native forest type. Slash is similar to longleaf but it is more suited to semi-saturated and deeper sandy soils and often occupies wetter sites. It is still fairly tolerant of fire and has basically the same high quality wood and timber characteristic as the other southern yellow pines. Due to its high resin content it is often used for railroad ties, pilings, and poles (Lohrey and Kossuth, 1990). It was (and to a lesser extent) is still used as a resin source for the

turpentine industry. Slash pines are sometimes difficult to discern from longleaf pines. They have fairly long needles (8-9 inches) and medium sized cones (3-6 inches in length) and express a similar growth habit and look as longleaf. They are also known to hybridize with both Longleaf and loblolly pines as well as Sand pine (*P. clausa*), which also occupies similar habits in the southern coastal plain. There are two varieties of slash pine, the typical *elliottii* variety and the Florida variety, with the latter occurring throughout the entirety of Florida, and even into the Florida Keys. Slash is fast growing and is often planted for soil stabilization as well as for wood products in the Southeast. Slash is most commonly regenerated using even-aged silvicultural methods. These consist of either artificial regeneration (clear-cut and replant with seedlings), or through natural regeneration using on-site parent trees (using a seed-tree or shelter-wood method). The two most common diseases of Slash pine are Annosus root rot (caused by the fungus *Heterobasidion annosum*) and fusiform rust. Slash, like loblolly is often planted off-site on soils that it is not well suited for. This can sometimes cause problems with stand longevity. Regarding wildlife, slash pine seeds are consumed by many birds and small mammals and thick stands offer good cover for deer and other species. Red-cockaded woodpeckers will sometimes use this species, as well as bald eagles, for nesting (like the aforementioned southern yellow pines). This pine is often one of the most common overstory species in the wet flatwood ecosystem. This ecosystem is maintained by fire, but at probably a slightly less frequent rate (perhaps 5-7 years) as compared to upland longleaf ecosystems (Landers, 1991). Wet flatwoods can be very diverse in their

herbaceous/shrub understories. They typically contain wiregrass (*Aristida*), blue maidencane, toothache grass, Carolina redroot, beaksedges, and various species of pitcherplants.

Changing the scenery completely, as we move up into the north half of Alabama and Georgia, through Tennessee, Kentucky and into Pennsylvania, New York, and Virginia we run into another common pine species, Virginia pine (*P. virginiana*). Virginia pine has short (1/2 to 3 inches long) twisted needles, with 2 per fascicle, and small cones of about the same length. Virginia pine prefers well-drained loam or clay in hilly terrain, but it also persists on very poor, sandy soil, or even rocky bluffs. Here in these harsh environments it often appears stunted and twisted. Virginia pine is short lived for a pine, usually only persisting 90 years or less. Unlike the other pines we've discussed, this species is poorly adapted to fire and is often found mixed in stands with hardwood species. It was historically used to produce mine timbers, railroad ties, and tar. Today it is used extensively for reclamation and rehabilitation purposes associated with coal mining operations, as it is fast growing. Virginia pine can sometimes produce good lumber but it is typically less desirable than the southern yellow pines. This species is also currently grown on tree farms for Christmas trees. Outside of this industry, Virginia pine is not commonly planted for timber production, although it has gained some popularity in recent years in the pulp industry. The Cherokee Indians used this species historically as a medicine for colds, fevers, and stomach ailments, as well as for a soap (from the needles). Other than providing thermal and tough cover, it has limited wildlife benefits.

Moving even farther north into Nova Scotia and across to the Northwest Territories of Canada down into the Great lakes area, the Jack pine (*P. banksiana*) is somewhat similar in its appearance to Virginia pine. It can form dense scrubby stands on poor sites and is ecologically important because it is the key habitat feature for breeding Kirtland's warblers, one of the rarest birds in the United States. This bird breeds only in large (100+ acres) stands of young jack pine in a very small area of Michigan. These young stands are often a result of periodic fire that causes mature jack pines to completely release their seeds. Kirtland's warblers winter in the Bahamas but depend on these specific young Jack pine habitats to breed. As they mature Jack pine stands generally become more open and host understory shrubs like blueberry.

The Eastern white pine (*P. strobus*) is a large, long-lived species found on well drained and rocky soils of the Appalachian Mountains and north into Maine, Canada, and the Great Lakes states. It is easily recognized by its blueish-green needles (2-5 inches) arranged in bundles of 5 per fascicle. It has loose slender cones and its branches are arranged in whorls on the trunk. Eastern white pine forests historically covered much of northeastern North America although only about one percent remains. The tallest eastern white pines are 180 feet. It has moderate to high wildlife value and its seeds are important for a variety of animals including red squirrels, crossbills, pine siskins, and others. White-tailed deer, rabbits, and other mammals browse it for forage, especially in winter. White pine produces high quality lumber and this species played a key role in the expansion of settlers and industry into the West. Historical reports from around the



Eastern white pine (P. strobus) is a large, long-lived species found on well drained and rocky soils of the Appalachian Mountains and north into Maine, Canada, and the Great lakes states. It is easily recognized by its blueish-green needles (2-5 inches) arranged in bundles of 5 per fascicle and loose slender cones. Photo: Wikipedia commons

Chicago area in the 19th century tell of hundreds of thousands of big white pines per year being sent to the lumber yards. Prior to that time this species was also interestingly used regularly for building large square rigged sailing ship masts. Large white pines in the original Thirteen Colonies area were even known as “mast pines” and were marked with symbols of the crown, reserving their use by the British Royal navy. Today it is commonly grown in plantations for lumber, furniture-making, and sheared Christmas trees. White

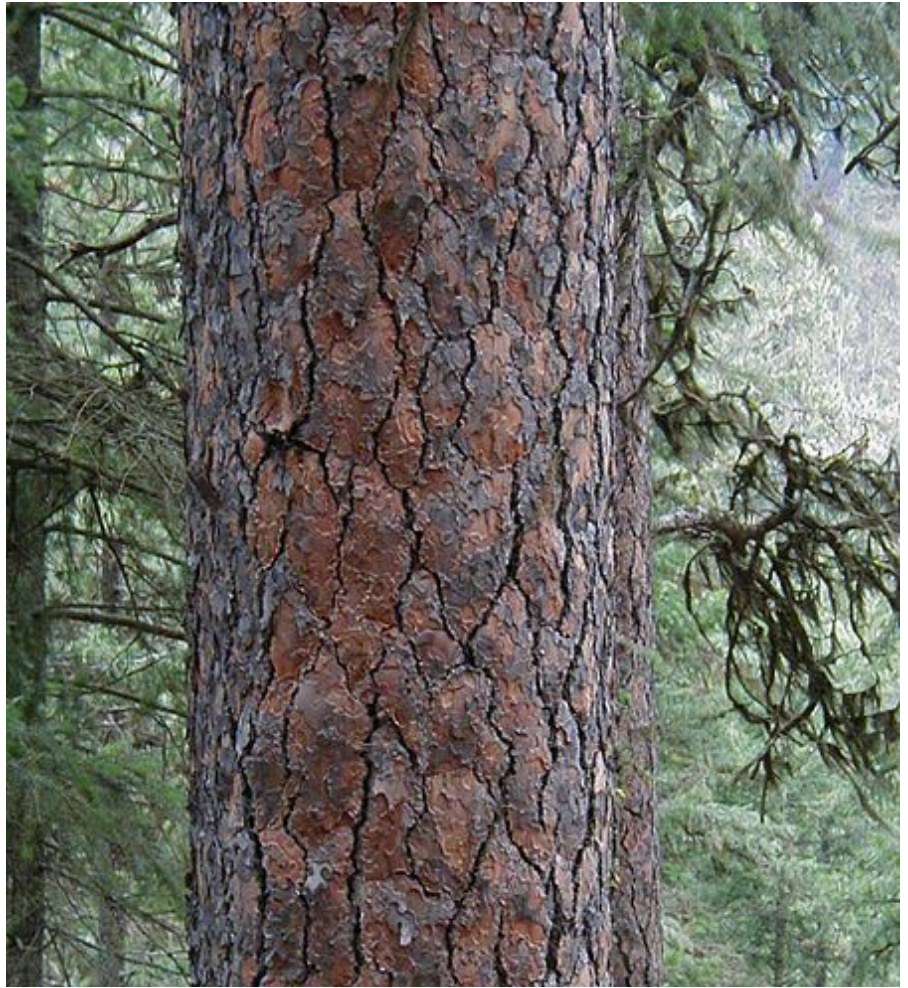
pine blister rust is an important disease for the species, caused by a non-native invasive fungus from Europe. Since its arrival about a hundred years ago, this fungus has taken a significant toll on many large populations of Eastern white pines, and as it continues to spread it now threatens all nine species of native white pines in the US, including the Western white pine (*P. monticola*), and even the ancient bristlescone pine groves of the Southwest.

One of the most common and charismatic pines found in the

mountains of the Southwest and north through the foothills of the Rockies, is the Ponderosa pine (*P. ponderosa*). Mature ponderosas are large trees and have yellowish-red bark with large bark plates divided by contrasting black furrows. The tallest was recorded in the Rogue River–Siskiyou National Forest in Oregon and measured 268 feet. Several subspecies and varieties exist but on average this species has needles in bundles of 2-3 and ranging from 4-8 inches long. They have long large taproots that help them withstand drought conditions for extended periods. Much like longleaf, this species is fire adapted and mature individuals are able to withstand periodic fire events due to their thick protective bark. They often grow in open savannahs or in scattered open woodlands with grass understories. At higher elevations ponderosa pine is commonly found in dense forest stands mixed with Douglas fir. Here it provides habitat for the endangered spotted owl. In the higher elevations the natural fire return interval is longer than on the drier ponderosa savannahs. Over time with fire suppression and land use changes these open systems, just like longleaf ecosystems, have declined sharply on the western landscape.

