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Earl Says...

My title as Publisher/Editor of a Wildlife Management publication affords me the opportunity (tongue firmly planted in cheek) to receive a steady stream of crazy emails from various organizations. From the “Save the Snails” crowd to the more sane and reasonable hunting industry, every group has their own agenda and they want the world to know about it.

Thank the Lord that we live in a free and open society where we can express our views on subjects that matter so much to each of us. But in these days of constant arguing and bitter debate, I only ask for folks to be honest and use *facts* to state their case. But recently I’ve been getting more and more of the “lunatic fringe” elements trying to convince me that the end of the world is at hand.

Last week I couldn’t believe it when one of these groups used the argument that if the US builds a new wall along our southern border, the ecological damage to fish and wildlife will be catastrophic. Dozens of species will soon be extinct and the damage will be irreparable. How in the world can someone make such an illogical stretch just to justify their political views? I’m afraid this kind of “my way or the highway” thinking is why we can’t seem to get anything done these days. My only hope is that sane folks out there can see through this kind of rhetoric and make up their own minds.

I believe all these good folks mean well and it is their right to express themselves as they see fit. But as a favorite commentator of mine once said, “*You have a right to your own opinion, but not your own facts.*”

Andy Whitaker
Publisher/Editor



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Warm Season Food Plots

By Jeremy Meares

Jeremy Meares is a certified wildlife biologist and manager of Westervelt Wildlife Services. Jeremy received both his B.S. and M.S. degrees from The University of Georgia specializing in deer management.



As we close the books on another deer season, most managers are thinking about next season and what is next on the to-do list. Planting warm season food plots is likely near the top of most managers' list. While warm season plots do provide benefit to a variety of wildlife species, food plots should be merely one piece of a landscape-level habitat management plan. Remember, food is only one part of what is defined as habitat. Too many times managers fall in the trap of looking for a quick fix to help get their "hit list" bucks to the skinning shed while ignoring other more critical habitat needs. When formulating a habitat management plan, food plots should usually be one of the last steps. I'll step down off that soap box for now.

Warm season food plots are a valuable addition to a management plan in that they have the ability to provide a food source during the summer as well as winter, depending on which species are planted. These forages provide quality nutrition

Soybeans provide excellent nutrition into late summer when bucks are growing antler and does are lactating. Photo credit Ryan Basinger.

needed for milk production, antler development, and fawn growth from late spring into early fall. In winter, corn and soybean seed provide a high-energy food source through the grain that is available, which can be important in years with low hard mast (acorns) production.

A variety of forbs (broadleaved herbaceous plants, a.k.a. “weeds”) typically make up a deer’s diet during the spring and summer. Depending on weather, these naturally occurring forbs usually become significantly less palatable and digestible as summer progresses. Planting high-quality summer legumes and other forages will provide great sources of protein and total digestible nutrients during this nutritional stress period. We will discuss the more common warm season plantings for white-tailed deer, and wild turkey. **All seeding rates are listed as amount of pure live seed (PLS) per acre.**

White-tailed Deer

While corn and soybeans are by far the most popular warm season plantings for deer, there are other species like lablab, iron-clay cowpeas, and grain sorghum just to name a few. We will take a look at several species along with field preparation and planting techniques, as well as weed control.

Soybeans

Soybeans are obviously highly preferred by deer and provide excellent nutrition into late summer and can also provide an important winter food source through the grain if they aren’t overgrazed (depending on management). The vast number of soybean varieties provide flexibility to managers with different maturity groups, weed control methods, planting dates, and planting methods. For these reasons, soybeans are often regarded as the best warm season food plot forage. However, there are a few things to consider before planting soybeans.

Soybeans are categorized into 13

maturity groups, 10 of which are commonly grown in the United States (MG 00-8). The northern U.S. typically grows early-maturing groups, while later maturing groups are better in the South. In addition to maturity groups, soybeans are also either determinate or indeterminate. **Determinate** varieties (MG 0-4) produce most of their growth prior to flowering and pod development, while **indeterminate** varieties (MG 5-8) continue developing leaves for a period of time when flowering and developing pods. When planting soybeans in the South, MG 4 can be planted in mid-April to allow flowering to

occur before late summer when dry conditions are common. On the other hand, determinate varieties can be planted in late spring (in the South) because of the longer growing season.

As if there were not enough options already, soybean varieties will show one of three canopy types: bushy, intermediate, or narrow. Those with a bushy canopy should be planted on wider spacings (30- inch rows or broadcast) with lower plant numbers. If planted too closely, they will attempt to grow taller producing small stems that cannot support the increased plant height. With intermediate varieties, a 15- inch row is



If soybeans are not overgrazed, allow them to stand through the fall and winter; the pods are an excellent winter food source for deer and turkey. Photo credit Ryan Basinger.

ideal and a 7- inch row for narrow. Generally speaking, determinate varieties usually have intermediate to bushy canopies, while indeterminate usually have narrow canopies. If you are unsure of the canopy structure for the variety you are planting, a 15-inch row would be your best choice.

Soybeans can be planted once soil temperatures reach 60°F. This can range from mid-March in the Deep South to early June in the Upper Midwest and Northeast. Planting rate for soybeans is actually determined by seed count and usually ranges from 130,000-200,000 seeds per acre. Broadcast planting or using a drill is typically less efficient than a planter and higher seeding rates may be needed to offset seed loss and inconsistent depth control. If you are broadcasting seed, 80-100 pounds per

acre is recommended. Planting depth for soybeans is 1-2 inches deep. If seeds are planted at higher rates, plants are typically taller with pods forming higher on the stem. In addition, weed competition is typically lower with higher planting rates because the plants reach “canopy closure” quicker, which helps shade out potential weeds.

Managers have several options for controlling weeds in soybean plots, depending on which weeds are present (e.g., grass weeds or broadleaf weeds). There are numerous herbicides labeled for soybeans that include preplant incorporated, preemergence, and post emergence. In addition, many varieties are Roundup-Ready which are tolerant to glyphosate, which is the active ingredient in Roundup. Insect pests and fungal diseases can also impact soybean

production.

Most seed is now treated with an insecticide providing protection for 25-30 days. Holes and leaf defoliation are signs of insect damage from caterpillars (moth/butterfly larvae), beetles or grasshoppers. Moth larvae such as fall armyworms, corn earworms, and loopers can cause problems in late-planted soybeans. Planting early and controlling weed competition that may serve as host plants for insects may help reduce insect problems. Checking your soybeans often is critical in discovering an insect problem before it is too late. If damage from defoliation exceeds 20%, an insecticide treatment may be warranted. There are a variety of insecticides available for treating soybeans.

If managers are growing soybeans for



Controlling undesirable weed competition can be achieved by planting Roundup Ready varieties or through using appropriate herbicides either pre- or postemergence.

deer, they should allow the beans to stand through the winter. If the soybeans were not overgrazed and beans are present, do not mow or disk them to prepare the field for fall plantings. Instead, leave them standing to allow deer to feed on the grain through fall and winter. Cool season forages, such as wheat and crimson clover can be top sown into the standing beans to provide additional green forage through the fall, winter, and spring. If soybeans have been overgrazed (and no beans are present), an effective strategy is drilling cool season forages like wheat and annual clovers over the existing plants in late summer or early fall. The more effective strategy for adding cool season legumes into a soybean field is to plant a good reseeding clover (like crimson) the fall before planting soybeans. With this strategy, the crimson clover will emerge naturally (without field prep or planting) in the plot in late summer/early fall as the temperature begins to drop and soybeans fade out. This technique is more effective than top sowing clover seed on top of dead soybeans due to the amount of thatch/debris that may be present on top of the ground that can inhibit good seed-to-soil contact for germination.

So, we often hear folks cannot plant soybeans because the deer quickly overgraze them. This situation usually stems from one or a combination of the following causes; plot size is too small, low quality of the naturally occurring forage, or deer density is too high. If soybean plots are small (less than one acre), their chances of establishing are low in areas where deer density is high. Smaller plots have limited nutritional impacts unless there are several scattered over a large area (and your deer density and habitat are in balance) So what is the solution? Managing the woods to promote better quality natural forages, employing some population management, and creating/enlarging plots to allow for suitable sites for planting soybeans will help alleviate

overgrazing problems. There are options for keeping deer out of soybean fields using fences or repellents but completely excluding deer from these plots really defeats the purpose of providing increased nutrition for antler growth and lactation.

Corn

Just like soybeans, there are hundreds of varieties of corn depending on soils, climate, and uses. The time required for maturity is an important consideration. If you are in the North, an early maturing variety (80-100 days) would be needed as opposed to a later maturing variety (120 days) that would be better suited for the South. County extension agents should be able to direct you to the most productive varieties for your area. Corn typically is planted in 20-30 inch rows with a corn planter (seed 6-12 inches apart) and 16,000-30,000 seeds per acre provide optimum grain production. For sandy loams and areas that are relatively dry, a lower rate of 16,000-22,000 seeds per acre is recommended. Conversely, for heavier clay soils that are more effective in holding moisture, higher rates (24,000-30,000)

are recommended.

Planting corn can be an expensive proposition due to its heavy nitrogen usage. The amount of nitrogen is highly correlated with production. In most areas to obtain a good yield, 160 pounds per acre of actual nitrogen is required along with the recommended levels of potassium and potash (based on soil test results). Corn and soybeans are often rotated given soybeans are legumes and have the ability to create nitrogen that can be available to other plants the following growing season. This helps reduce cost and increase efficiencies.

