



PRACTICAL WILDLIFE MANAGEMENT INFORMATION

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Earl Says...

Next month starts the Outdoor Hunting and Fishing Show season and we're preparing to hit the road again soon. I encourage you to make an effort to support these fine shows while enjoying yourself in the meantime.

If you've ever attended one of these shows you know how crazy they can be from trouble walking through the throngs of people to get to a certain booth to hearing the constant turkey, goose and predator calls. But I wouldn't have it any other way. There's always something new I find to buy (especially a new BBQ seasoning). And I really enjoy talking to subscribers and prospective subscribers on what kinds of new articles they would like to see in future issues of the magazine.

Again, I hope you get a chance to visit an Outdoor Show this season and look forward to seeing and talking to you all in person. Here's a schedule of the shows where we'll be exhibiting:

Birmingham, Alabama – July 13-15
Duluth, Georgia – July 27-29
Montgomery, Alabama – August 17-19

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Cover photo by Ryan Shurette

A Bird's Eye View: Mourning Dove Biology and Management

Text & Photography
By Ryan Shurette

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The mourning dove (Zenaida macroura) is the most widespread and common of the dove species found in North America. Although their population is believed to have declined slightly since the 1960's, the current mourning dove population is estimated at over 325 million individuals across the US.

Photo credit: <http://www.naturespicsonline.com>

If you are like me the following scene has been well-painted into your memory. It is a sunny September Saturday afternoon. The yellow goldenrods and white fall bonesets are in full bloom and there is a dry breeze stirring, giving the initial hint of something changing with the weather and seasons. You are sitting in the shade on a folding camouflage stool on the edge of millet field, listening to a college football game playing on the nearby truck radio. Other friends and relatives clad in camo t-shirts are also scattered about the field under their favorite pine tree or along their favorite fencerow. You load up your shotgun and watch the horizon for incoming birds.

Suddenly you hear that familiar whistling sound of an airborne mourning dove coming right over you. Instinctively your shotgun hits your shoulder, you take a good lead with your cheek on the walnut, and you squeeze the trigger. Man, there's just something about a good dove shoot! And it seems there are many who agree with that. In fact it has been estimated recently that about 900,000 folks will participate in dove hunting on a given year in the United States. Many come out with the goal of killing the limit, while it seems others just come to talk. I think I now actually enjoy yelling the names of my sons, other family members, and friends (as doves approach them) as much as I do actually shooting. And I think all of the above is actually what makes shooting doves special; it's an annual ritual that combines a wing shooting sport with comradery in a social setting. And it is typically done in near-perfect weather on dry land (unlike the typical duck hunt).

For many the memory of all this is still relatively fresh because they wouldn't dare miss a year without going on at least one good shoot. Whether you hunt corn fields, cow pastures, or amongst milo, millet, or sunflower strips, odds are this little brown bird stirs up recollections of fun times in pastoral settings, not to mention they are pretty good fare on the grill when wrapped in bacon! In this article we will get into the mind of the mourning dove, examine its biology and habits, and then discuss effective strategies for creating and



Doves locate and identify their food items by sight. Unlike quail, turkeys, and grouse (scratching birds) they do not dig through the litter or dirt for seeds. Their short weak legs are used only for walking and perching, and not for scratching out seed. Photo in the Public Domain

managing effective fields that maximize hunting opportunity.

Mourning Dove Biology

All doves are members of the Columbidae family. The **mourning dove** (*Zenaidura macroura*) is the most widespread and common of about fifteen species of doves found in North America, although only about half of these are native to the US. Although their population is believed to have declined slightly since the 1960's, the current mourning dove population is estimated at over 325 million individuals across the US. Similar species include the **Eurasian collared dove** and the **white-winged dove**. The Eurasian collared dove is an exotic species that has been expanding across the entire US over the past few decades. This dove is lighter colored and larger than the mourning dove and has a conspicuous black band on the back of its neck. The song is also very different. The **white-winged dove** is originally native to Mexico and Latin America,

the southwestern US, and south Florida, but it is also now expanding its range and is showing up in other parts of the North and East. It has a more rounded tail than the mourning dove and also has conspicuous white bars on the wings. The **rock dove** (also known as the common pigeon) is typically more of an urban bird, is larger, and has various color phases including white, tan and often iridescent patterns. There are also a few species of smaller ground-dwelling doves (including the common ground dove, the Inca dove, the ruddy ground dove, the ruddy quail-dove, etc.) but these are less similar to, and therefore less likely to be confused with, the mourning dove.