Farther to the north and northwest, the Lodgepole pine (*P. contorta*), or twisted pine, is another common pine of the West. It grows as far north as the Yukon in Canada and south through the Rockies, down the Cascades all the way into California. Its needles are short (1-2 inches) and occur in pairs. The species can occur as a shrub or a tree that reaches 150 feet tall, depending on site and subspecies. Lodgepole pines are common in Yosemite, Yellowstone, and several other western National Parks. In 1988 when the large Yellowstone wildfires burned, thousands of

acres of these trees were killed, but now some 31 years later, dense stands of young lodgepole pine trees have established themselves from seeds of the former generation. This species is an effective recolonizer following fires or drought. It has excellent wood properties for lumber, plywood, and paneling, and is also used for furniture, windows, and fence posts. Lodgepole is used in modern horticulture industry as an ornamental tree and for large containerized bonsai specimens. The lodgepole pine gets its name from its historic (and modern day) use in structural poles for Native American teepees. Ecologically speaking, lodgepole forests are typically low in structural and species diversity and provide habitat for relatively few wildlife species. The Northern goshawk is one exception and can often be found nesting in western lodgepole pine forests. Interestingly, lodgepole pine is a serious invasive species in New Zealand.



Mature Ponderosa pines are large trees and have yellowish-red bark with large bark plates divided by contrasting black furrows. The tallest was recorded in the Rogue River–Siskiyou National Forest in Oregon and measured 268 feet. Photo: Wikipedia commons

In summary, pines are a fascinating part of the cultural and natural history of the country. While there are certainly several more species of pines that occur across the United States, these are some of the most common. Many are important from an ecological and wildlife habitat perspective, as well as commercially. Soils, topography, climate, and periodic disturbances

such as fire, can dictate where and to what extent pines occur on the landscape. Some systems host extremely rare plant and animal communities and some species live to become giants. Others, like the

ancient bristlecones, seem to have the ability to make time stand still. Hopefully now as you travel across the country you will see the various species of pines along the way in a slightly different light.

References

Campbell, W.A., and Copeland, O.L. 1954. Littleleaf disease of shortleaf and loblolly pine. Circ. 940. USDA. 41 p.

Cronon, William (1991). *Nature's Metropolis: Chicago and the Great West*. New York, NY: W. W. Norton and Company. p. 183.

Eckhardt L.G., Weber A.M., Menard R.D., Jones J.P., Hess N.J. (2007). Insect-fungal complex associated with loblolly pine decline in central Alabama. *For. Sci.* 53: 84-92.

Landers, J.L. 1991. Disturbance influences on pine traits in the southeastern United States. Pages 39-60 in *High intensity fire in wildlands: management challenges and opportunities*. Proceedings of the Tall Timbers Fire Ecology Conference, No. 17. Tall Timbers Research Station, Tallahassee, Florida.

Lawson, E. R. 1990. *Pinus echinata* Mill. Shortleaf pine. Pages 316-326 in R. M. Burns and B. H. Honkala, technical coordinators. *Silvics of North America*. Volume 1. Conifers. U.S. Department of Agriculture, Forest Service. Agriculture Handbook No. 654. Washington, DC.

Lohrey, R.E.; Kossuth, S.V. 1990. *Pinus elliottii* Engelm. Slash pine. In: Burns, Russell M.; Honkala, Barbara H., technical coordinators. *Silvics of North America*. Volume 1. Conifers. Agric. Handb. 654. Washington, DC: U.S. Department of Agriculture, Forest Service: 338-347.

Pickens, B. 2019. Fire Ecology of Shortleaf Forests. Shortleaf Pine Initiative Website (<http://www.shortleafpine.net>). Accessed 10/20/2019.

Spawning

by Scott Brown



One-week old largemouth bass recently hatched in the spring

Most ponds and lakes have several fish species present that naturally reproduce and are self-sustaining. Some fish species never need restocking, others occasional restocking and some stocking every year depending on your management objectives. Once the initial stocking takes place, whether planned or accidental, most fish species will reproduce naturally through spawning. Depending where in the United States you are, each species time of spawning is different, and the water temperature to trigger the spawn may also be slightly different for the same species depending how far north or south your waterbody is. Knowing when, where and how some of your

important species spawn helps you better manage that species and others dependent or competitive with that species. Most private landowners are dealing with species such as largemouth bass, bluegill, redear sunfish, threadfin shad, golden shiners, various minnows, catfish and bullhead. Depending on how important the species is to your management strategy, addressing habitat improvements may help your overall management goals.

Crappie

Crappie are usually the first to spawn in your lake. They are triggered by water temperatures ranging between 55 and 65° F. Depending on how far south or north you are, this could be

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January to April. Although crappie spend a lot of time in open water, they do nest near shore, on silt free substrate. The male will spend a short period of time prepping a nest (fanning debris away) in water 1 to 20 feet deep depending on water clarity. The nest site is usually near vegetation or woody structure for fry to feed and escape predation after hatching. Once the eggs are deposited and fertilized the female will leave while the male remains to guard the nest. Black crappie females produce between 11,000 and 188,000 eggs; white crappie females produce between 2,900 and 91,700 eggs. Females will deposit eggs in multiple nests. The eggs will hatch in three-to-five days. Fry remain at the nest for

another two-to-three days, then leave on their own, not schooling with others. The nests are obscure and undetectable other than when the male and/or female are there. Crappie are prolific spawners and can quickly overpopulate a small waterbody.

Once Crappie become established in smaller waterbodies it is known there is suitable spawning habitat and water quality. Restocking is rarely required. Habitat improvement will not be necessary, but keeping numbers down so crappie grow to their full potential will be the challenge.

Largemouth bass

Largemouth bass will spawn in water temperatures 60°F and continue into the low 70's during the spring. Depending where your waterbody is, this could be in December in south and central

Florida to May much farther north. I know from personal experience, around 68°F is peak spawning temperature in Florida, but it is slightly cooler as you go north into Georgia and other states. I have observed spawning in Central Florida take place as early as December and as late as early March depending on the “winter” weather pattern. The male creates the nest in 3-8 feet deep water (depends on habitat and water visibility), coaxing the female to come lay her eggs. She will lay between 30,000 and 50,000 eggs and have been documented laying 100,000 eggs. Once a female reaches approximately age six, she will begin producing fewer eggs. After fertilization the male will remain on the nest and guard it until they hatch and stay with the school for a few days until they disperse. Once the bass hatch,

cover becomes very important for young largemouth bass survival from predation and where small organisms grow for young bass to consume. Females after age two grow faster than males and are the trophies. Males have been documented up to about five pounds, but most are small, under three pounds. Both males and females reach sexual maturity (start spawning) around two years old, but they have been documented as young as one and as late as three years old to reach sexual maturity. The question is always asked, “Does fishing bass beds hurt the population?” This depends on the number of large fish you have in the population and how frequent hooking mortality occurs. If you do bed fish, I recommend using artificial baits, circle hooks with your soft plastic baits and not letting them swallow it.



This female black crappie is ready to spawn along the shoreline amongst the cypress trees.



Here are newly hatched largemouth bass with the previous fall's bluegill hatch. The bluegill's ability to spawn from spring to fall is why it is so appealing as a largemouth bass forage.

Largemouth bass are another species rarely, if ever, needing restocking. If bass recruitment is low and the lake bottom is covered in organics (muck), performing a drawdown or placing #57 rock gravel beds along the shoreline in appropriate depth water for spawning will increase spawning areas, improve spawning success and increase fry and juvenile survival.

Redear Sunfish

Redear sunfish generally begin spawning before bluegill in water temperatures from 68 to 80° F and may spawn at or near the same time as largemouth bass. This may occur from March to June, depending where you are located. Redear beds look like bluegill, but closer together, so much that the bed rims may be touching. Males prep the nest and guard the eggs until they hatch and move into shore for protective habitat. Redear sunfish generally only spawn once, but have been documented to spawn twice per year on occasions. Depending on moon phase and when water

temperatures rise, redear and bluegill may spawn the same month, or redear may spawn a month earlier than bluegill. Redear sunfish will become mature and start spawning at age two.

If bluegill have adequate spawning habitat, redear sunfish will also. However, once redear hatch, their numbers and growth will be determined by their narrow forage requirement availability (clams, snail, grass shrimp) than spawning habitat.

Bluegill

Bluegills begin spawning when water temperatures reach about 72° F and may continue to spawn all summer unless water temperatures exceed 85° F, and may begin again or continue until water temperatures drop below 72° F in the fall. Spawning may begin as early as late March or not until June in other areas farther north. Bluegill beds are round shallow depressions in water ranging from 2-6 feet deep. They prefer to bed on hard substrate, but have been documented spawning on almost

any bottom type, while bed sites may include as many as 50 beds in a small area. Females will deposit eggs in multiple nests to ensure greater egg hatching success. Males prepare the nest and guard it until the hatch, but leave as soon as the hatch occurs. Bluegill have been documented spawning as early as age one, but usually begin at age two. Bluegill are prolific spawners and a favorite food source for largemouth bass, which is why they are recommended to stock as bass forage.

Bluegill population numbers on occasions become low and unbalanced, usually when the bass population becomes unbalanced or high in numbers of a certain size. Occasional restocking of small and/or large bluegill may be necessary as forage and breeders for an out of balanced bluegill population caused by an out of balanced largemouth bass population.