As with soybeans, there are multiple options for controlling weeds when planting corn. Roundup-Ready varieties of corn are available allowing glyphosate to be sprayed postemergence. This technology is particularly effective when combined with one of the pre-plant/preemergence herbicides (labeled for corn) is also used. Before planting non-Roundup-Ready corn, there are several options for applying herbicides preplant incorporated (atrazine, Bicep II Magnum, or Dual Magnum) to control grass and forb weeds. Additionally,



Vining legume mixture of iron-clay cowpeas, lablab, and peredovik sunflowers. Remember, the sunflowers are used to allow the cowpeas and lablab to climb, increasing the amount of available forage.

Basagran or Permit can be applied post-emergence for controlling various forb weeds and yellow nutsedge. Other options for controlling forb weeds only (postemergence) include 2,4-D, Aim, Banvel, and Clarity. However, depending on the severity of weed competition, some of these “weeds” may actually be beneficial if they aren’t too dense and choking out the corn. Species like common ragweed, pokeweed, smartweeds, and others provide seed and cover highly beneficial to a variety of bird species (game and non-game). These “weedy” fields can also provide attractive cover and browse for deer. If undesirable weed species are present, herbicide treatments may be needed. May want to mention a few other herbicides used to manage corn other than Roundup

In addition to weeds, insect pests also can significantly reduce corn yield. This can be managed on the front end by planting varieties resistant to various pests and diseases and to use a seed treatment. Again, a County Extension Agent should be able to help with this.

Planting early can also help reduce crop damage from pests like armyworms. Regular crop inspection is highly recommended. Insecticide treatments may be needed if armyworms are found on 25% of corn seedlings, when 5% of corn seedlings are damaged by cutworms, or when 10% of corn seedlings are infested by stinkbugs. If you are not already familiar with these insects and their associated signs of damage, a quick web search should get you up to speed.

Other single-species plantings and mixes

While soybeans and corn get most of the spotlight with regard to warm season food plots, there are several others that can produce high-quality forage and are extremely attractive and nutritious for deer and other wildlife. Species like American jointvetch, Florida beggarweed, perennial peanut, and alyceclover are all great warm season plantings in the South (jointvetch and alyceclover do well further north as well – another benefit of these two is that they can be suc-

cessfully established via no-till top sowing, which is ideal for those lacking conventional planting equipment or for hard to reach plots). Although less attractive, buckwheat can be a single-species planting especially where a quick “green up” is needed and in areas where you want to increase soil organic material. However, I recommend using buckwheat in a mixture with other species, such as jointvetch and alyceclover.

Vining legumes like lablab and cowpeas are best planted with a substrate plant, such as sunflowers or grain sorghum to provide climbing structure increased production. A common vining legume mix would consist of 50 pounds iron-clay cowpeas, 10 pounds lablab, and 5 pounds peredovik sunflowers. In this mix, the vining legumes produce excellent forage for deer into late summer or early fall when natural browse is less available and palatable. The cowpeas and lablab tolerate grazing pressure pretty well. While deer may browse the seedheads of the sunflowers, remember they are not in this mix for

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forage but for structure. Planting only one legume species in this mix is also an option; plant 75 pounds of cowpeas or 25 pounds of lablab. To control weed competition (grass and forb), Prowl, Dual Magnum or Treflan can be applied preplant incorporated or pre-emergence (read the label). If additional grass control is needed, a grass-selected herbicide can be applied post-emergence, such as clethodim or Poast.

In the South Carolina Lowcountry and other areas of the Deep South a mix of American jointvetch (10 pounds), alyceclover (10 pounds) and buckwheat (5 pounds) is commonly planted. Both jointvetch and alyceclover are slow to establish, thus the addition

of buckwheat will provide a quick green up and buffer grazing pressure.

Warm season food plots for deer should again be part of a holistic management approach where habitat and herd management are at the forefront. If you cannot get a warm season food plot established because of browse pressure, you may be planting fields that are too small or you may have a deer density that is out of balance with the habitat.

Responsible deer management practices dictate plugging the lowest hole in the bucket first, then work your way up. Most managers have a passion for managing for more species than just white-tailed deer so we will shift gears and look at options for wild turkeys.

Wild Turkeys

Turkeys mainly benefit from seed producing plants in warm season food plots during the fall and winter months when natural foods may be limited. These high-quality food sources can reduce required movements and lead to increased winter survival. The main players for turkeys are corn, soybeans, grain sorghum, and chufa.

Corn, Grain Sorghum, and Soybeans for Turkeys

If managing specifically for turkeys, use the widest row spacing (30 inches) and the lowest recommended seeding rate when planting corn or grain sorghum. This method allows more space



Weed control in chufa plots is more efficient if chufa is planted in rows. Photo credit Ryan Basinger.

between plants and provides better structure for turkeys to navigate while still producing an acceptable grain yield. Using shorter varieties of corn and sorghum will make these plots more attractive to turkeys because the seed is more easily accessible while providing better visibility. In an effort to make grain even more accessible, some will silage chop, mow, or knock over stalks. An alternative to manipulating the crop is to leave it standing. Turkeys will find a way to get the grain if they need it. Allowing corn plots to go fallow the year after planting can produce great brood-rearing cover (depending on the forbs that germinate from the seedbank) by creating an umbrella protecting broods while they forage for bugs and seeds underneath. Turkeys will use soybean fields to forage for insects but their primary use is once again seed like corn and sorghum. As we mentioned above, allow soybeans to stand through winter depending on seed availability. Similar to corn, if planting soybeans specifically for tur-

keys, a MG 4 or 5 variety with a short bushy canopy and planted on a wider spacing (30 inch or broadcast) at a lower rate is recommended.

Chufa

Chufa is a type of yellow nutsedge. Turkeys will eat the nutlike tubers produced on the roots, which are extremely attractive. Chufa tends to grow well on a variety of sites. However, turkeys have a difficult time scratching up the tubers in heavy clay soils so it is a better fit for loamy soils unless you plan to lightly disk portions of the plot to help turkeys access the tubers after they mature. Chufa can be planted in mid-April – July 1 using a drill, planter, or broadcast and then covered 1-2 inches by disking. The planting rate for chufa is 50 pounds per acre when broadcasting, but reduce the rate accordingly if using a planter or drill. As with any planting, the soil needs to be amended with lime and fertilizer (raising the levels of P and K accordingly) to allow for maximum yields. Nitrogen can be top-

dressed at 60 pounds per acre once the plants reach about six inches in height and rain is in the forecast. On average chufa matures about 100 days after germination. Herbicide control of weed competition is more efficient if chufa is planted in rows. Forb weeds can be controlled postemergence using 2,4-DB, Banvel, or Clarity. If grasses are the problem, treat chufa with a postemergence treatment of Clethodim or Poast.

Planting and managing warm season food plots are a valuable addition to a property management program. This article just scratches the surface of the possibilities for these plantings. Managers wanting to manage habitat in conjunction with a sound food plot program should pick up a copy of Dr. Craig Harper's book titled "*A Guide to Wildlife Food Plots and Early Successional Plants*". This is a valuable resource providing practical information and quick references for herbicides/insecticides, planting dates/rates, forage analyses, and much more.

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The Effects of Fire Suppression and Hardwood Midstory on Bobwhite Quail and Other Wildlife

By Ryan Shurette

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Studies have shown relative abundance (whistling males) of bobwhites to be significantly higher in thinned shortleaf pine stands with little to no hardwood midstory, as compared to shortleaf stands that had thicker midstory and canopy.

For a biologist who manages Bobwhite quail, Bachman's sparrows, or Red-cockaded woodpeckers, it is fairly easy for them to walk through a forest and give a thumbs up or down on whether habitat is suitable for those species. One of the key things they will undoubtedly be looking for is the structure of the stand and whether it is open and sunny, or dense and dark due to hardwood encroachment. The difference can be night and day. In this article we will examine the ecological significance of hardwood midstory in upland pine habitats, control strategies, and wildlife implications of these treatments.

Fire Suppression in a Pine Stand

I remember as a child the excitement of "helping" my family burn the woods around our farm and property every year in February or March. My grandfather's

old drip torch was a fascinating piece of equipment to my little brother and me. We hardly ever got to run it but we were generally content to do battle with whatever small spot-overs and unruly broom sedge flames that threatened our fire breaks with the pine top or fire rake that we were more commonly outfitted. Most often my folks would wait until late evening to light it up and so that meant most operations carried on well into the dark. My brother and I loved these night ops missions and we thought whatever task we were assigned by the grownups was essential and critical to the safety of not only our farm, but any and all lives and homes for at least a hundred miles in any direction. At the end of the assignment we would be worn out, smut-faced, and reeking of smoke, but we were smiling. While our duties were never actually that important, there was some purpose to what we were doing. I eventually learned to recognize some of the reasons for our

burning and to understand the various effects that it had on the forests, vegetation, and ultimately wildlife species like bobwhite quail, turkey, and deer. Later in the season and as spring progressed one of the most obvious effects, that even a youngster could see, was the openness of the stand and the resulting bunchgrasses and weeds that proliferated in the recently burned pine stands, although it took a few years for me to put it all together in my mind. At the time we were happy just to run around and swat at flames. To me, and to many others I suspect, there is something mesmerizing and primal about the sweet smell of wood smoke and the orange glow of low flames creeping steadily along in the dark.

It has been well documented that the southeastern US and other regions of the country were influenced by periodic fire. There is however some debate about exactly how often fire occurred on the southeastern US landscape, as

well as the sources of ignition. Lightning was obviously the primary source of starts prior to habitation by humans. Lightning-season (spring and summer) fires are typically better at controlling hardwood encroachment and provide essential habitats for species such as bobwhite quail (Cox and Widener, 2008). There was undoubtedly variation, but it is believed that lightning-caused fire return intervals would have been as short as 1-2 years in some areas. In other areas 5-7 years, or longer, would have been the norm. Native American tribes also regularly initiated burns in the South to improve game habitat and reduce undergrowth (Harper, 1958). It was the presence of these periodic fires (both natural and human-initiated) that maintained the integrity of open timber stands, especially longleaf pine, as they are eventually replaced by other forest types in the absence of disturbance (Cristensen, 1981). Without periodic fire, these open



It was the presence of periodic fires (both natural and human-initiated) that maintained the integrity of open timber stands. Little to no hardwood midstory is preferred for early successional species like bobwhite quail and others.