At about 12 inches long the adult mourning dove is generally identified by its relatively small round head, its pointed wings and tail, and by its dark brown wings with black wing spots. Males and females are very similar in appearance, save for a bit more pinkish and bluish

iridescent colorations on the male. Juvenile mourning doves typically have buffy tan-tipped feathers until their first molt into adult plumage. A large proportion of the 20 million or so doves harvested every year will be juveniles and they can easily be distinguished from the adults by the buffy tipped feathers, shorter tail, and smaller overall size.

Reproduction

Mourning doves are typically monogamous and mate with a single bird during the breeding season. This bond may even last until one of the birds die. The “cooing” song made by the males is used to attract females and defend the area around her. This song evidently sounds to some folks like a crying or mourning sound, thus the species’ common name. When a pair bond is established the male selects a nest site and construction begins. According to several studies, preferred nesting habitat is typically within and along edge habitat (field borders, woodland edges, etc.) as opposed to the interior habitats of large continuous forests or openings. However, interestingly a Missouri study in 1997 (Drobney et. al.) found that actual nest success in these two types of habitats (edge vs. large continuous habitats) did not differ significantly. Nests of mourning doves are typically loosely and poorly constructed using twigs and pine straw. It is actually pretty common to find an unhatched egg on the ground under a mourning dove nest that has fallen through the bottom.

Generally the nest is built at a height of 12-20 feet in the branches of one of various tree species, especially yellow pines (longleaf, loblolly, or shortleaf) in the Southeast. In the West, however, the mourning dove sometimes nests on the ground or even on the tops of houses.

After copulation, the adult female typically lays two plain white eggs (about 1 inch long) per clutch. In the Southeast, nesting season typically starts around late March or early April and a pair can raise several successful broods (up to 5 or 6) per year. In fact mourning doves have one of the longest breeding seasons of any bird in the country and broods can keep going until late July. The incubation period of the mourning dove is about 14 days. The altricial chicks are called squabs, and like many other species, they are blind and completely dependent on the adult parents for food until about two weeks after hatching.

Diet

For the most part the mourning dove is a seed eater. Mourning doves consume approximately 15 percent of their body weight each day when food is available. Doves are adapted to flying long distances to find abundant food. Most of the diet consists of wild weed and grass seeds, cultivated grains (including soybeans, corn, wheat, oats, millets, sorghum, and peanuts), and to a lesser extent, other vegetative matter (foliage, grass, and berries). Historically (pre-European settlement times) doves would have been most plentiful in early

successional areas (woodlands, open burned timber stands, prairies, etc.) where seeds (of grasses, forbs, and legumes) would have been abundant. Like most granivorous birds, mourning doves swallow these seeds whole and they pass through the esophagus down to an enlarged pouch called a crop for storing seeds and other foods. Typically the dove will feed and fill the crop on the ground and then fly to a safe perch to preen, rest, and digest the seeds. Just like in gallinaceous birds (quail, turkeys, grouse, and chickens) and ducks, doves and pigeons have strong muscular gizzards that grind up hard seeds and grain. Gravel, sand, and grit is often also ingested to assist the gizzard in this process. Where this grit is limited on the landscape, some hunters have actually had success shooting over areas that are frequented by doves for this reason. However, a consistent food source is a much more reliable attractant in most situations.

Doves do not have a well-defined sense of smell and therefore they locate and identify their food items by sight. Unlike quail, turkeys, and grouse (scratching birds) they do not dig through the litter or dirt for seeds. Their short weak legs are used only for walking and perching. Food items have to be visible and accessible in either sparse short ground cover or on bare soil or rock (always keep this in mind when preparing fields). If they can’t see it, they can’t eat it, and so they won’t waste their time on it. If there is an easily accessible source of

food in a particular location, however, the doves will typically keep coming back until it is gone (if it is safe and they are not continually disturbed). Constant disruption can change feeding patterns so limit disturbance when birds are feeding. One potential problem that biologists are seeing in some areas where doves are foraging in the same areas that traditionally get hunted year after year is lead poisoning. Since the small lead shot look like weed seeds, they can get picked up and ingested. As was the case in ducks prior to steel shot became the norm, some samples have found dozens of shot in the crops of individual doves. One 2009 study (Franson et. al.) found the average frequency of doves that had ingested shot was about 2.5%

across several regions of the country. The level of impacts are still being studied but some locations have already moved to non-lead shot restrictions to try to reduce impacts to their dove populations.