Threadfin Shad

Threadfin shad spawn in the spring when water temperature gets above

65° F. Spawning usually occurs early in the morning on available vegetation. The eggs adhere to submerged and floating objects. Females lay from 2,000 to 24,000 eggs. This open water schooling species, often introduced as a supplemental forage, threadfin shad spawn in the spring and early summer with a secondary spawn often occurring in the early fall. We often recommend a late summer/early fall stocking of threadfin shad in the South, as the landowner may get a shipment of shad then receive “more” via late year spawn to feed their bass.

In green waterbodies with good water chemistry, threadfin shad will successfully spawn. However, they can experience a cold-water die-off should water temperatures get below 42° F and need restocking. Restocking may also be required when you have a quality



Threadfin shad will naturally reproduce and survive in waterbodies with an algae bloom. However, they will need to be restocked annually if the lake is clear or you experience a cold-water die off.

largemouth bass population and the shad reproduction cannot keep up with loss to predation from bass.

Golden Shiners

Golden shiners begin spawning when water temperatures reach 70° F and will stop once they exceed 80° F. This species may also spawn in fall if water temperatures slowly fall and stay in the desirable range

long enough. No nest is prepared or does a parent guard the eggs. Adhesive eggs are distributed over substrate, algae or vegetation, and have been documented to be deposited in largemouth bass nests. The eggs take approximately four days to hatch and the fry quickly form large schools and head for shallow water to feed on algae, plankton and zooplankton.



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In most small man-made lakes, channel catfish will not naturally reproduce and/or survive to create a self-sustaining population. In some instances, they will not spawn at all, in others they spawn, but none survive due to predation on the young.

Due to low reproduction and poor survival in waters with quality largemouth bass and/or crappie, these may need restocking every so often when numbers get low. In waterbodies with out of balanced bass populations (lots of small bass, no larger individuals) shiners may appear out of control with large numbers of big shiners and no small ones. This is due to no large bass. Once larger bass start appearing in the population, the big shiners will disappear from predation.

Fathead Minnows

Fathead minnows begin spawning when water temperatures approach 64° F and continue until it gets to 84° F then stop and start again when it drops below that temperature in late summer. Spawning can result in 16 to 26 spawning events per female and an annual number of 6,800 to 10,600 eggs per female produced. Males set up territories under submerged objects (logs, boulders, etc.) and defend these breeding sites from other males for up to five weeks. Females are attracted to the males and lay eggs on the undersides of the hard surfaces in the water. Spawning objects provided by lake managers include boards, pallets, plastic tarps and irrigation tubing. Once eggs are laid, the male defends the nest until all the eggs hatch. One female will lay her eggs in several nests and spawning may occur over a five-to-six-week period. Although the fathead minnow is a very common small hatchery produced forage fish that does not easily naturally reproduce in smaller private ponds. They usually do not have the type or amount of habitat needed or too many predators to sustain a population. To supplement the lack of survival and reproduction success, restocking annually or bi-annually is usually necessary.

Channel catfish and Bullheads

Channel catfish spawn with water temperatures from 70° to 82° F. This can be in April to July, depending where you are located. It is rare for channel catfish to spawn in small private lakes, but it does occur. Lack of spawning habitat and high mortality are reasons for the unsuccessful reproduction. Channel catfish need a cavity for spawning such as a hole in a bank, underwater pile of logs, hollow logs, root balls (naturally or piled up when lake was built), tires, pipes, etc. The males will clean out the nest in preparation for the female to lay her eggs. The eggs take about a week to hatch and the fry do not leave for another week after hatching, and the male guards them during the whole process. The week-old fry form a large school and leave, as does the male.



Largemouth bass spawning, success and survival numbers are rarely an issue in smaller waterbodies. Keeping their numbers in check is the more challenging task.

These large balls of young channel catfish are very vulnerable to predation and very few, if any survive.

If you desire channel catfish and they do not naturally reproduce, keeping track of harvest and restocking every 3 years will keep

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numbers up and offer various sizes for harvest. If you feel spawning success is sufficient, enjoy. If you feel natural spawning is overpopulating, take as many out as possible annually. I have seen 12-inch diameter pipe two feet long, concrete pipe, pallets, tires and submerged root balls used as channel catfish nesting material to encourage natural reproduction.

Bullheads (Brown, Yellow and Black) have similar spawning habits as channel catfish. The spawning season for the bullheads starts in late spring when water temperatures are about 68-70° F and goes into early summer. The female will prepare the saucer-shaped nest in shallow water. She

will seek out a location underneath matted vegetation, fallen trees or overhanging banks. Bullheads require less of a “cave” to nest in than channel catfish. Both the male and female guard the nest after the eggs have been fertilized. Once the eggs hatch, the male takes over parental care and continues to protect the young until they are about one inch in length. The young fish swim around in a tight ball. Even after the parents leave, the young will continue to swim in a school for many days as they begin to feed. Schools of channel catfish and bullhead can be observed in the shallows if present in early summer. Do not mistake them for tadpoles, which also look similar at that length.

In small waterbody management, bullheads are rarely desired. Every one caught should be removed unless abundant bullheads is your management goal. They are much more successful at spawning and juvenile survival than channel catfish in small, man-made lakes.

The more you know about the fish species you manage the better you can make quality management decisions. This information helps you plan and budget in the future. There are many other fish species in your lake that were not covered, however these are the most important ones to the majority of lake owners/managers



This female is almost ready to spawn, her stomach is bulging with eggs. Won't be long and she finds a male with a nest made willing to protect it until they hatch. After she lays the eggs she heads out.

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Grow More Wood Ducks

Inside-the-Box Strategies for Success

By Steve Tillmann



Steve Tillmann has over 30 years' experience working with natural resources and directs Research and Development for Minnesota-based Plantra, Inc., where their focus is on seedling tree establishment. Steve is a regular contributor to Wildlife Trends on a range of topics involving tree growing and wildlife habitat. Contact him at steve.tillmann@plantra.com.

Smaller in stature but with unmatched beauty, the Wood Duck or “Woodie” is one of the most sought-after ducks for waterfowlers and wildlife enthusiasts. One of the few ducks to call the southeastern US its home year-round, wood ducks provide enjoyment for all four seasons. Encouraging wood ducks to remain on or near your property starts with creating the right habitat that supports year-round food, nesting sites and cover for brood rearing. This article discusses how landowners with suitable habitat, can take the chance out of wood duck nesting success with the right nest box and a duck-focused approach.

Easily found in many regions today, the beginning of the last century saw wood duck numbers in steep decline largely due to unregulated market hunting. The Migratory Bird Treaty Act of 1918, with specific protections for woodies, including closed seasons until 1941, may have saved this species from extinction (Bellrose 1976). In response to this legislation, wood duck numbers soon started to rebound, but with land use changes on the horizon, the Woodie was by no means out of the woods.

By the 1940's large-scale wood duck habitat loss ensued as bottomland hardwood forests were converted to ag fields. Nowhere was

the impact of habitat loss more significant than the Delta country of the Mississippi Basin where millions of bottomland acres were converted to soybeans and other uses (Bellrose 1976). From 1940 to 1970, east Louisiana alone saw its bottomland forest slashed from 4.3 million acres to 1.8 million acres; a stunning loss of over 2.5 million acres in only 30 years! That's the habitat bad news. The good news is that dedicated conservation efforts launched on public and private lands continue to create habitat and homes for wood ducks for folks who enjoy them.

WHY YOU SHOULD USE NEST BOXES ON YOUR PROPERTY

Natural “Suitable” Cavities Are Often Scarce

Wood ducks have specific requirements for cavity size, safety and distance from brood rearing habitat. Most natural cavities in a given area may not be “suitable” for wood duck nesting. Many are too small, too easily accessed by predators or otherwise unsafe for incubation. Natural cavities that are the right size, the right height and in the right habitat are often a limiting resource for wood ducks.

A tree cavity survey conducted on the Muscatatuck National Wildlife Refuge near Seymour, Indiana in 1984-1985 demonstrates how few cavities may exist in a given area, and of those cavities, how few eventually may be used by wood ducks. Of the 789 cavities surveyed, 122 (15%) were deemed suitable for

wood duck nesting. Of the suitable cavities, only 7% and 9% were used by wood ducks during the respective 1984-1985 breeding seasons. The estimated density of suitable cavities used by wood ducks in this survey only yielded about one nest per 25 acres (Robb, Bookhout 1995)

In their literature review, Semel and his colleagues estimated that the density of natural nesting cavities suitable for Wood Ducks ranged from .2/acre (0.5/ha) to 3.1/acre (7.7/ ha), with a mean of about 1.2 cavities per acre (3/ha) (Semel et al, 1988).

It should be noted that natural cavity inventory varies by forest composition and may also vary from region to region. Older growth hardwood trees produce more cavities but have often been the focus of habitat loss, especially in bottomland areas. Habitat loss of older growth hardwoods has

slashed natural cavity inventory across many regions of the wood duck’s range.

With fewer suitable natural cavities available, nest boxes and a duck-focused approach can help fill the void to increase nesting success in suitable habitat. This sentiment is echoed in the words of respected author and waterfowl conservationist Franck C. Bellrose in his 1953 *Housing For Wood Ducks Circular* “Although nest sites are only one requirement in the management of wood ducks, the scarcity of natural cavities is so great that nest boxes represent an important and tangible means by which conservation-minded individuals or groups can make significant contributions to the welfare of these beautiful birds” (Bellrose 1953).

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to supplement natural cavity inventories. They can be made to the right size, from durable materials, installed in the best locations, protected from predators and regularly maintained. The success of nest box use by wood ducks is significant. According to the Natural Resources Conservation Service's 2007 *“Wetland Management for Waterfowl Handbook”*, nest boxes may contribute an estimated 150,000 juvenile wood ducks to the Mississippi and Atlantic Flyways each fall (Nelms 2007).