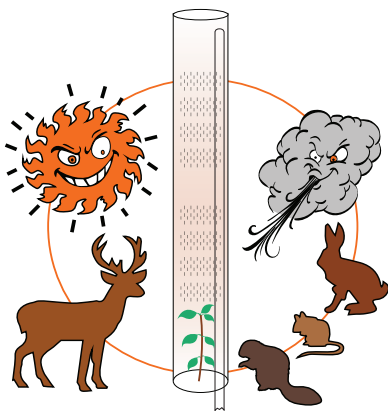


In a 2002 study that looked at midstory effects in Alabama longleaf pine stands, I found that total breeding bird abundance increased steadily as the amount of hardwood midstory structure decreased (regression trends for ground level and 7.0 meter heights shown here).

pine stands become encroached with hardwoods that would naturally have been killed by fire. Unless the soil is so poor, steep, or rocky that hardwoods cannot survive, species like yellow poplar, sweetgum, sourwood, blackgum, red maple, and oaks eventually become the dominant species in an upland timber stand that goes unburned. Some hardwood species (such as blackjack oak, turkey oak, post oak, etc.) are actually pretty fire tolerant and are not necessarily out of place in fire-maintained uplands, but an influx of “off-site” hardwoods is not natural. A thick hardwood midstory and closed canopy not only shades out any longleaf pine recruitment (seedlings) but it also eliminates the weedy herbaceous understory (i.e. preferred wildlife habitat). Over time this conversion has important effects on many game and non-game wildlife species. Bluestem grasses, Indiangrass, wiregrass, lowbush blueberry, native lespedezas, beggarweeds, partridge pea, ragweed, goldenrod, and other quail plants require a lot of sunlight and they fade out of the picture as

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the shade comes in. These plants are usually replaced by sparse and less desirable ground covers including woody vines like muscadine and poison ivy as the sub-canopy closes.

As we have discussed in previous *Wildlife Tends* articles, there was once plenty of open, fire-maintained pine habitat (mostly longleaf pine) from Virginia to Texas. More than a hundred million acres of diverse and abundant herbaceous plant communities existed beneath these open pine woodlands. There was certainly a lot of variability across the landscape and some areas probably had more of an upland hardwood component than others. But generally speaking these woods were open and grassy. Even many longleaf stands in the mountains historically resembled the open, park-like longleaf forests of the coastal plains (Shankman & Wills, 1995). Early seral habitats abounded and many associated species that were common in those days are now fairly rare. And as you have also probably heard before, of that original hundred million acres, only about three million

acres are still intact and open. We won't beat this horse anymore but it is worth mentioning again in this article because it leads us to a point worth considering; there is a pretty good chunk of forested land out there that is fire-suppressed with hardwood midstory. The good news is that these fire-suppressed stands can usually be "fixed" when it comes to restoring early successional wildlife habitat. Sometimes it is a challenge, but sometimes it can be as simple as removing the hardwood midstory. We'll discuss these control strategies in further detail later.

Hardwood Encroachment and Wildlife

Now that we have driven home the fact that fire suppression leads to hardwood encroachment, let's take a look at what that means to some of the wildlife species we might want to manage. When it comes to most species' preferences, there is a lot of difference in an open stand and a densely encroached stand. This is certainly true when it comes to bobwhites. While the saplings

and dense shady midstory could provide some level of tough escape cover for quail, the really critical habitat components (nesting, roosting, brood-rearing) would typically be compromised or eliminated completely by all the woody competition. An Arkansas study (Cram, et al.) from 2002 showed relative abundance (whistling males) of Northern bobwhites to be significantly higher in thinned shortleaf pine stands with little to no hardwood midstory, as compared to shortleaf stands that had thicker midstory and canopy. This is due to the drastic reduction in the herbaceous ground cover that comes with hardwood competition. The best bobwhite brooding habitat has been repeatedly shown to be open and free of hardwood structure. In other studies, reduction of hardwood structure in the stand has been linked to higher survival rates and decreased avian predation (Sisson, et al., 2002.). Hardwood branches and structure can provide cover and hunting perches for Cooper's hawks, Red-shouldered hawks, owls, and other predators, resulting in more predation



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Immediately after hardwood midstory stems are cut, stumps should be painted or sprayed with a water-soluble herbicide (such as a glyphosate product like Accord AC, or an amine formulation of triclopyr such as Garlon 3A) at about a 50% concentration in water.

mortality to adult and juvenile quail.

A species that illustrates the point perhaps even more starkly than the bobwhite is the **Red-cockaded woodpecker (RCW)**, and it is a mental picture of good RCW habitat that most managers hold in their mind as a benchmark for many other species. RCWs simply will not tolerate a lot of hardwood midstory. Though they seldom spend any time below ten feet, an open forest stand and the resulting herbaceous ground cover ultimately benefits the RCW because insects and other arthropod food items crawl up and out of the understory onto the trunks of pines where this species forages. Perhaps even more importantly,

the RCW's affection for openness pertains to their potential nest predators. Rat and corn snakes, raccoons, and other predators can more easily access their cavities if there are plenty of limbs and structure to gain entry. Good RCW habitat simply has little to no hardwood midstory. I realize very few private landowners have RCWs on their property and therefore wouldn't necessarily be interested in managing for them, but the point is that this kind of open habitat (which was once very common) is preferred by a myriad of wildlife species.

In the Florida coastal plain (Tall Timbers Research Station), Engstrom et al. (1984) observed a dramatic change

in the total bird community structure as a tract of fire-maintained pine forest was allowed to develop a thick hardwood understory via the elimination of fire over a period of fifteen years. As a result, there was a marked decline in early-succession species (including Bachman's sparrow, Eastern kingbird, Eastern Towhee, Yellow-breasted chat, Prairie warbler, and White-eyed vireo). Several of these species are seeing declines across their breeding range due to the scarcity of open, burned landscapes. Mesic woodland associates (including Red-eyed vireo, Yellow-billed cuckoo, and Hooded warbler) were observed in the later stages of the study as hardwood encroachment progressed. However, canopy species (including Great-crested flycatcher, Blue jay, and Summer tanager) appeared to be minimally affected by hardwood understory development. These latter species are typically pretty common across the region and are not generally in decline. Dr. Geoff Hill (1998) with Auburn University observed higher densities of Bachman's sparrows (a species of high management concern) in burned pine stands actively managed for Red-cockaded woodpeckers (no midstory), as opposed to those not managed for these conditions. Bachman's sparrow also requires a grassy herbaceous layer that is often found in non-encroached habitats that have been managed for RCWs and bobwhites.

As you move out of the coastal plain and piedmont ecoregions, and into the mountains, this trend still holds true. In 2002, I conducted a study in the Talladega Mountains of northern Alabama where I looked at breeding bird communities in montane longleaf pine habitats. Roughly half of the 57 study plots were located in open longleaf stands with no hardwood midstory, and the rest were located in hardwood-encroached longleaf stands. By measuring the midstory structure and density at various heights and comparing those data to the bird species that were present

there, I was able to determine the effects of the hardwood midstory encroachment on avian communities. Just like in the coastal plain, early-successional species such as Yellow-breasted chat and Prairie warbler were much more common in open stands, and mesic hardwood species such as Red-eyed vireo and Yellow-billed cuckoo were more frequently observed in longleaf stands with hardwood midstories (Table 1). Species of special concern (including Bachman's sparrow and Brown-headed nuthatch) were more common in open stands. Several species did not differ significantly in abundance between the two longleaf communities, but bobwhite quail was detected only in the open, managed stands. Total breeding bird abundance increased steadily as the amount of midstory structure decreased (see Figure 3 and 4). In other words when it comes to midstory, less is more for these uncommon bird species.

On most landscapes, other game species like white-tail deer and wild turkeys also typically respond favorably to midstory reduction or removal. This is because the diverse plant communities that follow, after the midstory canopy is opened, can provide highly nutritious browse and quality fawning cover for deer, and good brooding, foraging, and nesting habitats for turkeys. While deer may also browse the sapling and vines of encroached stands, this vegetation is much lower in crude digestible protein as compared to native legumes and forbs of open stands. The practice of hardwood midstory removal is becoming more common on properties with a wildlife or ecosystem restoration focus. Rare and uncommon plant species also sometimes show up in the understory after the midstory is taken off and a prescribed burn or two is conducted.