Although mourning doves are seed specialists, they are still considered habitat generalists because they live in so many regions across the country and eat many varieties of seeds and grains. They are usually especially well-fed in high agriculture production areas. Typically, a fresh water source is needed, but in some arid or desert locations they have been shown to survive drinking brackish water when fresh is not available. One other interesting adaptation that all doves and pigeons use is the ability to

produce “crop milk”, or “pigeon milk”. Since doves are strict seed eaters and these foods would be tough fare for a newborn squab (most other birds feed their young insects), adults begin to produce crop milk a couple days prior to the hatching of the eggs. Crop milk is very different from mammalian milk in that it is essentially composed of fat-rich cells and tissues that separate from the lining of the esophagus of both the male and female parents. This substance is regurgitated to feed the squabs for the first several days after hatching, until they are weaned onto normal adult food items. Crop milk is extremely high in fats and proteins and like the milk of mammals, the substance has been recently found to contain immune factors and antibodies that is passed along to the squabs. Besides doves and pigeons, only a few other birds (including some penguins and flamingos) employ this strategy.

Predation

In most regions, mourning dove nest predation and mortality is significant. Other bird species like blue jays, grackles, and crows commonly detect and predate the white eggs which are visible when adults are off the nest. Squirrels and snakes (gray rat snakes primarily) also find and eat some of the eggs and chicks of mourning doves.

Since mourning doves have relatively large and meaty wing muscles (breasts), they are a sought-after prey species by a myriad of avian and terrestrial predators. All the usual suspects will try their luck at a mourning



Mortality from mammals is generally pretty low. Avian predators on the other hand are typically more successful at taking doves. Accipiters like the Cooper's hawk (shown here), and falcons like the peregrine, are among the few raptors that have the stamina and speed to catch a dove on the wing.



Doves, like most temperate and cold weather birds, need to feed during the day to generate warmth at night, so cold winter days later in the season can see some of the best shooting action.

dove if they get a chance. However, a dove is not an easy target. They are strong and fast flyers (they have been clocked at over 55 mph) and have quick reflexes and excellent vision. Small mammal predators are therefore not usually very effective at catching adult and juvenile doves. Foxes, housecats, and bobcats may catch one every now and then by surprising it feeding on the ground, and a raccoon or opossum may accidentally run into one on the roost in the middle of the night, but mortality from mammals is generally pretty low. Avian predators on the other hand are typically more successful at taking doves. A dove's eyes are arranged on the side of the head

to detect movement and they are constantly on the watch for birds of prey. Accipiters like the **Cooper's hawk**, and falcons like the **peregrine**, are among the few raptors that have the stamina and speed to catch a dove on the wing. Less agile buteo hawks like the **red-shouldered** and **red-tailed hawk** however, can still sometimes catch doves by surprise and make a kill on the ground while the dove is feeding. Hawks are therefore, a common sight on the dove field. The presence of the hawks does not typically ruin a shoot or permanently scare away doves from an area but it can make them wary. Remember, it is illegal to shoot any species of hawk, so it is a good idea to make sure everyone is aware of that fact before a dove shoot. As a side note, it is interesting that there are still strict laws protecting even the most common hawk species despite the fact that some populations (namely red-tailed and Cooper's) have become extremely high over the past several decades in the East. Most mammal predators can be legally controlled, especially when management or recreational hunting conflicts arise. Perhaps at some point these laws may change.

Dove Field Management Considerations

Considering the above biological aspects of this species, land managers can consistently and predictably attract mourning doves to harvest. A "Dove field" can be many things. Local laws vary and can change from year to year so it is obviously important

to make sure you know what those are before planning a dove shoot to protect yourself and guests from being fined, or worse. One of the most common strategies is of course to plant a grain-producing crop in the growing season so that it will mature and bear seed in time to attract enough birds to have a good shoot. In reality though, there are a few more things to consider before you hook up to the disk and spreader. If you are lucky enough to live in a good "flyway" county you are already ahead of the game. The fact is that not all geographic locations are equal. Some counties are highly agricultural and open while others are mountainous and heavily wooded. The former is usually (but not always) better than the latter. In my home county in central Alabama there are few open areas besides grazing pastures here and there. It is very rural but predominately comprised of hilly dense pine and hardwood forest, and therefore it is harder to attract a large number of doves to a field there than in the adjacent counties that have much more agriculture and wide open lands. If you are in hill country however, the upland ridges are typically better locations for attracting doves than the lowest bottoms.