One comparison demonstrating the effectiveness of nest boxes was conducted at the Chautauqua National Wildlife Refuge near Havana, IL in 1965 where Dill stated *“Approximately 1.2 wood ducks were produced in nest boxes for each acre of timber on the refuge. Nest success was 81 percent in nesting boxes in 1965. Natural cavities usually produce approximately 0.1 duck per acre of timber. Nest success in natural cavities in this area averages 35 percent”* (Dill 1966). Nest boxes in this example delivered more than double the nest success and twelve times the duck numbers produced per acre compared to natural cavities.

In another study over four consecutive Mississippi breeding seasons, the authors reported nest box use rates of 66% the first year, which increased annually to 96% in the last study year (Strange, et al, 1971). Nest box use rates in this study were three to more than four times the 21.4% average natural cavity use rate reported in an IL study nest cavity study (Yetter, et al. 1999).

A Nest Box Program Is Something You Can Do!

Whether you own wood duck brood habitat or have permission to use and enhance it, you can put nest boxes to work for woodies. If

you're handy with tools, preferred designs can guide you. If you would rather purchase nest boxes, commercial suppliers offer them for sale. One way to source nest boxes is through local scout troops and other organizations that build nest boxes for fundraising. Whichever route you choose, it's important to start with a proven nest box design and only commit to the number of nest boxes you have time to maintain.

Getting Started

The four critical elements to any duck-focused nest box program includes Woodie-safe nest box designs, effective placement near suitable brood habitat, predator-proof installation, and regular nest box maintenance. All four are necessary for the safety of incubating hens and the young once they leave the nest. To omit any of these elements can at best, reduce the effectiveness of your nest box program and at worst, subject hens and ducklings to needless mortality during incubation and brood rearing.

Critical Element #1 – Woodie-Safe Nest Box Design

It all starts with selecting the right construction material. Many artificial nest box materials have been tried and tested including wood, plastic and metal. Let's look at the advantages and disadvantages of each.

Wood – The standard material for wood duck nest boxes since they were first introduced.

Advantages

- Readily available material
- Can be purpose-built for the job
- Can be cut and assembled to proper dimensions including specific nest hole size and side clean-out door

- Moderate durability if care is taken to source naturally rot resistant material like cedar and cypress
- Can incorporate sloping roof rain shield for entrance and passive ventilation to manage interior temperatures
- Can be sourced completely assembled

Disadvantages

- Low durability for rot-prone wood like pine
- Heavy and cumbersome to transport and install (and even heavier when wet!)
- Lower hygiene potential - interior wood surface may harbor pathogens and ectoparasites
- Prone to high inside temperatures – requires proper ventilation near roof to partially mitigate this effect
- Requires construction and assembly for do-it-yourself projects

Plastic – Early designs were not properly ventilated and were prone to high inside temperatures. New designs incorporate effective ventilation to achieve inside temperatures lower than wood in direct sunlight.

Advantages

- High durability – plastic can be made to be an extremely long-lasting material that won't rot and resists photo-degradation if proper UV inhibitors are used during manufacturing
- Can be designed to have lower inside air temperature in direct sunlight than wood or metal – improved heat safety for incubating female and egg embryos

- Can be purpose-built for the job unlike re-used metal containers designed for a completely different purpose
- Can be molded into proper dimensions including features like entrance hole complete with rain/sun shield, rain-guarded ventilation ports and easy-to-reach bottom clean-out drawer
- Weighs much less than cedar and cypress, making it easier to transport and safer to install
- Higher hygiene potential – Improved sanitation possible as plastic surface can be easily cleaned unlike wood which may harbor parasites and pathogens that cannot easily be removed or mitigated

- Comes pre-assembled
 - Though higher initial cost when compared to DIY projects, durable plastic with rugged construction easily outlasts even rot-resistant wood reducing the need for wood repair or nest box replacement
 - Termites won't destroy plastic nest boxes!
- Disadvantages
- Limited suppliers of Woodie-safe designs
 - Slightly higher initial cost than DIY wood projects

Metal – Limited applications exist of used metal containers originally

intended for different purposes.

Advantage

- Potentially longest lasting material if drain holes allow rain water to escape and reduce oxidation and rust

Disadvantages

- Low resistance to heat rating for metal means hotter interior temperatures in direct sunlight than wood or plastic
- Interior temperatures in metal can be unsafe for brooding females and egg embryos

As discussed, wood, plastic and metal materials all have potential for durability and all have the

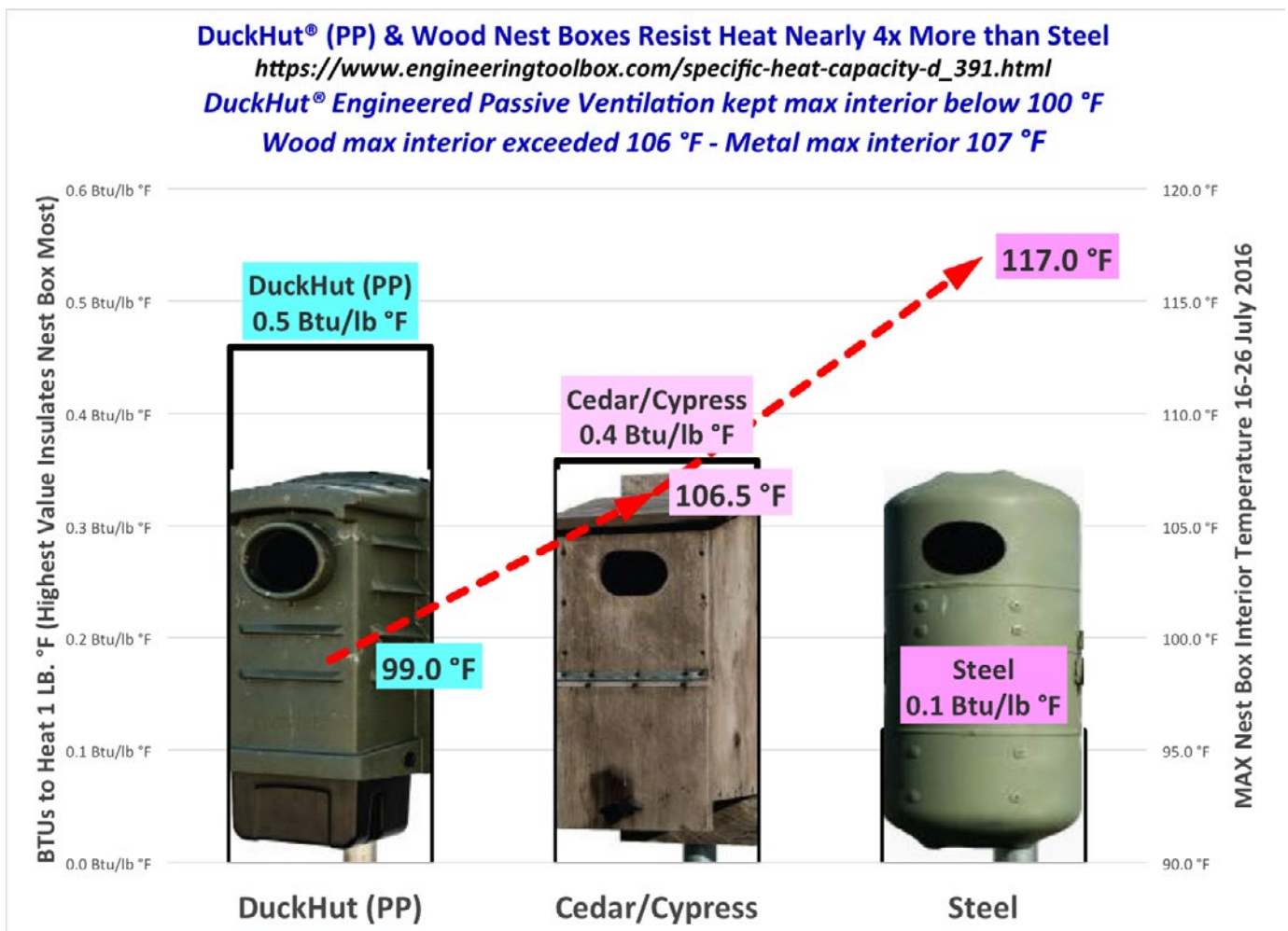


Figure 1. Heat resistance comparison of plastic DuckHut, wood nest box and metal canister. In a 2016 Wapello, IA temperature trial, the plastic DuckHut had the lowest recorded maximum interior temperature of 99.0°F due in part to a high resistance to heat and also due to superior passive ventilation. The maximum interior temperature for the wood nest box was 106.5°F and for the metal container the maximum interior temperature was 117.0°F.

potential to provide the space needed for incubation. However, each material has different heat resistance properties that affect interior nest box air temperatures particularly in direct sunlight.

Nest box interior temperatures are a function of material construction and impact both the health of the incubating female wood duck and the developing egg embryo. This is particularly important during the day when temperatures are at their maximum. A research review by D. R. Webb reports 41°C (105.8°F) to be the maximum short-term embryo temperature for avian egg survival for most species studied including chickens and ducks (Webb 1987). It should be mentioned that metal containers installed in full sunlight conditions could exceed this temperature

threshold on hot sunny days. Heat experienced in a nest box during the incubation period should be at the top of the list when sourcing a completed nest box or construction materials.