Hardwood Midstory Removal and Control Techniques

Now that we know the importance of hardwood midstory control, what can a landowner do to address it? There are

several options (obviously varying in cost and technique) and the best approach is determined by the specific situation. A **mechanical midstory control treatment** (with equipment or chainsaw) is very similar to a commercial timber thinning in an ecological sense. Simply put, it sends more sunlight to the ground by physically cutting the vegetative structure. Unlike a commercial timber harvest though, midstory hardwoods are generally non-merchantable. The felled midstory trees can either be removed, mulched, or more commonly, left in place to decay or be burned over time. One thing to keep in mind is a midstory treatment only serves its wildlife-benefitting purpose if you have a low enough basal area of larger leave trees that ample sunlight will hit the forest floor after the midstory is removed. The term "midstory" by the way describes the middle of the forest structure; the small to medium-sized trees in a stand (from sapling size up to the subdominant overstory). If the large overstory is dense (more than about 70 square foot per acre in basal area for pine stand, and 60 for hardwoods), a commercial timber thinning will likely be needed in addition to provide the desired results. These basal areas would obviously need to be even lower for high quality quail habitat (less than 50 square foot per acre). If a landowner happens to be having their timber thinned, this is a good opportunity to ask the logger about also taking some of the smaller non-commercial trees to try to get as much of the midstory structure as possible out of the woods during the operation. Most likely however, loggers will not want the smaller (1"-8" DBH), less desirable hardwoods. Therefore, the commercial harvest may result in a properly thinned stand with some moderate to light midstory remaining, a situation that is fairly easy to clean up. It wouldn't take much in this case for a crew of a couple folks to go back through the stand with small chainsaws and finish touching up to create an open

structure. Immediately after the stems are cut, I highly recommend spraying or painting the cut stumps with a selective water-soluble herbicide (either a glyphosate product like Accord AC, or an amine formulation of triclopyr such as Garlon 3A) at >50% concentration in water. The sawyer can actually carry a spray bottle on his side to make the application (around the cambium on the top of the stump) immediately after each hardwood is cut. The addition of this inexpensive herbicide application will kill a lot of the hardwood rootstocks that will otherwise sprout back after they are cut. Any larger hardwoods that were previously cut during the timber stand will have to be dealt with later as they sprout, via fire or herbicide. Cut stump herbicide applications can be made year-round but are usually most effective in many hardwood species during the dormant season.

Let's look at a different scenario. Suppose a landowner has a fire-suppressed stand that has a fairly low basal area of larger overstory pines (not needing a commercial thinning) but with a significant amount of smaller hardwood encroachment. This is actually a very common scenario a few years after a timber thinning in a stand of pre-saw-timber pines, where adequate prescribed burning has not been performed, resulting in a moderate to heavy midstory layer. In this case the recommended control strategy would be determined by two factors: the **size (DBH) of the midstory** and the **density of the midstory**. If the average midstory stems are relatively large in diameter and not very dense, the chainsaw method above would be a good strategy to use. Or if that doesn't sound like how you'd like to spend your weekends, this type of work is commonly contracted in the \$60 to \$200 per acre range, depending on the job. Even if it is contracted, the cut-stump herbicide add-on option should be of minimal cost and would be well worth the extra few dollars per acre in the long run, considering the

Common Name	Scientific Name	Abundance	P value
			Treated/Untreated
Acadian Flycatcher	<i>Empidonax vireescens</i>	0/1	0.322
American Crow	<i>Corvus brachyrhynchos</i>	2/1	0.469
American Goldfinch	<i>Carduelis tristis</i>	6/1	0.041
American Robin	<i>Turdus migratorius</i>	1/0	0.322
Bachman's Sparrow	<i>Aimophila aestivalis</i>	9/0	0.002
Barred Owl	<i>Strix varia</i>	0/1	0.322
Black-throated green Warbler	<i>Dendroica virens</i>	11/26	0.013
Black-and-white Warbler	<i>Mniotilta varia</i>	3/27	<0.0001
Blue Jay	<i>Cyanocitta cristata</i>	10/8	0.449
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	10/11	0.875
Blue-headed Vireo	<i>Vireo solitarius</i>	32/23	0.094
Broad-winged Hawk	<i>Buteo platypterus</i>	0/1	0.322
Brown Thrasher	<i>Toxostoma rufum</i>	4/2	0.399
Brown-headed Cowbird	<i>Molothrus ater</i>	7/3	0.133
Brown-headed Nuthatch	<i>Sitta pusilla</i>	34/3	<0.0001
Carolina Chickadee	<i>Poecile carolinensis</i>	12/31	0.016
Carolina Wren	<i>Thryothurus ludovicianus</i>	9/8	0.514
Chipping Sparrow	<i>Spizella passerina</i>	25/4	<0.0001
Common yellowthroat	<i>Geothlypis trichas</i>	1/0	0.322
Downy Woodpecker	<i>Picoides pubescens</i>	8/9	0.899
Eastern Bluebird	<i>Sialia sialia</i>	3/0	0.083
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	24/8	0.002
Eastern Wood-Pee-wee	<i>Contopus sordidulus</i>	3/1	0.263
Great-crested Flycatcher	<i>Myiarchus crinitus</i>	11/16	0.474
Hairy Woodpecker	<i>Picoides villosus</i>	1/3	0.406
Hooded Warbler	<i>Wilsonia citrina</i>	0/1	0.322
Indigo Bunting	<i>Passerina cyanea</i>	56/26	0.0001
Mourning Dove	<i>Zenaida macroura</i>	3/3	0.851
Northern Bobwhite	<i>Colinus virginianus</i>	2/0	0.164
Northern Cardinal	<i>Cardinalis cardinalis</i>	11/13	0.913
Northern Flicker	<i>Colaptes auratus</i>	11/3	0.012
Ovenbird	<i>Seiurus aurocapillus</i>	1/24	<0.0001
Pine Warbler	<i>Dendroica pinus</i>	70/49	0.005
Prairie Warbler	<i>Dendroica discolor</i>	93/33	<0.0001
Red-cockaded Woodpecker	<i>Picoides borealis</i>	2/0	0.160
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	3/9	0.163
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	2/1	0.337
Red-eyed Vireo	<i>Vireo olivaceus</i>	12/49	<0.0001
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	2/4	0.563
Scarlet Tanager	<i>Piranga olivacea</i>	6/12	0.234
Summer Tanager	<i>Piranga rubra</i>	41/12	0.009
Tufted Titmouse	<i>Baeolophus bicolor</i>	15/31	0.111
White-breasted Nuthatch	<i>Sitta carolinensis</i>	16/18	0.941
White-eyed Vireo	<i>Vireo griseus</i>	3/1	0.704
Wild Turkey	<i>Meleagris gallopavo</i>	1/0	0.322
Wood thrush	<i>Hylocichla mustelina</i>	0/1	0.322
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	1/0	0.322
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0/9	0.002
Yellow-breasted Chat	<i>Icteria virens</i>	41/12	<0.0001
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0/4	0.044
Yellow-throated Warbler	<i>Dendroica dominica</i>	46/16	<0.0001

Table 1. Observed frequency of breeding bird species in open montane longleaf pine stands (Treated) versus longleaf stands with significant hardwood midstory (Untreated) in the Talladega Mountains, AL, 2002.

carbohydrate reserves underground.

Another option of physically eliminating the midstory is via **mulching** with a masticator, particularly if the saplings and midstory trees are very dense. The costs of machines also vary but I've typically seen coarse chop jobs (not manicured like in a park or yard) that would be adequate in a forestry situation contract out in the range of \$150 to \$400 per acre.

A dense midstory layer (with smaller average diameters) may best be addressed by a foliar or even **ground-applied herbicide application**. These applications can be made by hand (backpack) or from a boomless tractor- or skidder-mounted rig. If the midstory is low and shrubby, a foliar application of a tricopyr or imazapyr tank mix (with water and non-ionic surfactant) could be used (following label rates) on the actively growing foliage of the saplings during the growing season. Note that Imazapyr is ground active and should only be used where damage to other hardwoods would not be a concern, as this herbicide will hammer hardwoods large or small, anywhere in the immediate vicinity of the application. If the stand has an overstory of pines and there is no desire for larger hardwood retention, a ground-applied, ground-active herbicide application (imazapyr or hexazinone) alone could address hardwood encroachment, regardless the size. However this strategy would leave a lot of standing dead hardwoods that would come down slowly over time. I have seen this practice used a few times as a wildlife stand improvement application, and as the snags come down, grasses and fine fuels eventually appear and a functional prescribed burning program can eventually be established. Most managers however simply don't like the look of the stand in the meantime.

The cheapest strategy (if it can be used) is the use of **fire**, just like it happened in nature. However, once a hardwood midstory becomes well estab-

lished, the chances of fixing it with prescribed fire (at least one you could hope to control) can be fairly low. Once a shady midstory situation is established, fine fuels disappear and humidity on the floor is typically higher, making it difficult to get a functional fire going. If conditions are dry enough to get a hot fire going however, especially during the growing season, you can begin to cause some mortality in the larger hardwoods. This is especially true if you repeat the burns regularly. These kinds of burns can sometimes be hairy though and extreme caution should be used when conducting these “thermal thinning” type burns. If there is commercial value in the stand, a timber harvest may be the best option before hot fires are re-introduced. Unless there is some reason a manager cannot burn at all (which is not a good situation to be in), fire is usually the very best way to maintain the stand after the midstory has been removed and fine fuels restored. Sprouting will almost certainly continue for a while

after the hardwoods are cut, so repeated fire will be key to top-killing them until the sugars in their rootstocks are depleted. Typically after the midstory is removed and a couple of good prescribed burns are conducted, the understory will respond and native herbaceous plant communities really start to come in. These habitats are now ready for use by bobwhites and other early successional wildlife.

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Vector Pests

By Daryl Bell

Daryl Bell is a freelance outdoor writer from Mobile, AL and President of the newly formed Five Rivers Delta QDMA Branch. Contact him at darylbell7041@gmail.com.



Aedes Albopictus, also known as the Asian Tiger Mosquito

In epidemiology, a **vector** is any organism that transmits infection by conveying pathogens from one host to another. In our neck of the woods and all over the globe, the mosquitoes and ticks are vector pests of the highest concern.

Mosquitoes

Of everyone who reads this, I bet there's not one person who enjoys getting bit by mosquitoes, I know I sure don't. Aside from being an aggravating nuisance that will ruin an outside dinner party or family function, they are also carriers of some pretty nasty diseases. West Nile Virus, St. Louis Encephalitis, Lacrosse Encephalitis, Eastern Equine Encephalitis, Western Equine Encephalitis, Chickengunya, Dengue Virus, Yellow Fever, Malaria, and the one I'm sure you all have heard a lot about lately, the Zitka Virus. These are all common viruses across the globe that are known

to be transmitted by mosquitoes to humans, birds, and other mammals.