Before we go into detail about planted and native vegetation management for doves, it is worth mentioning a few alternative situations sometimes used as places to shoot doves. If you have access to a cattle farm or feed operation, you may already have a ready-to-shoot

dove field. Cattle farms often have large open spaces, low vegetation and bare ground, and lots of waste grain. Since many states allow dove hunting in and around any “normal” agricultural operations, spilled and cast cattle feed can be a pretty effective attractant in many areas. Ponds and other water sources can also be a bonus feature for holding doves but alone are usually not enough to draw large flocks in the East (since there is so much water). If you do have a pond near or adjacent to your field, mowing a large percentage of the perimeter (pond edges) would be good since high vegetation is usually intimidating to doves. Perching wires (if there are no powerlines) over or near the food source are also another simple thing that will make doves comfortable in using a particular field.

As we said before, large agricultural operations are often the most effective at pulling and holding September and October doves. Commercial corn, sunflower, or millet fields are usually hard to beat, but since these are managed by the owners or leased to farmers, they are really outside the scope of this article, and so we won't go into any more detail on the management of these areas. The best thing to remember about these places is to be nice to folks, network, and hope that you are lucky enough to get invited to one of the epic shoots. If you are invited, bring plenty of shells and get ready to shoot your barrel hot because sometimes the doves darken the sky and make powerlines sag around

commercial agricultural operations.

Vegetation Management for Doves

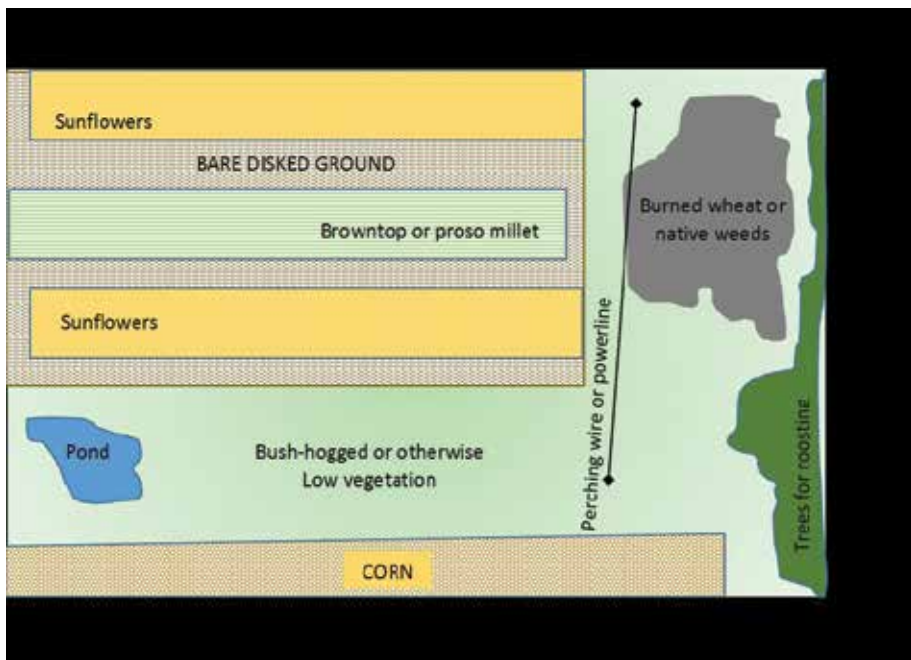
For most of the rest of us, we generally have to build our own place to shoot every year. History is one of the best indicators of whether a property will be able to attract large numbers of doves. If you've planted a field with success in the past, it stands to reason it'll draw doves again. However, if you've not had much success in the past at a particular location, there may be some things you can do to improve the situation. One thing you could try is to increase the size of the field. As a general rule, a larger field is better (up to a certain extent when the concentration of doves becomes so diluted that you decrease shot opportunities). Some publications recommend a

minimum of ten acres for a field, but typically only a portion of the actual field is planted at one time. But if the adjacent habitats are pretty open, a successful field can often be smaller. If you are starting a new field and you are not sure what kind of mourning dove use you will get, talk to others in the area to see what kind of numbers they typically see and what has worked for them.