A material's resistance to heat (Btu/lb. °F) should be considered when buying or building any nest box. Figure 1 shows heat resistance for plastic (polypropylene) wood and metal. Plastic has the highest resistance to heat of the three materials compared here. This means that plastic resists temperature increases better than wood or metal. Metal has the lowest resistance to heat compared here meaning it heats up faster (and cools faster) than plastic or wood. Maximum interior nest box temperature readings are presented for each material on the chart.

These temperatures were recorded in a temperature trial to be discussed next. They, along with heat resistance, help illustrate why metal containers heat up more than wood and plastic in direct sunlight. Imagine the impact of heat resistance on an egg or duckling that is in direct contact with these materials. Which would you prefer?

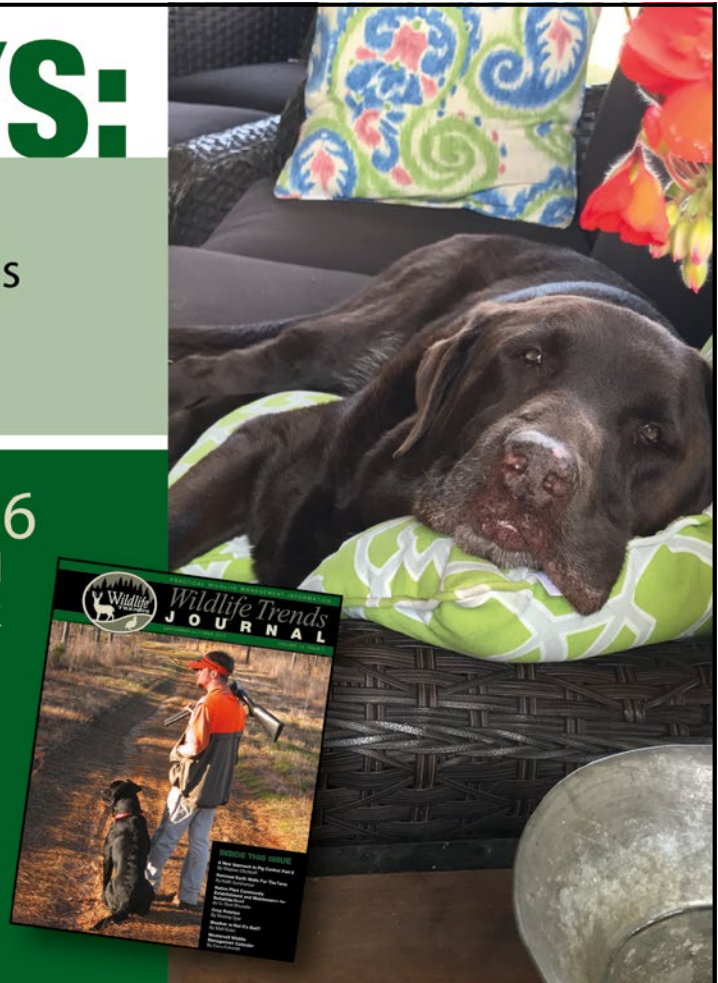
Temperature research comparing different nest box designs and materials is limited but one manufacturer, DuckHut of Wapello, IA, agreed to share nest box temperature data for this article. This experiment (shown in Figure 2) compared interior temperatures of DuckHut's ventilated molded plastic design to a standard wood design and a metal canister sometimes used for nesting wood ducks.

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The results of eleven days of temperature testing from July 16 to July 26, 2016 (Wapello, IA) are presented in Figure 3. The straight horizontal double black line towards the top labeled 105.8 F (41 C) references the upper threshold for survival for egg embryo temperature. The black line across the middle of the temperature bars tracks actual maximum daytime temperatures recorded for comparison. Each treatment has color-coded maximum recorded interior temperature labels.

There were two DuckHut nest boxes in the temperature study (DH 1 and DH 2). Due to limited space on the chart, only DH 2 temperatures are labeled.

Maximum interior nest box temperatures were higher than those collected at the weather station (objects warm in direct sunlight) but generally tracked maximum ambient temperatures. It's important to note temperature comparisons for the July 26 date. Despite this day having a relatively lower maximum weather station reading, the wood and metal nest boxes recorded much higher interior temperatures, which is likely due to a higher UV index for this recording period.

Based on this experiment, temperature in the plastic DuckHut was consistently lower than wood or metal and never approached the danger zone for maximum egg embryo temperature survival tolerance. This is not surprising



Figure 2. DuckHut temperature test site, Wapello, IA July 16-26, 2016. Three different nest box materials (plastic, wood and metal) were compared.

given what we know about the high heat resistance of plastic. Wood nest box interior temperatures were hotter than DuckHut but cooler than metal. Still, wood interior temperatures exceeded 105.8 (41 C) once and came close a second time in 11 days of testing. Metal performed even more poorly in this regard. The canister interior temperatures regularly exceeded 100 F and on two days, significantly exceeded 105.8 F (41 C) threshold making it a dangerous choice for full sun exposure locations.

It's important to note here that interior nest box temperature does not immediately raise egg embryos to the same temperature. Due to the specific heat of water, egg temperature lags behind interior nest box temperature fluctuations. That said, construction material and ventilation matter when choosing a nest box.

When buying assembled nest boxes, it's best to choose a proven design made of wood or ventilated molded

plastic design like DuckHut (www.duckhut.co) for full sun exposure locations. If you're handy with tools, effective nest box plans made from wood are readily available. The best wooden materials are naturally rot resistant like rough-cut cedar and cypress. Proven wooden nest box designs are listed below and more can be found online.

- Ducks Unlimited - <https://www.ducks.org/conservation/waterfowl-research-science/wood-duck-boxes>
- Alabama Extension – Wood Duck Management In Alabama <https://www.aces.edu/blog/topics/enjoying-birds/wood-duck-management-in-alabama/>
- Texas Parks and Wildlife – Managing For Wood Ducks In East Texas By Carl Frentress, Regional Waterfowl Biologist - Retired, East Texas https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_1045.pdf
- The Georgia Department of

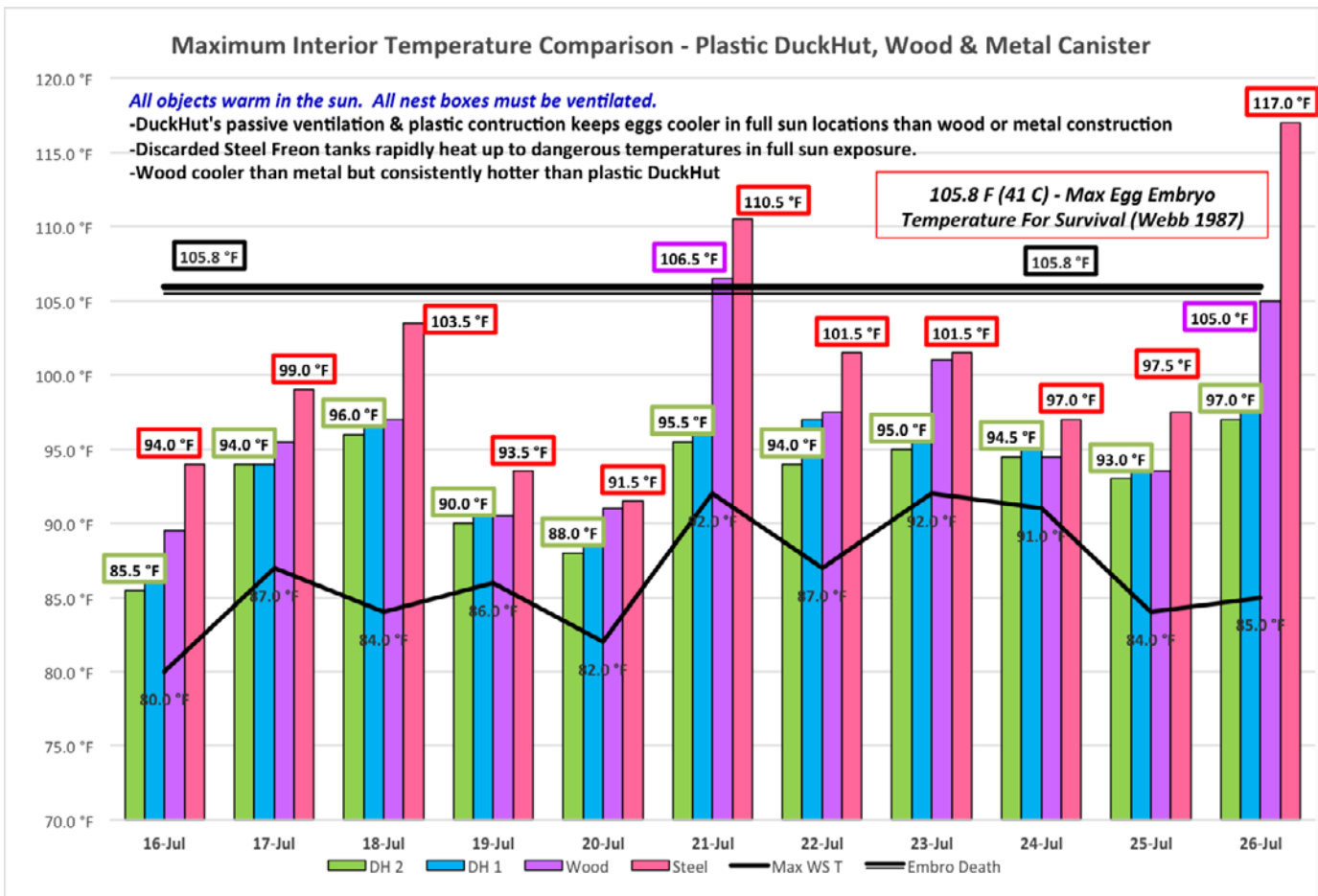


Figure 3. Maximum Interior Temperature Comparison – Plastic DuckHut, Wood & Metal Canister (Data Source DuckHut, Chart Author Joe Lais, Plantra, Inc.)