The first confirmed case of Zika virus was on Feb. 3rd 2016 and since then there have been over 5,000 travel related transmissions of the virus. Of those, 29% were confirmed in the state of Florida. This virus is cause for extreme concern for women as it's known to cause serious birth defects in children who are born from women infected with the virus. A few common symptoms of Zika virus are red eyes, rash, joint pain, and oddly enough, a fever of exactly between 100.5 and 101. Of all the mosquitoes that are a nuisance in the Southeast, only two are known carriers of the Zika Virus. The *Aedes Aegypti*, commonly known as the Yellow Fever Mosquito, and the *Aedes Albopictus*, commonly known as the Asian Tiger Mosquito. Of those two, the *Aedes Aegypti* is the one we really need to worry about as it seems to be the prominent carrier of the virus. Lucky for us, the *Aedes Albopictus* seems to be the more aggressive mosquito of the two and we believe this has pushed the *Aegypti* out of the panhandle of Florida, which is why the experts believe the Zika virus is so prominent to south Florida and has not made it up our way. Both mosquitoes are what we refer to as domestic mosquitoes, which means they prefer to inhabit areas that have regular human activity. These mosquitoes are also daytime fliers, which means they are even more of a concern for daytime outdoor events.

The good news is that of the mosquitoes in our area, including the two we have mentioned, all are controlled in the same ways. In this article, I am going to cover the proven ways to control these *Aedes* mosquitoes around your home, as well as a few tactics to implement on your farm or hunting property to help keep these pests in check. However, I am going to steer away from suggesting exact name brand pesticide types for control as some products will not be available to everyone.



Control

The most effective and economical way to control all types of mosquitoes is **source reduction**. This simply means removing as much standing water or moisture as possible to eliminate the breeding grounds for these pests. For the domestic mosquitoes that frequent around your home, source reduction is fairly simple. The key is to eliminate any standing water around your home, or within 150 meters of your home whenever possible. This includes bird baths, flower pots, car tires, gutters, kid toys, or anything else that may be collecting water around your home. These domestic mosquitoes complete their life cycles, from egg to adult, in 7-14 days. For bird baths and your pet's water bowls this simply means freshening up the water once every few days will eliminate the mosquitoes' ability to breed in the water.

On farms and large properties, source reduction can be difficult. Especially near low lying, swampy areas where the breeding grounds for mosquitoes are endless. In these large swamps that are constantly muddy or constantly holding stagnant water, unfortunately there is no real solution. Obviously, you cannot dump out the standing water in a swamp and chemical treatment is virtually impossible on a large scale where access with equipment is difficult. If you have areas like this around your

home or on your property, the best option is to plan outside events when the wind is blowing from you, into the swampy area. This will keep most of the mosquitoes from being able to swarm during your event or activity. However, if you are wanting to control the mosquito numbers in areas of your property that you frequent often, you do have a few options.

The first option is treating the breeding areas with **growth regulators**. A growth regulator is a pesticide that mimics juvenile growth hormones. Treating the areas that mosquitoes are breeding in with growth regulators will trick the mosquito larva's nervous system and keep it from ever being able to mature, thus resulting in the death of the larvae.

Another option for treating these pests are **larvicide treatments**. Larvicides work somewhat like growth regulators in the fact that they keep the mosquito from being able to mature. However, their mode of action is to simply kill the mosquito larvae, compared to the growth regulators which only keep the mosquito from maturing.

The final chemical option you have for controlling mosquitoes is with **adulticide treatments**. These are pesticides designed to kill adult mosquitoes on contact. I'm sure everyone is familiar with the big trucks that ride down the road spraying a fog out of the back of the



truck. They are treating with adulticides and are normally doing so at night or at dusk when swarms are more prevalent.

The hardest part about controlling mosquitoes from a home or property owner stand point is getting the equipment to render the treatment effectively. Personally, I own a **mosquito fogger** that is basically a Stihl backpack blower with a tank attached to the top. You mix your products into the tank and it will inject the mix into the handle of the blower, resulting in a pretty nice fog. I then walk my property and fog any harborage areas that adult mosquitoes would hide out in during the day, as well as any areas that mosquitoes could possibly breed. When I fog my property, I am normally using a mix of adulticides to kill adult mosquitoes and a growth regulator to target the larvae that may be hatching in the water puddled up in leaf litter or plants around the house. I find this method extremely effective and combined with eliminating the stagnant, standing water around my property, I am able to knock the mosquito population back about 98%. You'll notice that I did not say 100%. This is simply because there is no way to kill every mosquito on your property. However, a 98% elimination is pretty noticeable, especially when you otherwise would not be able to stay outside

or host a function.

When getting your hands on equipment to fog for mosquitoes is simply not an option, **granular larvicides** are the second best choice. These larvicides come in many different forms, but the most common is fine granules about the size of common fertilizer, but they also come in tablets. If this is the treatment method you want to go with, the process is pretty easy. Simply walk the property and when you see a low-lying area that is either muddy or holding water, throw a handful of the larvicide in that spot. Then, once the water comes back up and the eggs hatch out, the larvicide will kill the larvae. Or, if there are already larvae in the standing water, it will kill them pretty quickly. They can also be applied to the gutters around your home if standing water tends to be an issue.

It is common for properties to have ponds on them for many different recreational activities. This also presents a challenge when it comes to mosquito control. The pond itself normally doesn't have issues with mosquitoes mostly because they tend to be in open areas that get a lot of wind friction. The wind friction keeps the mosquitoes from being able to breed in the body of water. Also, dragon fly larvae and certain types of fish will feed on mosquito

larvae as well, which helps control mosquitoes in these bigger water bodies.

Ponds become a challenge when we get excessive amounts of rainfall. This will raise the water level of the pond resulting in standing water in areas that it otherwise wouldn't stand. Once the water level goes back down, it will leave stagnant pools of water around different areas of the pond. This is ideal breeding habitat for mosquitoes. This is also where the granular larvicide will come in handy to treat these stagnant pools before the mosquitoes become an issue. However, what I have found helps the most in the buffer areas around ponds is to keep the areas clear of grass and brush to minimize the harborage areas for the mosquitoes to breed.

If you have an area that constantly holds water but is far back in the woods and doesn't have the wind friction we were talking about, there is also a solution for this too. It's called **mosquito fish**. The eastern mosquito fish is a species of freshwater fish, closely related to the western mosquito fish. The eastern mosquito fish is native to the eastern and southern United States from Florida to Delaware and inland Alabama and Tennessee, while the western mosquito fish has a larger distribution throughout the United States. You tend to find mosquito fish in shallow standing or slow

moving pools of water, mostly in vegetated ponds, lakes, and sloughs. However, you can often find them in tanks at your local pet store, which makes them easily accessible. Oh, and their diet strongly consists of mosquito larvae, which is a major plus! If you find yourself in a situation where you can't get equipment into an area to fog for mosquitoes, or you choose to go a non-chemical route, simply go down to your local pet store, buy 20-30 mosquito fish and turn them loose in your body of water. These will reproduce rapidly, eliminating your mosquito issue in that body of water.

For the deer and turkey hunter, there is actually a pretty affordable solution to keep the mosquito pressure off you while you're in the stand or on the ground hunting. THERMACELL makes an absolutely wonderful product that establishes a zone of protection around the hunter that will keep the mosquitoes at bay.

I remember a hunt from this past year in the Mobile-Tensaw Delta that was probably the worst I've ever experienced in regards to mosquitoes. It had

rained for two days prior and the temperatures were well above average. Since it only takes 3-4 days above 70 degrees for mosquitoes to begin swarming, they were in heaven in this swamp. At one point while I was walking in I thought the mosquitoes were going to carry me off. I was strongly considering going back to the truck, but it takes a lot more than a pesky mosquito to keep me out of the deer woods.

Once I got in the tree and began to settle down, they begin to get even worse. That's when it dawned on me that I had my THERMACELL in my backpack. So, I broke it out, threw a new pad in it and got it heating up. It takes 10-15 minutes for the unit to get hot enough to start producing a vapor, but once it does, you will literally be able to see a wall of mosquitoes out at about arms reach. If it wasn't for my THERMACELL I would not have been able to make it through that hunt. I hear a lot of concern about the use of these units while deer hunting for the risk of the deer smelling the vapor emitted. I

can't speak for anyone else but I can say that I have never once had a deer react badly while I was using this product.

Ticks

Another vector pest that is a major concern, especially to anyone who spends any amount of time in the woods, is the tick. Normally during deer season, you don't have to worry about ticks too much because the cold weather keeps them in check. However, the mild winters we have had the past few years hasn't seemed to help keep tick numbers down. The last weekend of Alabama's deer season this year I pulled three ticks off myself after a short 20-minute walk through the woods. This was absurd to me and definitely not the norm during February. Could you imagine being a whitetail and having that immense tick pressure all year long?

Not only are ticks a nuisance to the deer, but they can also reduce fawn survival and antler size by 15% or more! On top of that, it seems like every month we turn around the scientists

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have discovered a new disease associated with ticks or tick bites. Lyme Disease, Anaplasmosis, Colorado Tick Fever, Rocky Mountain Spotted Fever, STARI, TBRF, and Tularemia are just a few in a very long list of tick-borne diseases. The fact that most of us spend an extensive amount of time in the woods turkey hunting, shed hunting, doing habitat work, or even just going for a hike makes ticks and the diseases they carry public enemy number one.