As far as what to plant there are lots of choices and I have heard tell of some great shoots over what some of us would consider unconventional dove fields (such as peanut and soybean fields). However, there are five or six crops that seem to dependably draw doves and therefore are the most commonly used in modern dove field management. These dove candy crops are **millet**s (dove proso and/or browntop), **black oil**



Most corn varieties mature at around 150 days. It prefers a slightly acidic pH of 6-7 and it will need a supplemental dose of nitrogen after establishment. Drill at a rate of 5-10 pounds/acre at about an inch deep for best results.



To mitigate the effects of weather, seasonal maturity timing, and deer depredation, many managers use a combination of crops. On some of the most consistent and successful dove fields, strips (at least 10 rows wide) of different crops are alternated with bare ground maintained in between them (by herbicide or disking). Water sources, burned areas, and trees for loafing and roosting, and wires for perches are bonus features that can help attract larger numbers, depending on your surroundings.

sunflowers, corn, grain sorghum, and wheat. With the exception of wheat all of the above are warm-season crops and should generally be planted

in the spring or early summer to mature in time to attract birds for the opening weekend of season. Wheat is planted in the fall and matures in the late spring or

early summer. Therefore, it is sometimes used as a jump start attractant crop for doves earlier in the year and through the summer months to draw birds before warm season crops mature. Often, wheat fields are burned in the late summer, exposing the remaining seeds and cleaning up the ground. This can really pull in the doves pre-season. Planting an early crop of wheat, however, may or may not be worth the effort depending on the location and surrounding land use of a particular property. Wheat grain is no doubt highly preferred by doves and it is more commonly used as an “instant” attractant by planting it only a couple or three weeks before shooting. In many states this can legally be done if the wheat is planted for erosion control or wildlife food plot reasons. In Alabama for example, wheat plantings that have been planted for deer food plots (under the normal excepted



Large machines and planting implements (top) are nice for establishing large crop areas, but you can create a good dove field with the same equipment you use to plant food plots (bottom).



If you are able get a large, good quality stand of sunflowers to maturity and mow some strips through it to scatter those highly sought after seeds, you better get ready for some shooting because they are dove magnets.

planting times and preparation methods) can be used to legally shoot doves as long as no supplemental feeding or “replanting” occurs.

For the actual warm-season dove crops planted in spring there are a few things to consider prior to planting. As always with any agricultural crop operation, you need to know what your soil chemistry is and what you can expect from it. For some managers this step is often skipped and that may be ok if you are familiar with your soil’s pH and nutrient characteristics and what to add to it for it to produce. However, if not, it is simple and well worth the few minutes it takes to collect a soil sample for analysis. Do this in

the fall or winter so that you’ll have time to figure out what you will need to do. We will not go into the details of fertilization and liming rates in this article because depending on what kind of soil you have and which of the above crops you choose, this will vary. As a general rule of thumb, you will need some lime on poor acidic regions (much of the South) and will need to add a complete fertilizer with a significant nitrogen (ammonia) component since none of the above dove crops are legumes. In fact corn, millets, and sorghum are all members of the grass family (Poaceae) and grasses typically need ample nitrogen to thrive. While native grasses like bluestem can grow

well on poor acid sites, cultivated crop varieties typically cannot access and use nitrogen in the soil if it is bound to it by the low pH. The results of the soil test will provide specific fertilization and liming rates for maximizing cultivated grain crop production.

Crop Establishment and Maintenance

Among the warm-season dove crops there are advantages and disadvantages of each. Factors such as cost of seed, preparation time, drought tolerance, local soil suitability, etc. can influence which is considered best. For example, browntop millet is relatively inexpensive, more deer resistant, and is pretty drought tolerant when compared to black-

oil sunflowers. But if you are able to get a large good quality stand of sunflowers to maturity and mow some strips through it to scatter those highly sought after seeds, you better get ready for some shooting because they are dove magnets. To mitigate effects of weather, seasonal maturity timing, and deer depredation, many managers use a combination of crops. On some of the most consistent and successful dove fields, strips (at least 10 rows wide) of different crops are alternated with bare ground maintained in between them (by herbicide or disking).