Natural Resources – Wildlife Resources Division Wood Duck Fact Sheet https://georgiawildlife.com/sites/default/files/wrd/pdf/fact-sheets/wood_duck_2002.pdf

- Natural Resources Conservation Service – Fish and Wildlife Habitat Management Leaflet: Wood Duck https://efotg.sc.egov.usda.gov/references/public/SC/Wood_Duck.pdf
- Audubon - How To Build A Wood Duck Nest Box <https://www.audubon.org/news/how-build-wood-duck-nest-box>
- Henderson, Carrol L. Woodworking for Wildlife: Homes for Birds and Animals. Nongame Wildlife Program, Minnesota Dept. of Natural Resources, 2009.

Critical Element #2 – Effective Nest Box Placement Near Suitable Brood Habitat

You’ve heard it before; what matters is location-location-location! Choose your nest box sites carefully. Select nest box sites near beaver ponds and other shallow water areas with little or no current and with brood food and brushy cover near the shoreline. Avoid extensive open lawn/shore areas devoid of protective cover.

Installing nest boxes away from suitable brood habitat with food and cover is not only unproductive, it would likely be dangerous to both the female and her young when they leave the nest. The greater the distance from suitable habitat, the greater the risk hens and ducklings face on their trek to safety. Duckling losses can also occur even

if the distance is not great, but other obstacles hinder the journey. A Burlington, IA survey reported a loss of 61 ducklings from 189 observed starting the journey from nest boxes to the Mississippi River. Nearly 1/3 of these ducklings perished negotiating a steep bluff and other pitfalls, though the distance from the nest boxes to the water’s edge was only about a city block (Bellrose 1953).

Suitable habitat is by far the most important consideration in nest box location – period. This cannot be overstated. Also important is the “placement” of individual nest boxes in such habitat. Wood ducks evolved to be solitary cavity nesting birds. This makes sense considering most natural cavities are not the right size for woodies. For those cavities that are suitable for wood

duck nests, many are dispersed and located in the upper forest canopy where they are not readily visible by females competing for nest locations. Dispersed and hidden nest locations reduce competitive interactions between breeding females and increases overall nesting success.

The practice of “clustering” or placing multiple nest boxes in close proximity and where they are readily visible is common and often intended to “boost” local wood duck nest box occupancy rates. It is common to see more than one wood duck nest box on a single pole or tree or clusters of nest boxes in highly visible locations like lakeshores and marsh edges. Clustering nest boxes can increase nest box installation efficiency, especially where suitable habitat is limited. But what seems like a good idea in practice may actually have negative impacts on nesting efficiency.

Research findings suggest that clustering highly visible nest boxes reduces nesting efficiency by encouraging brood parasitism or “**dump nesting.**” Nest boxes placed close together in obvious locations make it easy for female wood ducks (and other cavity nesting duck species) to observe Woodie females entering and leaving nest locations. These observations trigger semi-colonial nesting behavior that leads to multiple females laying eggs in a single nest box. Dump nests, often defined by clutch sizes > than 15 eggs per nest, contribute to reduced nesting efficiency primarily by reducing hatch rates by females that can successfully incubate only a limited number of eggs. Studies have shown individual dump nests to contain as many as 50 or more eggs.

In one study, Semel and Sherman

conducted research in northeastern Illinois over a four-year period from 1989-1992 that compared nesting efficiency between two methods of placing wood duck nest boxes. The first method, “**visible**” installation involved erecting pairs of nest boxes on single posts over water where they could easily be seen. These nest boxes were intended to replicate nest box clustering in locations easily observed by nesting female wood ducks. The second method relied on mounting individual nest boxes on deciduous forest trees in “**hidden**” locations away from the water’s edge.

Early in the study, visible nest boxes installed in the open experienced dump nesting at a rate more than double (72%) that for hidden nest boxes installed in the neighboring woodlands (35%). Over the 4-year study period, dump-nesting rates increased for visible nest boxes but remained low for hidden nest boxes despite both methods having similar use rates (87% for visible and 84% for hidden). Eggs laid in visible nest boxes experienced heavy dump nesting and hatched at lower rates (45%) when compared to eggs laid in hidden nest boxes (64%) that experienced lower parasitism rates. Both methods produced about the same number of ducklings per nest box (9.0 for visible and 9.2 for hidden) but the real story was how many eggs remained un-hatched. Visible nest boxes contained an average of 10.9 un-hatched eggs per nest box, more than double the rate for the hidden nest boxes which was only 4.4 un-hatched eggs per nest box (Semel, Sherman 1995).

The results above show a clear relationship between nest placement and frequency of dump nesting, which reduces nesting efficiency by causing lower egg hatch rates. Another negative effect

of visible nest box locations that experience dump nesting can encourage physical conflicts between competing females that can lead to injury and in some cases, death.

Visible nest box sites, especially those that experience brood parasitism, are also more likely to experience predation. This is due to easily discovered locations and because of increased nest box activity resulting from use by multiple females. A Mississippi study reported that 55 dump nests occurred in a total of 168 nests. Of the 55 dump nests, predators destroyed 31 and the other 24 were abandoned (Strange et al, 1971). This and other research suggest that the best way ensure full reproductive potential for breeding female wood ducks is to install nest boxes individually, in inconspicuous locations near suitable brood habitat and predator proof each nest box.

Critical Element #3 – Protection from Predators

Proper nest box installation must include protection from predators from the get-go.

An unprotected nest box that’s an easy mark for egg and duck eating predators can be worse for woodies than no nest box at all. Wood duck nests are preyed upon by a host of critters and leaving nest boxes unprotected is inviting trouble sure to come. The eggs may be eaten or destroyed by raccoons, snakes and squirrels and an incubating hen is no match for a marauding mink, raccoon or opossum.

To compound matters, predators may quickly learn to identify nest boxes (and natural cavities) as a source of food. In a study where artificial duck nest locations were flagged to help researchers locate nests, the authors reported

increased predation of these nests by predators that associated the visual cues to physical nest locations (Eric and Wend Hein, 1996). If predators can learn to associate simple flagging with nest location, they likely can do the same with nest boxes and natural cavities.

In one study, fox squirrels destroyed the most eggs but raccoons destroyed more nests in advanced stages of incubation. In these instances, raccoons killed about one incubating female for every three nests they raided (Bellrose 1953). A two-year Illinois study reported that predators wiped out 80% of nests in natural nest cavities in the first year of the study and 55% in the second year (Yetter, et al, 1999).

It's important to note that natural nest cavities, by definition, are essentially unprotected, but nest boxes can and should be protected. One way to minimize predation is to avoid installing nest boxes on trees. After all, a nest box on a tree is simply an unprotected cavity on the outside of the tree. This situation is no safer for woodies than a natural cavity. In fact, a tree-mounted nest box may be more vulnerable to predation because of its exposed profile, which may be easier for predators to discover.

The first step to predator-proofing your nest box is to commit to installing your nest boxes support poles. Poles can be predator-proofed unlike trees or other supports that can be easily climbed. A nest box nailed to a climbable tree is the equivalent of "wood-duck-on-a-stick" for a hungry raccoon, mink or opossum.

Tip: When deciding where to sink support poles, choose locations that offer a clear flight path from the entrance to and from water areas and that are not obstructed by over-hanging branches predators can use to access the nest box.

Support poles can be made of wood, metal or plastic. Wood poles should be pressure treated for the longest field life and should be rigid enough to get the job done. For wood, a 10-foot length is recommended (with 2ft to go in the ground) and having a diameter of at least 3 or 4 inches. Nest boxes can be secured directly to the wood with lag screws before the posts are installed.

For metal posts, 10-foot lengths (again 2ft to go in the ground) of heavy duty, 1-inch to 2-inch diameter electrical conduit are suitable options for many soil conditions. Conduit has an advantage over wood in that it can be driven into firm soils easier. Installation in soft or wet soils can be improved by using at least a 1 1/2 -inch to 2-inch diameter conduit. Attaching nest boxes to metal poles can be accomplished with U-bolts. "Schedule 40" polyvinyl chloride (PVC) pipe "blue-pipe" has also been used in a 4-inch diameter. This material won't rot and because the material is hard and slippery, it's almost impossible for critters to climb (Frentress, 2005).

The next step in your installation is to predator-proof the support pole. For wood and plastic posts, cone-shaped metal guards can be used to prevent climbing by raccoons, snakes and other critters. Metal posts can be protected with either cone-shaped metal guards or a flatter version made of plastic shown in Figure 4. It is important to note that these guards can

exclude climbing mammals and reptiles but they won't prevent fire ants from getting to wood duck nests. To stop ants, it is recommended to coat posts with a 2ft-wide band of either food-grade, water-proof grease (may need to be reapplied annually) or a longer lasting, non-toxic paste like Tanglefoot®. Texas trials have shown Tanglefoot to last at least 6 years in demanding conditions (Frentress, 2005).

Another consideration involves the use of nest boxes by bees and wasps. More pest than predator, bees can discourage breeding females from using nest boxes. One solution comes from the folks at the Maryland Wood Duck Initiative Research Institute. They recommend rubbing soap on the inside of the nest box roof to discourage bees from colonizing nest boxes. This remedy was tried on about fifty nest boxes and the idea worked if soap was applied thick enough to fill all wood seams and if it covered the entire inside surface of the roof. It is further recommended to apply the soap before final construction for new nest boxes in the production pipeline.