Lyme Disease tends to be the tick born disease that we hear about more often than others. Lyme Disease is caused by a bacterium and is transmitted to humans through the bite of an infected tick. Symptoms tend to include fever, headache, fatigue, and a skin rash called Erythema Migrans. If left untreated the infection can spread to joints, the heart, and even the nervous system. The good news is that in most cases, Lyme Disease can be treated successfully with a few weeks of antibiotics.

There are multiple different “at home” remedies floating around on the Internet on how to reduce and control tick populations. I am not in the business of proving or disproving any of these non-conventional methods. However, I can tell you what is proven to help keep these pests off you and reduce their numbers in your general area; insect repellent, prompt removal of ticks, applying pesticides, and reducing tick habitat.

Control

Like mosquitoes, I recommend always using insect repellents that contain Deet when trying to keep ticks off you. There are many studies out there that say there are natural products that will repel these pests as well as mosquitoes, but like I said earlier, I am not out to prove or disprove these studies. I am strictly going to tell you what is scientifically proven to work.

When I am turkey hunting, doing habitat work, or simply out in the woods during the spring or summer, my

favorite preventative is **Permethrin** bonded clothing. There are companies that make clothing bonded with the insecticide Permethrin as well as Permethrin sprays designed to treat the outside of your clothing. As ticks travel across the clothing that has been treated with Permethrin, it kills them fairly rapidly. On a side note, early testing with Permethrin by the military reported 97% success at repelling mosquitoes also. Never, never, never apply Permethrin spray to your skin, that's what the Deet is for. A skin treatment of an insect repellent containing Deet, combined with Permethrin treated clothing is a very effective method of keeping ticks, mosquitoes, and chiggers off you. *Note: Not all Permethrin sprays are designed for bonding with clothing. Some are designed for treating vegetation for insect control on crops, and others may be designed to bond with hair for treatment of pets. Be sure when you purchase a Permethrin spray that it is specifically designed for the treatment of clothing.*

A tick can lie dormant in vegetation for up to seven years without a host to feed on. This has made ticks very adaptive to environments and difficult to control. The best way to reduce the tick numbers on your property is by being sure you keep the vegetation maintained throughout your property. This includes keeping your yard, fields, and right of ways mowed on a regular basis. Keeping them mowed will eliminate harborage areas for ticks and leave them more susceptible to predation by birds and other predators, such as opossums.

There is a lot of controversy about the effectiveness of prescribed fire at controlling tick populations. Whether it does or does not help control populations, I don't know. However, it does help eliminate harborage areas for the ticks. On top of that, it is one the most cost effective and beneficial habitat improvement projects you can do for your property so I highly recommend getting your property on at least a

three-year burn pattern.

Controlling ticks on your deer herd is also a very tough task. However, I think I have found a product that will greatly help us in the battle against parasites in our deer herds, **Antler-X-Treme**. Let me start by first saying I was not paid to promote this product nor am I benefiting from mentioning them in this article. Their products simply work! Antler-X-Treme is a feed product with a specially encapsulated garlic and other natural ingredients that are shown to naturally reduce the number of parasites on deer, resulting in an overall healthier herd.

The key to this product is to start feeding it to your deer herd as early in the year as legally possible. This will give the deer time to adapt to a new food source and get the product in their system before tick numbers get out of control in the spring. I start feeding my herd Antler-X-Treme as soon as deer season closes in Alabama. I do recommend starting the feed on the ground to let the deer have time to adjust to the new food source. After I see that my deer have accepted the feed and are using it regularly, I will then begin using it in feeders to cut down on non-target critters getting into it like raccoons and birds.

After every day in the woods, I recommend looking yourself over for ticks. You want to locate them and remove them as soon as possible. The longer they are on you, the greater the risk of them transmitting some type of disease. When you remove a tick, it is important to remove the entire tick, including the head which will tend to be buried a little deeper and be harder to remove. Because of this, I have found the best method for removing them is using a cotton swab dipped in rubbing alcohol. This will take a little more time than simply pulling it out, but the alcohol will cause the tick to begin pushing out of your skin and make removal with tweezers a little easier.

Ridding ourselves of ticks, mosqui-



Tick infested deer.

toes and other parasites would be ideal, but it's simply not reality. The best thing we can do is try our best to be informed and take every precaution to protect ourselves and our families from the pests. I have known two people personally who have contracted Lyme Disease because they did not take precautions and did not check themselves for ticks when they got home from the field. I can assure you, you do not want anything these pests carry. It's a grueling, tough process and you are never truly the same once you have had the disease. So be careful, protect yourselves, and enjoy creation.



The Crappie



By Scott Brown

Scott Brown is a biologist and regular contributor to *Wildlife Trends Journal* with over 30 years experience in research and managing natural resources throughout the Southeast. Scott founded Southern Sportsman Aquatics & Land Management in 2007 and now has clients from Texas to Florida, and into the Carolinas. Scott can be reached at scott@southernsportsmanaquaticsandland.com or (336) 941-9056.

This five acre south Georgia pond has an outstanding fishery including large-mouth bass and black crappie. The deeper water, shoreline vegetation, flooded timber and a forage base of silversides (glass minnows), golden shiners, and bream have held up over the past decade due to intense management practices and provided quality fishing year after year.

Many lake owners ask about improving their crappie fishery or creating one in a lake they are not currently. In my opinion, nothing is a finer eating freshwater fish than fried crappie. Minnows or small jigs with ultralight tackle make for some exciting fishing for both experienced and novice anglers. Sometimes a crappie population is easily created and/or maintained, but in other situations it's a disaster or not recommended in the first place. Crappie require a larger waterbody and in some situations different forage than other predator species, such as the largemouth bass. A few small pond owners questioned me for my caution regarding crappie in small ponds and said their small crappie pond has been quite successful and my response is to enjoy it, because once they are there, it takes drastic measures to get them out.

Description, History and Habits

There are two species of crappie, the **black** (*Pomoxis nigromaculatus*) and **white** (*Pomoxis annularis*). I have also heard them called White Perch, Calico Bass, Papermouth, Speckled-Perch, Speck and Sac-a-lait. They are members of the sunfish family and the largest of the species.

The black crappie is native to most of the eastern half of the U.S., but has been stocked and transplanted so much that today they almost entirely blanket the US, even reaching up into southern Manitoba, Ontario and Quebec, Canada. It is only noticeably scarce in an area of the Midwest stretching from western Texas up through Nevada, Colorado, Utah, Wyoming, Idaho and western Montana, and even these states have black crappies either along their borders or in limited internal areas. The black crappie is deep bodied, silvery green in color with possibly some yellow, with

black blotches randomly throughout the body. The dorsal fin has 7 - 8 spines. They will commonly reach lengths of 9 - 14 inches, with the world record set in 2006, from a private lake in Missouri, weighing 5.0 lbs. Depending where you are located they live between 4 - 6 years, but have been documented up to 9 years old. During the spawning season males and females look similar. Like other sunfish, they are nest builders and usually spawn in water temperatures between 55-68° F depending where in the country you are located, usually between February and April. In the Southeast, crappie are usually the first nest spawning fish you will see along the shoreline. Although most of the year this species lives and feeds in open water in schools, during spawning season they move near shore in water 3 - 8 feet deep, near vegetation and fan a nest 8 - 15 inches in diameter. Females will lay between 10,000 and 180,000

eggs. Eggs hatch in 3 - 5 days, guarded by the male who continues to stay with the newly hatched fry 2 - 3 more days until they leave the nest. Newly hatched black crappie feed on their egg yolk sack, then zooplankton (microscopic animals), insects and small fish. After about age two, they feed almost exclusively on small fish and occasionally large insects.

The white crappie is native to the eastern half of the U.S. and southern Ontario west of the Appalachians. This species has also been introduced throughout the continental United States. It is missing from most of peninsular Florida and from some north, central and Midwestern states. The white crappie is more silver with green vertical bars and a greenish back. The dorsal fin has 5 - 6 dorsal fin rays. Their size is slightly longer, but not as heavy as black crappie. The white crappie world record was caught in 1957



The crappie is one of the most highly targeted freshwater fish species in the country for sport and table fare. Depending on the circumstances, it can be introduced to some private ponds.



These threadfin shad and brook silversides are the perfect forage for crappie. Without the proper forage, stocking any predator is a waste of time and money.

from a public lake in Mississippi, weighing 5.3 lbs. White crappie spawn when water temperatures are between 57 – 70° F depending on location. Females produce 2,900 to 91,700 eggs when they nest. Both species will only nest once per year. Both species have a prolific reproduction rate and in small waterbodies usually become stunted with lack of proper forage for adult fish. They reach about four inches total length after the first 12 months. Both species sexually mature at age 2 – 3.

Management

If you have crappie in your lake, whether it is small or large, you have to deal with them. If you do not yet have them, do not make an uneducated deci-

sion regarding introducing them into your waterbody. The old rule was if your lake is under 25 acres do not stock crappie, but that has changed over the years as more and more people have successfully stocked in smaller lakes. But for every success story there are stories of failure in small lakes. We assess the lake size, physical traits, habitat, water chemistry and forage available before any decisions are made. I have never seen a quality crappie population in a waterbody less than five acres. I have successfully managed both public and private five acre lakes with quality black crappie populations. But again, that is not the norm.

Crappie spend most of their adult life in open, deeper water, in schools, feed-

ing on small schooling fish such as juvenile gizzard shad, threadfin shad and silversides (glass minnows). We have seen them thrive in a small waterbody on golden shiners and fathead minnows, which does not fit the typical forage base criteria. A mixture of two or three of the above-mentioned forage species seems to work best in any size waterbody in keeping a sustainable crappie population. I believe as one forage base dwindles they switch food sources, allowing the depleted one to rebound while the crappie target another. Without an abundant food source, they will not survive and will not reach their growth potential.