In other words, a strip of browntop millet a hundred feet wide would be bordered by a 50-foot strip of bare ground followed by a hundred-foot strip of sunflowers followed by bare ground and then corn. Regardless if you plant multiple crops in strips or a solid crop stand, the following planting rates and methods generally apply (on soils of average fertility) in the South. Black-oil sunflower seeds are typically drilled or row-planted, although they can be broadcast (least preferred) at about an inch deep. For drilling or row planting (36"

width average) you should shoot for about two sunflower seeds per foot of row. This would still equal only about five pounds of seed per acre. Browntop millet can be planted as early as April 15 in most of the South or as soon as the ambient air temperatures settle into the 60-80 degree range. Browntop grows best in slightly acidic soils (pH of around 6) and can actually start to set seed in about 60 days after germination and can produce over half a ton of seeds per acre. Since it matures so fast, planting can be delayed until late May or June and it will still make seeds in plenty of time for an opening day dove hunt. The Natural Resources Conservation Service recommends seeding rates of 14-20 pounds/acre (drilled) or 25-30 pounds/acre (broadcast) for browntop at ½ to 1 inch deep. Dove proso is also fast-maturing (65-75 days) and generally grows taller than browntop (about 3 to 4 feet). It also prefers slightly acidic to neutral soils (pH of around 6.5 - 7) and can produce up to a ton of seed per acre. NRCS recommends a minimum planting area of 5 acres and rates of 6 pounds/acre (drilled) or 12 pounds/acre (broadcast) for dove proso. Grain sorghum (also called milo) can grow to ten feet tall in some cases and therefore can also be used as hunter cover strips in the middle of fields. Drill it at about 5 pounds/acre or broadcast at 15 pounds/acre on a well prepared seedbed for best results. To drastically increase yield (just as in corn) apply ample nitrogen after the sorghum is established. Most sorghum



If you want to try to bring in some doves using native vegetation, some good candidates are croton, ragweed (shown here), foxtail, pokeweed, paspalum, beggarweeds, and panic grasses.

varieties mature at 70-100 days. Corn can also obviously be a taller crop that can provide strip cover for hunters and it is tough. That is it can last longer into the season and even into the winter. Leave a portion of the corn field standing if you want to shoot again later in the season. Most corn varieties mature at around 150 days. Corn prefers a slightly acidic pH of 6-7 and as we mentioned will need a supplemental dose of nitrogen after establishment. Drill at a rate of 5-10 pounds/acre at about an inch deep for best results. The most important thing to remember is to have food available well before the date you plan to shoot! It takes time for doves to find and use the food source especially in large numbers, so having food available for at least two or three

weeks is critical (more time is better). Bush-hog, disk, or burn some portion of the crops in advance and make the seed readily available for use. If you plan to have multiple shoots, keep some of it standing and keep it going. Many folks plant second or third crops later in the season to ensure they'll draw doves for multiple shoots (you still have to balance the shooting so as not to create too much disturbance). Doves, like most temperate and cold weather, birds need to feed during the day to generate warmth at night, so cold winter days can see some of the best shooting action. With all crop species mentioned above (especially with sunflowers) expect some level of deer depredation if densities are high in your area. Scare tactics or fencing may even be necessary

in some areas to get your dove field up and running.

Dove field management is more similar to commercial agricultural crop operations than perhaps with any other game species we manage. This doesn't necessarily mean you need large industrial equipment. Large machines and planting implements are nice for establishing large crop areas, but you can create a good dove field with the same equipment you use to plant food plots. The similarity to commercial agriculture I was referring to deals more with weed control and "cleaner" farming practices. In bobwhite quail management we often talk about the benefits of "dirty" farming practices and allowing weedy borders and vegetation to persist in and around agricultural fields. When

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using crop plantings for doves however, keeping clean bare ground within and around rows and strips for foraging is actually preferred. This is because a foraging mourning dove would rather be able to detect potential predators at a great distance and fly away at its leisure than to hunker down and hide in thick vegetation. Doves obviously do eat weed seeds and sometimes forage in high weeds but when preparing a shooting field we want to make it as attracting as possible without the undesirable tangle of thick vegetation on the ground where the feed will be. Also, nobody likes losing a shot down dove in a mass of grass thatch or dense undergrowth. Therefore, one very important thing (which seems is also too often dismissed) to consider is whether you will need to use herbicide as a tool to creating a quality dove field. Odds are it will improve the attractiveness to your site. It is obviously critical when using no-till planting methods, but herbicide is also important in traditionally prepared fields and for weed maintenance in any type of field where plowing or disking alone can't maintain clean and low competition crop growth. Yield of the crop as well as the accessibility of the seed on the ground is dependent on how well you can limit the amount of competition (grass and weeds) amongst the crops. Let's look at a classic example. Many a hopeful dove hunter has attempted to plant a browntop millet crop in a pasture full of sod-forming cattle forage grass. This can certainly be done but rarely can it be done successfully