In summary, an unprotected nest box is an open invitation for predator troubles. When considering how many nest boxes to employ, determine how many you would commit to predator-proofing.

Critical Element #4 – Regular Nest Box Maintenance

You know that throwing up any old duck nest box on any old tree is not worth the effort and may lead to trouble for any nesting wood duck that happens to use it. It takes commitment and effort to manage a nest box program that's good for woodies and good for you. The

same goes for nest box maintenance. Installing a protected nest box is the beginning of the process, not the end of it.

Regular maintenance improves nest box hygiene without a doubt. But letting things pile-up inside nest boxes from season to season has been shown to actually reduce nest use (Utsey 1997). Next season's breeding female wood duck has no use for last season's wasp nest, broken egg shells, matted nest shavings that may be infested with ectoparasites (i.e. fleas and such) and other leftovers from previous occupants. Nest boxes need regular inspection and cleaning and clean nest boxes lead to higher use and more wood ducks.

One study recommends inspecting nest boxes and cleaning them after the spring nesting peak. The cleaned nest boxes can help encourage a second nest in some cases. Mid-season cleaning should be followed by another inspection and required cleaning in late fall. At this time temperatures are cooler making inspections safer,



Figure 4. Plastic predator guard installed on 2-inch heavy-duty electrical metal conduit.

especially where bees may be a problem (Utsey, 1997).

One inspection tip that saves time and ladder climbing involves using “borescopes” or “snake cameras” to view the inside of nest boxes from the ground. These nifty cameras can be purchased with extensions up to 3 meters, which should be more than enough range for pole-mounted nest boxes. Search online for the terms

“borescope” and “snake camera” to learn more.

In conclusion, the key to ensuring wood duck nesting success is committing to an inside-the-box, duck-focused approach – where the right nest box gets used in the right habitat, in the right place, protected from critters and is well maintained. When the ducks come first in your plan.... Woodie nesting success won't be far behind.

WORKS CITED

- Bellrose, F. C. 1976. Ducks, Geese and Swans of North America. Stackpole Books, Harrisburg, PA. PP 178.
- Bellrose, F. C. 1953 Housing For Wood Ducks. Illinois Natural History Survey. Circular 45. 45pp.
- Davis, B. J. 2015. Simulations of Wood Duck Recruitment from Nest Boxes in Mississippi and Alabama, Straub, J. N., Wang, G., Kaminski, R. M., And Leopold, B. D. - The Journal of Wildlife Management. 79: No. 6: 907-916
- Dill, H. H. 1966. Meeting Management Objectives For Wood Ducks On Midwest National Wildlife Refuges. Wood Duck Management & Research: A Symposium - Wildlife Management institute
- Frentress, C. 2005. Managing For Wood Ducks In East Texas. Texas Parks And Wildlife. PP 1-20
- Hein, E. W. And Hein, W. S. 1996. Effect of Flagging on Predation of Artificial Duck Nests, Journal of Field Ornithology. 67: 604-611
- Nelms, K. D. 2007. Wetland Management For Waterfowl Handbook. Natural Resources Conservation Service. PP 53-69
- Robb, J. R. And T. A. Bookhout. 1995. Factors influencing wood duck use of natural vavities. Journal of Wildlife Management 59: 372-383
- Semel, B. And Sherman, P. W. 1995. Alternative Placement Strategies for Wood Duck Nest Boxes. Wildlife Society Bulletin. 23: 463-471
- Semel, B. 1988. Effects of Brood Parasitism and Nest-Box Placement on Wood Duck Breeding Ecology Sherman, P. W. And Byers, S. M. The Condor 90: 920-930
- Yetter, A. P. 1999 Natural-Cavity Use by Nesting Wood Ducks in Illinois. Havera, S. P. And Hine. C.S. The Journal of Wildlife Management. 63: 630-638
- Strange, T.H. 1971. Use of Nest Boxes by Wood Ducks in Mississippi. Cunningham, E. R. And Goertz, J. W. The Journal of Wildlife Management. 35: 786-793
- Settle, A. 2010 Five Year Monitoring Of Wood Duck Nest Usage Of Nest Boxes Installed On The Melvin G. Bosley Conservancy Property, Edgewood, MD. Brenner, F.J. And Stambaugh, A. Journal of the Pennsylvania Academy of Science. 84: 67-73
- Utsey, F. M. And Hepp, G. R. 1997. Frequency of Nest Box Maintenance: Effects on Wood Duck Nesting in South Carolina - The Journal of Wildlife Management. 61: 801-807
- Webb, D. R. 1987. Thermal Tolerance of Avian Embryos: A Review. The Condor Vol. 89: 874-898

Wildlife Trends Journal Management Calendar

Dave Edwards



Now is the time to clean out and prepare wood duck nesting boxes for the upcoming nesting season.

Erect new wood duck boxes and/or clean out existing boxes in preparation for the nesting season

The first step in preparing existing duck boxes for this nesting season is to clean all the old nesting debris out. A good nest box design allows an easy way to clean the old nesting debris out. Common designs may include a drop floor or a side door where debris can be pulled out. Once clean, place 4"-6" of sawdust or wood shavings in the bottom of the box for nesting material. I prefer shavings versus sawdust because they do not absorb moisture as easily which causes

rotting and mold – check with a wood shop that uses a planer for shavings. Cedar chips that are used for dog bedding can be good nesting material as well and can be purchased at pet stores. Erect new boxes before February in highly visible areas near good brood rearing habitat. Adequate protective cover is essential for brood survival. Brood habitat should include a dependable source of water with plenty of shrubs and emergent vegetation for food and cover. These areas are generally along the perimeter of a pond or swamp. Wood duck boxes should be cleaned out and inspected at

least once per year. Word of caution – always be careful when opening wood duck nest boxes. Many other animals use the boxes. Animals that are commonly found in wood duck boxes include gray squirrel, flying squirrel, rat snakes, screech owls, and flycatchers. Building wood duck boxes, putting them out, and checking them after nesting season to monitor use is always an adventure and gratifying. This is also a great project to include children. Managing wood duck boxes provides lots of hands on work and makes them feel good about helping animals...plus it teaches them good stewardship.

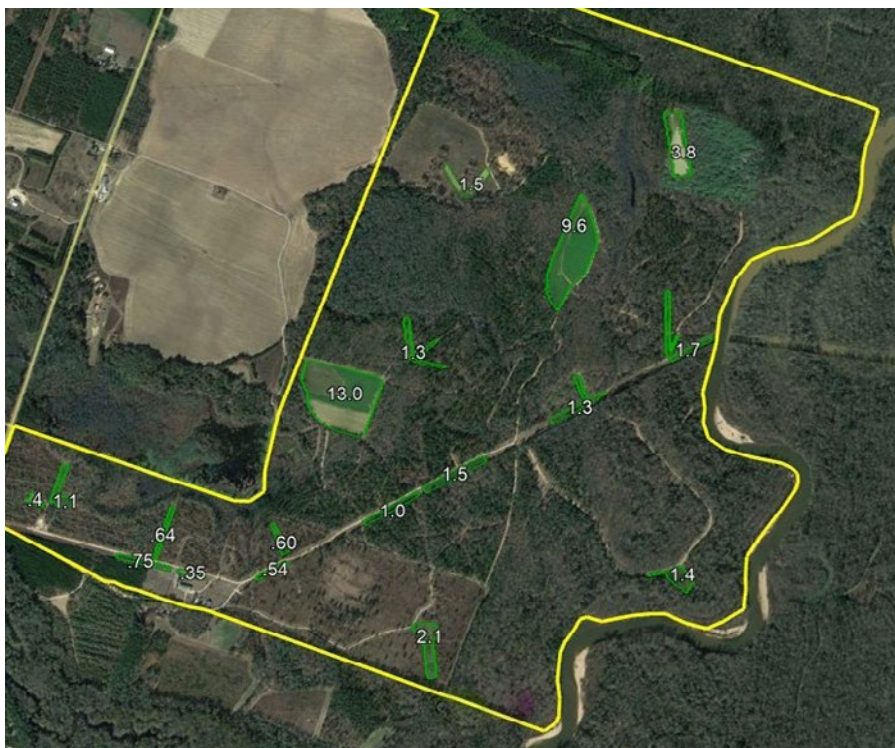
Obtain an updated aerial photograph of your property

Updated aerial photographs are an invaluable tool in land/wildlife management. In fact, it is the first thing I want to see when someone asks me to help improve their property for wildlife or create a management plan. I prefer aerial photographs taken during the dormant season when deciduous trees have lost their leaves (i.e., late winter or early spring before green up). This allows you to distinctly see differences in pine or evergreen habitats and hardwoods. Infrared images taken during the growing season can do this as well, but I prefer color photos taken during winter. An aerial photo puts everything into perspective by allowing you to see the various habitats and how they lay across a property. While this may sound odd, it also allows you to see habitat diversity and layout of your neighbor's land which may play a role in how you manage your property. For example, if your goal was to manage for turkeys and you see on an aerial that your neighbor's property is primarily mature timber, increasing nesting habitat on your property will likely attract nesting hens (and gobblers) from the surrounding property in the spring (not that you want to "steal" turkeys from your neighbor. Ha!). Also, aerial photographs often become my "drawing board" when devising plans to improve a property. That is, having a map of the entire property in front of me, I can see everything, where various habitats are on the property, where food plots are located, etc. Having this, I can visualize how hunters, deer or other wildlife use the property and/or how we can improve the property to not only ensure quality habitat is provided across the landscape, but where habitat management can be used to

direct wildlife to areas for improved hunting. There are many companies that specialize in taking aerial photographs, adding geographic features (roads, property lines, habitats, etc.), and providing a custom aerial map to the customer's specifications. While using these companies is obviously more expensive than pulling your property up on something like Google Earth, the resulting map/photo will be of high quality, up-to-date, customized to your liking, and can be uploaded into GIS type programs that allow you to pull useful information about your property (e.g., number of acres of each habitat type) and create detailed habitat management plans. While I prefer professionally flown custom maps to work with, I must admit I use free online satellite imagery (e.g., Google Earth Pro, Bing Maps, etc. more often than in the past. They are simply fast and easy to use. The downside of these images is that they are often outdated, particularly if you are actively managing habitats.