In small ponds, crappie will compete with largemouth bass for food. Removing all small bass when caught to allow more forage numbers for crappie is advised, if quality crappie is the goal. This also helps with reducing numbers of larger bass in the future and actually helps both species. Small bass and large crappie have the same size mouths; hence they look for the same size forage whether near shore or out in open water. Once largemouth bass reach 18 inches they will be targeting larger forage and possibly different species.

Another fact regarding crappie is that they are cyclic. For one or two years you may have a great fishery then a few years later it is considered average or even poor, but rebounds again in a couple years to quality status. This holds true in both large open systems and small closed ponds. This fluctuation goes up and down as the forage base improves and declines, but usually takes longer in larger waterbodies than smaller ones. For example, a 2,500-acre lake may take 5 – 7 years from good year to good year, while we have seen in 5 – 25 acre lakes maybe 3 – 4 years from good year to good year.

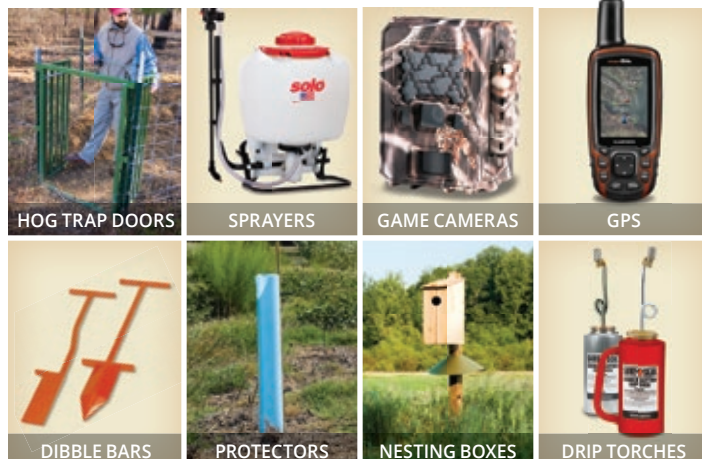
Preferred habitat for adult crappie is a shoreline with vegetation close to spawning with a sandy or gravel substrate, although they will also nest on mud or clay. Deeper open water with woody snags, either standing timber or underwa-

ter brush piles (or artificial fish attractors) are desired for hiding and feeding where they spend most of their adult life. It has been my experience where both crappie species are present when not the spawning season, the white prefer brushy areas and black more open water. Brush and vegetation both provide surfaces for invertebrates and zooplankton to live, which feeds and grows small crappie.

In the Southeast, most folks stock black crappie and as you move north, landowners have the luxury of either species. Now you can obtain a white/black cross, which does not spawn as prolifically and helps with overpopulation, and a few other crossing combinations with various claims on why they are better. I recommend starting in the middle or lower end of the recommended stocking amounts that range from 50-100 per acre. If the forage is there, numbers will quickly come up and growth rates will be better if lower stocking rates are used. If creating a crappie only pond, stocking rates have been recommended as high as 200 per acre where sufficient forage is available, but again I recommend lowering that number and maximizing the growth rates from the first-year class.

Fishing and Preparing for Table Fare

Crappie fishing is vastly different all over the country. Some successful anglers use cane poles with minnows over brush piles in frigid fall and winter tempera-



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This black crappie female is ready to spawn. She was collected while electrofishing in 3-4 feet of water, 62° F water temperature, along a weed line edge.

tures, while others drift across open water in spring, summer and fall with small jigs or minnows and load the cooler. Each waterbody and region has its own successful crappie fishing techniques. You will figure out your most successful technique as you fish more and more. Different techniques will be better than others depending on the time of year. A small (1/32 to 1/16 ounce) jig with colored rubber tail or minnow attached through the lip works well. A #4 hook, with a minnow hooked through the back, split shot and bobber also works well in certain lakes. With a slight breeze or use of a trolling motor, I like to drift across a lake with a few minnows or jigs out at various depths to locate the depth they are and see their



Although an algae bloom is not necessary for a successful crappie fishery, it does help to support some of their favorite forage such as threadfin shad.



This photo sums up an ecstatic pond owner's day on his waterbody with a catch of quality bluegill, redear sunfish, black crappie and a few mid-size largemouth bass. These came from a 10-acre southwest Georgia farm pond.

bait preference, then concentrate on what works and where. Just before dark, crappie can be spotted feeding at the surface either on shad or silversides. Casting into the school with a small jig and rubber tail, and reeling back in at moderate speed will fill a cooler in minutes when conditions are right. During the spring spawn, dropping minnows along the vegetative edge will catch some of the largest crappie in the lake.

Everyone has their own idea of what a harvestable size crappie is. Since they are highly successful at reproducing, over-harvest in smaller waterbodies should not be a concern. Some like

anything over 8 or 10 inches, and some want the "slabs" of 14-16 inches. You will learn about the crappie size structure in your pond as time goes and be able to figure out at what size they will max out. If this is your situation, do not wait for 14 inchers when 8, 10 or 12 inches may be as big as they will get in your area or waterbody.

I am a traditionalist, nothing beats a scaled, gutted and headed crappie, dipped in egg and cornmeal, then fried in a cast iron skillet or deep fried until fins are crispy served with hush puppies, baked beans and coleslaw. The larger crappie, "The Slab", can be fil-

leted and fried, baked or broiled. Many also enjoy a whole large crappie scaled and baked in foil with butter, lemon and seasoning.

Do your homework and be honest with yourself. Your pond may be able to grow nice crappie, but many small ponds cannot. Consult a trusted professional pond manager that does not tell you what you want to hear, but gathers facts and makes an educated recommendation from the data available. It is better to evaluate and know your limitations than make a costly mistake and have to get the rotenone (fish poison) out and start your pond over.

Wildlife Trends Journal Management Calendar

By Dave Edwards

April/May 2017

Dave Edwards is a certified wildlife biologist and regular contributor to *Wildlife Trends Journal* and other hunting/wildlife publications. Dave was honored as QDMA's 2007 Deer Manager of the Year and nominated in 2011 as Alabama Wildlife Federation's Wildlife Conservationist of the Year. Dave is General Manager for Cabin Bluff Lodge and President of Tall Tines Wildlife & Hunting Consultants, Inc. Contact him at Dave.Edwards@CabinBluff.com or 912-464-9328.

Spring and early summer are often low use periods and thus great times to perform maintenance and repairs to trail cameras.



Make repairs to deer stands

Don't wait until you get the "fall bug" in September to start repairing deer stands. How many times have you made significant repairs including painting of stands right before hunting season started? Me too! Although fixing or performing general maintenance to deer stands is not what most hunters are thinking about during or just after turkey season, now is a great time to tackle this task. In many cases these repairs require oiling moving

parts, replacing parts, and/or painting. Whether you need to use WD40 to quiet squeaks, add new tie wraps or pipe insulation, screening material, seat cushions, weld new pieces in place, or simply repaint shooting houses or ladder stands to prevent rust, most repairs result in "stinky" results. That is, maintaining and repairing stands results in lots of foreign scents. By completing these repairs in early summer, stands have several months to air out before being placed in the

woods for another hunting season. Because I primarily bow hunt, I even purchase and air out tie down straps used to fasten stick ladders and lock on bow stands this time of year so that they are "scent free" by fall. Doing this work now also reduces unnecessary scrambling to get things ready as the season approaches.

Perform general maintenance and repairs to trail cameras

Unless you use trail cameras to scout

during the last part of spring gobbler season, late spring and early summer are great times to perform normal maintenance to trail cameras. Generally speaking, this is the period I use my cameras the least. Taking care of cameras now will ensure they are ready to be deployed in late summer to begin assessing bucks or conducting camera surveys in early fall. With over 20 years of experience using trail cameras and currently owning roughly 100 cameras, I can assure you that giving them a little TLC goes a long way in extending their life. I normally perform a detailed cleaning of each camera. Focus deep cleaning efforts on the user panel (where you adjust settings), battery compartment, lens, and flash areas. I use an electronics spray duster (can of compressed air or liquid gas) often used to dust/clean computer keyboards. A toothbrush is a good tool to clean small debris from these areas as well. I have also found that removing the batteries during storage prevents build up on the camera's battery terminals. If your camera has a rubber seal around access compartment doors (most do), pull them and clean them good. I often wipe them down with Vaseline to lubricate/condition them which gives them a better seal. If the rubber seal is dry rotted, simple order a new one from the manufacturer. This is also a great time to send "broken" cameras back to the manufacturer for repair if needed. Obviously, there are many things that can break with trail cameras. Although we all try to handle them carefully we are taking them into rough and bumpy environments, so occasional issues will occur. A few of the more common problems I've encountered include flash not working properly, photos having a halo around white out areas (like reflective deer eyes), and being out of focus. These are problems that only the manufacturer can fix.

Subsoil food plots

Soil compaction, also called hardpan, may limit or constrain forage produc-

tion and plant survival in food plots. A hardpan is a densely-compacted layer of soil that lies between the topsoil and the subsoil. Generally speaking, depth of hardpans vary but are often 4"-12" below the surface of the soil and are caused by the weight and pressure of tractors (and other equipment) on the soil and repeated disking/tillage over several years that loosen topsoil allowing the finest particles of the soil (clay) to migrate downward, accumulate, and bind creating a very dense layer. This dense layer is "the hardpan". Imagine it

as a layer of concrete below the surface of the soil. As you would expect, water and oxygen do not travel well through hardpans, thus during periods of adequate rainfall, water may lie in puddles on the surface of the compacted soil and evaporate before it can seep down into the soil. Similarly, during periods of low rainfall, the topsoil of food plots that have a hardpan dries out quickly due to the shallow layer of topsoil and inability to draw moisture from subsoil resulting in stressed or dead food plot crops. Hardpans can be easily detected



Occasionally breaking up the underlying hardpan in food plots will enhance moisture and oxygen management within the soil resulting in better growing conditions.

in food plots using a soil probe, which is a 2' to 4' metal rod sharpened on one end to penetrate the soil, and a handle on the other end to assist in pushing the probe through the soil. You can make a probe out of rebar or purchase one from a forestry supply company (www.forestry-suppliers.com) for about \$75. The best time to check for hardpans is when the soil is not extremely wet or dry. Insert the probe at various locations across the food plot. As the probe is inserted, the force required to move it through the soil should remain about the same until a hardpan is reached. Upon hitting a hardpan, it will take much more effort to push the probe. From my experience, hardpans in food plots are often 4"-6" below the surface, which is the depth at which most disks plow, and may be 2"-10" thick depending on soil type and age of the field. Breaking the hardpan is often referred to as "subsoiling" which breaks up the soil to depths of 6"-12" and fragments compacted soil allowing water and roots to penetrate into the subsoil. To

subsoil, you will need to use a subsoiling chisel plow – simply referred to as a subsoiler. Subsoilers do not invert or turn the soil like a plow used to prepare the field to plant; they are simply heavy duty steel shanks tipped with blades that drive deep into the soil and are pulled along to break the hardpan below the surface. As you can imagine, subsoiler plows cause significant soil drag and require a tractor or dozer with at least a 50-horsepower engine. A good rule of thumb is 10-15 additional horsepower is required per shank on the chisel plow. Most plows have 1-5 shanks that are set 9" to 12" apart. Generally speaking, subsoiling every 2-3 years will benefit soils, keep hardpans from developing, and enhance plant growth in food plots. In most cases where subsoiling has not been used in the past, results are significant and often amazing. I use it as a routine food plot management tool to ensure quality soil management and more productive plots. While you can subsoil anytime of the year, I often do it in the spring/summer

during slower equipment periods and/or when fall plots are fallow. If you do not own a subsoiler, many companies rent them. However, it is a valuable food plot implement I recommend owning if you manage many acres.

Drain flooded hardwood that are being intentionally flooded and managed for waterfowl areas (aka – greentree reservoirs or GTR's)

Managing and flooding hardwoods is a common management practice to attract and provide quality food for waterfowl and/or a way to increase duck hunting opportunities on a property. To be effective, the manager must have the ability to control water levels within the area. Most GTR's are created by building a small dam or levee around the hardwood area being managed that allows you to hold water on the area. Water control structures are used to allow the area to flood, control the depth of flooding, and to release water or drain the area. The timing of



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the flooding or flooding regime/strategy is very important and, over time, will affect the species of trees that will exist in the area. Ideally, the goal is to have quality oak species that will produce acorns for ducks to eat, along with quality vegetative and aquatic food sources. Most of the desired oak species such as water oak, cherrybark oak, pin oak, laurel oak, and others, are flood tolerant during the winter because they are dormant then, but are not flood tolerant during the growing season. Thus, areas that contain desirable oaks need to be drained before spring green up (which varies throughout the Southeast) to ensure their survival. Areas that are allowed to remain flooded into the growing season will slowly convert to flood tolerant tree species such as tupelo and cypress or other less desirable tree species. Without management, Mother Nature dictates the tree species in an area that floods. Think about areas on your property that remain flooded or only flood during the winter. Areas that remain flooded through summer or year around will be primarily composed of undesirable tree species for waterfowl. Having said this, many of these areas are still attractive to waterfowl due to the aquatic plants and associated invertebrates that colonize in the water. If you do not have a GTR on your property, but have area(s) that would lend themselves well to this type of management, spring and summer is the best time to create them. Depending on the situation, constructing a GTR can be relatively easy and inexpensive and will add additional recreational opportunities for you to enjoy. One word of advice that will save you time and money - consulting with a professional is money well spent during the planning stages.

Inspect and manage planted hard and soft mast fruit trees

Late spring is a good time to provide TLC to planted fruit trees. By this I simply mean taking time to inspect each

tree to see what it needs in preparation for the growing season. If tree tubes were used, make sure the tree and tube are properly staked and upright. If fire ants have built a mound inside the base of the tube, treat them. Make sure zip ties are secure on stakes and tubes. If trees were mulched, inspect the mulch and add more if needed to reduce weed competition. Speaking of which, late spring/early summer is a good time to spray glyphosate (RoundUp) around the

base of each tree to kill grasses and weeds that compete for water and nutrients.

Prepare and plant food strips for turkeys and quail.

Food strips are “food plots” for turkey and quail that wind through fields, quail courses, along fire breaks, or wooded habitat. Most supplemental food plantings for quail are warm season crops and established during spring and sum-



Young trees need some TLC during their first year or two to give them a jump start in life.



Summer food plots can provide an abundance of quality nutrition. This exclusion cage shows just how much forage deer are consuming in this plot.

mer. Food strips are particularly beneficial in years of low native food availability. Plantings of Egyptian wheat, Sorghum-Sudan, grain sorghum, brown-top millet, fox tail millet, and pearl millet are great crops to plant in food strips and will do well in most soil types in the Southeast. Food strips should be planted in a rotational fashion. That is, in successive years place new plots adjacent to previous years' plot to create a mosaic of current year plot and stubble/annual weed community from previ-

ous years' plot. Leaving the food plot stubble (not disking and replanting in the fall) will provide quality cover during fall and winter for game birds.

Plant summer food plots for wildlife

Throughout most of the Southeast, April and May are the desired planting periods for many summer crops such as millets, sorghum, peas, corn, soybeans, sunflower, etc. Because many of the seed producing grass type crops that

benefit birds are summer crops, wingshooters devote a lot of energy and effort into planting during this time of year. Deer hunters are well aware of fall food plots because they are so attractive to deer during hunting season, which helps hunters observe and harvest deer, but often overlook the benefits of summer crops for deer. If you are not fortunate enough to have commercial agriculture on your property or nearby, planting summer crops will benefit your deer herd if adequate acreage is planted.

Many nutrient draining biological processes such as fawning, milk production, and antler development are taking place in deer at this time. Most summer plantings for deer are very nutritious and high in much needed protein. Commonly planted summer crops for deer include many varieties of peas, soybeans, corn, lab lab, vetch, and clovers. One of my “go-to” summer blends for deer in the Southeast is a combination of clay-iron peas, lab lab, and pere-dovic sunflowers. One mistake I often see made is trying to plant these crops on small food plots. Because they are so attractive, plots need to be at least an acre, preferably more. Even at low densities, deer can apply too much grazing pressure on small plots and in many cases, eat all plants shortly after germination before the crop has a chance to

establish. Regardless of whether you are planting for birds or deer, a successful planting starts with testing the soil and applying required fertilizers and lime to ensure good soil quality. Create a clean, smooth seed bed and plant under favorable conditions. Favorable conditions mean adequate soil moisture and a good chance of rain after planting takes place. As you can imagine, weed control poses more problems in summer plantings because of the warmer soils and good growing conditions. Therefore, it is essential to monitor summer food plots for weed encroachment and treat as needed for optimal forage production. I also recommend placing a deer “excluder cage” on each food plot to monitor crop production and deer use. Most of you have used or seen these in the past, but an excluder is simply a piece of 4’

tall close wire fence rolled to make a 3’ diameter tube then staked to the ground. It prevents deer from browsing plants inside the cage.

Control feral hog populations

Feral hogs are very destructive and a nuisance on many properties throughout the Southeast. While hogs add additional hunting opportunities for landowners, they are difficult to control. I often hear “I’d like to have a few hogs on my property to hunt”. I agree and enjoy hunting hogs from time to time. However, if you’ve ever had hogs, you know this is not possible...you cannot have a “few” hogs. A property normally has either no hogs or an overabundance of them. The reproductive potential of hogs is extremely high in good habitats. With pregnancies lasting only 115 days,



Hogs can be extremely destructive. Early summer is a great time to ramp up efforts to remove them without adding disturbance during hunting season.



Early summer is a great time to check and repair water control structures.

hogs generally produce 2 litters of 1-13 piglets per year, with the potential to have 3 litters! So needless to say, extreme/aggressive control is needed to simply keep up with or stabilize a hog population. There are many ways to remove hogs. Some of the most common methods include trapping, recreational hunting, and professional hunting/trapping or a combination of all. There have been many articles in Wildlife Trends dedicated to successful trapping methods. Hog control should be applied throughout the year or when needed. However, many landowners increase efforts during the summer to reduce disturbance and “hunting pressure” during hunting season. Besides their destructive nature on wildlife habitat, hogs can destroy roads, food plots, pond dams and many other structures on

your property. They can do several thousand dollars’ worth of damage in a short period of time. Controlling hogs will save you time, money, and frustration.

Inspect and make repairs to water control structures, spillways, and overflow pipes.

Most recreational properties have some need for controlling water levels or water flow. Examples may include controlling water levels in fishing lakes, duck ponds, beaver pond, canals, or swamps/marshes. To do this, a wide variety of water control structures are used. Early summer is generally a good time to inspect these systems. Generally speaking, early summer is a dryer period than late summer or winter in most of the Southeast. Some of the common things to look for include clogged

pipes, deteriorated culverts, beaver dams, broken or missing flash boards, eroded banks, vegetation that is causing problems (like willows), broken valves or levers, missing or damaged stakes, broken beaver excluder fencing/cages, and damaged access docks/decks. Obviously, with so many different situations and different water control systems/structures out there, each structure has its own unique things to check, repair and/or replace. The point is to do a thorough inspection and make any repairs needed during the “dry season”. It is certainly better to find and fix problems now rather than having to do so after your property is saturated during the wet season or when a flood event takes place and blows out weak components in your system.



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