Initiate Late Winter/early Spring Strip Disking

Are you looking for an inexpensive management strategy that can significantly improve the wildlife value of your property? Strip disking is an excellent management practice that can produce exceptional food and cover for various wildlife. If you have a tractor and a disk, the only expenses of strip disking are fuel and time. Simply find areas within relatively open habitat, drop the disks, and drag them. Obviously, the tractor operator needs to pay attention to avoid stumps or other obstacles to prevent damaging the tractor or disks. The goal is to just "stir" the soil to promote germination of seeds in the natural seed bank. Generally speaking, one pass is all that is needed. Disking can be done along roadsides, in or around old fields, and within thinned pine plantations or mature longleaf stands. Disking strips 10-30 feet wide in late winter and early spring will stimulate the growth of desirable native quail



Knowing accurate food plot acreage will result in more successful crops as well as saving money.



If you have areas that need mowing, mow them before turkey nesting season starts

food plants such as partridge pea and beggarweed. The new succulent vegetation that grows in the strips will also attract insects. Late winter – early spring is also the best time to disk to promote high quality deer browse as it promotes broadleaf weed growth. These areas can be managed by re-disking every other year. The time of year you disk will influence the types of plants that colonize. For example, winter disking produces heavy-seeded quail foods such as partridge pea and ragweed, while disking in April increases the production of important seed-producing grasses such as panic grass. Disking in June favors grasses and green vegetation that attracts insects and a number of major seed plants that turkeys and quail readily feed upon in the fall. In general, seasonal disking can provide a diversity of seed producing plants for quail and turkeys as well as quality browse plants for deer.

Mow early or wait until early summer

If you have areas that need to be mowed, mow them before turkey

nesting season (which is generally March-May in most of the Southeast) to prevent destroying nests. Unless necessary, I recommend leaving as much of roadsides, fields, and other openings un-mowed to provide additional nesting habitat for turkeys and other birds. Much turkey nesting research shows that these areas are valuable and heavily used for nesting by hen turkeys. Even if turkeys do not use all of the un-mowed areas, these areas will host an alternate food source (small mammals – rats, mice, and rabbits) for potential turkey nest predators. Having this “extra habitat” also increases the “search area” and reduces predator success in finding turkeys and their nests giving turkeys a better chance of producing a clutch and surviving. This strategy is more valuable for landowners whose property has limited nesting habitat.

Plant shrubs to screen unnatural structures or objects

While this has nothing to do with wildlife management, it may enhance experiences around the

property you hunt. Late winter is a great time to install or transplant shrubs or other plants to hide unnatural objects around your camp or property. Examples of such items may include electric boxes, AC units, pump houses, clay target throwers, etc. While purchasing shrubs or plants is always an option, consider transplanting natural plants that exist on your property. These plants are well adapted for the soils and climate of your property and best of all they are free. Choose shrubs/plants that are evergreen or will provide the “cover” needed to do the job. A few plants I have had great success with include wax myrtle, broomsedge grass, and various holly and ferns. When digging up plants keep as much of the root ball intact as possible. That is, leave plenty of room around the base of the plant and cut a circle around the plant with a shovel working deeper and under the plant until the root mass (full of dirt) breaks free. Handle the root mass with care while transporting to its new home. The goal is to keep as much of the existing soil

around the roots in place as possible – which protects small feeder roots of the plant. A large plant container (black pot that shrubs or trees are grown in) is useful to have when transporting to protect the root ball. Dig the new hole larger than the original and loosen soil in and around the hole. After placing the plant in its new home, use soil from the hole to pack around the root ball. Ensure no air pockets exist and firmly pack the soil (firm not compact) around the plant. If possible, water the plant in. During its first year of life (particularly the first summer), the shrub may need a little TLC. Make sure it has plenty of water and keep competing vegetation under control. Depending on the situation, native shrubs can provide great screening along property lines where needed.

Calculate acreage of food plots

Late winter can be a down time for many landowners. Most deer seasons are close to being over and many hunters are already thinking about what can be done to improve their property and hunting for next season. In the world of food plots, knowing the size of your fields can be critical to growing successful crops. Technology has come a long ways since I was a young biologist. One of the easiest ways to determine acreages of areas such as food plots, timber stands, or lakes is by using Google Earth Pro. I have found this free software program very user friendly and accurate. If you are not familiar with it, simply search the internet and download it. The program is relatively easy to learn/navigate but has help/tutorials if needed. If you are more “old school” and need to “put your hands on it” there are several other ways to measure and determine acreage. A few of these include

using a handheld GPS and simply make a lap around the plot, using a range finder to shoot/determine lengths of plot perimeters, or simply using the old tried and true pacing method. The ability to pace off a distance with reasonable accuracy is useful for many applications when managing a property. In fact, I still use the pacing method for many applications, particularly when roughing in new food plots. To determine the length of your pace follow the steps below. Once you know the length of your pace, simply measure the length and width of a food plot to determine its acreage.

Determining the length of your pace:

1. Starting with one foot, count a pace every time the opposite foot is put down. With a measuring tape or length of rope, mark off 100 feet along a dirt road or on a food plot.
2. Using a normal, comfortable stride, pace the 100 feet about 4 times, noting each time the number of paces it takes to cover the distance. (Note: For the best accuracy, it is important to walk at a normal pace rather than exaggerated steps.)
3. Divide the sum of the total number of paces by the number of times you paced the distance. This figure represents the average number of paces it took to walk the 100 feet.
4. The length of your pace will be equal to 100 feet divided by the average number of paces it took to travel the 100 feet (calculated in step 3).

An example of stepping off measurements to calculate the acreage of a food plot:

A person with an average pace of 5.6 feet found that a rectangular food plot measured 64 paces by 97 paces. What is the acreage of the food plot?

1. First convert paces to feet: 64 paces x 5.6 = 358.4 ft., and 97 paces x 5.6 = 543.2 ft.
2. Next calculate the area of the food plot in square feet: area of a rectangle = length x width, so area = 358.4 ft x 543.2 ft. = 194,682.9 sq. ft.
3. Then divide the area of the compartment by the number of square feet in an acre (43,560 ft.): thus 194,682.9 sq. ft. divided by 43,560 sq. ft. = 4.5 acres.

Knowing the exact size of a food plot is extremely useful when it comes to figuring up proper amounts of lime, fertilizer, and seed. Over-applying any of these is not only a waste of money, but also can negatively impact your crop performance. Many times, seed is put down too heavy on food plots because actual size of the area being planted was not known. “More is better” does not apply to food plot planting. Crops need to be planted at or close to the recommended rate. Too many seeds per square foot results in a poor stand when plants begin competing for moisture and nutrients. Take a day this winter to make a lap around your plots and get an accurate reading of the areas you plant, it will pay off.

Now is the time to scout for new deer stand locations

How many times have you heard (or said to yourself) “Those dang deer know when deer season starts – we’ve been seeing them all summer and now they have gone into lock down”? Deer do not have deer season on their calendar. Hunters are their alarm clock. It



Late winter is the time to implement full-scale scouting missions to locate new deer stand locations.

happens every year and we have all been guilty of it. The woods have been quiet with no humans walking around, no ATV's, no chainsaws, no trucks or tractors, no loud voices or other odd noises and then a month (or week) before the season the woods are inundated with LOTS of these unnatural disturbances – Hunters busting through the woods doing lots of things associated with preparations for hunting season. This is the alarm clock that triggers deer to alter movements to avoid these disturbances and potential dangers.

All these things are described by two words – disturbance and pressure. I have spent most of my career helping hunters manage for better deer and better hunting. Generally speaking, growing “big bucks” is relatively easy when hunters follow management recommendations. However, getting these bucks in front of hunters is often the most challenging task I have. One thing that I have learned and have seen play out time and time again is that hunting pressure (which is a culmination of all the unnatural disturbances described

above) plays a significant role in hunting success. So, if you want to see and harvest more deer (i.e., improve your deer hunting experiences) intensively manage hunting pressure (and other disturbances) on the property you hunt. One of the best ways to reduce pressure is to be ready well before hunting season. Late winter, or just after hunting season, is one of the best times to learn more about your property, find areas that could be improved, and figure out how deer or other wildlife use your property. Learning these things will help you maximize the value and use of your property. As I have mentioned in past calendars, February and March is my favorite time to learn how deer use a property and strategize on new stand locations. Because deer have been exposed to a great deal of hunting pressure over the past few months, they are using areas that they are most comfortable in and feel safe. If you find out where they are “hiding” now, you will know where to find them next season once the hunting pressure builds and deer seem to disappear. During this time of year, buck sign such as trails, rubs and scrapes are still fresh. Erecting or relocating stands now reduces that amount of “pressure” you will need to apply just before deer season and allows deer to get used to seeing them over the summer. Although you will have to touch them up before the season starts next year, late winter is also a good time to trim shooting lanes around deer stands. Having done all this in late winter, you will significantly reduce pressure just before the season starts next year which will enhance your opportunities to see and harvest the big bucks you’ve worked so hard to grow.



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