without at least one herbicide site prep application. Even after being disked prior to planting, without herbicide the Bermuda, Bahia, or Dallis grass rhizomes will out-compete the millet and cause a drastic reduction in seed production, and more importantly seed access. So the hunter ends up having six or eight birds come September and a less than exiting opening day shoot. Herbicide is also an effective method in maintaining stands of crops after they are planted. For sunflowers, the USDA Plants Materials Center and Mississippi State Extension Service recommends either Dual Magnum (at about 1.5 pints/acre) and/or Spartan 4F (at about 5 ounces/acre) at the time of planting for grass and broadleaf weed control, and Select 2 EC (at about 8 ounces/acre) for grass control later after seedlings are established. For millets, sorghum, and corn, glyphosate and 2,4D products are commonly used in pre-emergent applications. Using "Roundup ready" corn varieties allows a manager to essentially control weeds with one herbicide product through the entire rotation of the corn crop. Post-emergent herbicide options in millets and grain sorghum are more limited, however, so make sure you get a solid pre-emergent kill and prepare a good seedbed for these crops. Don't be overwhelmed with herbicide tank mixes and options. Just read the label on the product you are using and remember; the take home message is to simply keep your dove crops as clean and productive as you can.

If you want to try to bring in

some doves using native vegetation, some good candidates are **croton, ragweed, Setaria (foxtail), pokeweed, paspalum, Desmodium (beggarweeds), and panic grasses**. These hearty seed-producing species can be planted but are more commonly just encouraged as existing resources on the landscape by periodic disturbance or fertilization. Often there is nothing to be done besides bush-hog or burn patches or strips through this native vegetation and let the seeds fall onto the stubble or bare ground. Unless you have good quality stands of these naturally occurring species, however, planted crops are usually more attractive as far as concentrating large numbers of birds.

Conclusions

In summary, a knowledge of the mourning dove and its biology and behavior allows us to predictably attract it in numbers large enough to have a fun and successful shoot. It's all about providing an abundant and consistent food source (seeds). A combination of crops and bare ground will typically pull doves in, but remember the pros and cons of the available crops as well as considering soil fertility, herbicide, and site preparation needs. Some locations will be better than others and there may be certain things (like adding water, perches, etc.) landowners can do to sweeten a spot. Remember that food must be visible and accessible for enough time to allow doves to find it prior to the hunt. It is also important to minimize disturbance as much as possible

during this time (other than during the actual shoot). Using these methods will maximize the opportunity for some exiting shooting this coming season.

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Wild Turkey Declines: Is It All A Bunch of Poop?



Text & Photography
By Lynn Lewis

Lynn Lewis is a Certified Wildlife Biologist with 20 years of experience in wildlife and forest management working in academia, state agency, private consulting and non-profit areas. Lynn is currently the Chair of the South Carolina Prescribed Fire Council. Lynn is also a Double Dawg with her B.S and M.S. degrees in Forest Resources/Wildlife Management from the University of Georgia's Warnell School of Forestry and Natural Resources.

What does chicken poop and wild turkeys have in common? And why should you care? If you are a land manager concerned about his food plots, a landowner concerned about economic returns from your timber, agriculture or hunting lease interests, a chicken producer concerned about his livelihood, or a hunter concerned about maintaining healthy, huntable wild turkey populations, there are a few things you do need to know about chicken poop and wild turkeys.

Long story-short, previous studies have shown that litter from domestic layer/breeder poultry operations can cause disease infection in wild turkeys, namely Histomoniasis, also known as Blackhead Disease. With recent wild turkey reproduction and subsequent harvest declines in several Southeastern states, many point to chicken poop as the suspect. But is this just perception or correlation or is there something to it?

Chicken litter being applied to a pasture as fertilizer. Credit: UGA Extension Service.

Chicken Poop and Wild Turkeys: Setting the Stage

If you're like many land managers and landowners, you're looking for ways to boost the productivity of your soil. Whether to improve production of row crops, pastures, planted pines or food plots. Most of us don't have the luxury of rich, bottomland soil with a perfect pH to work with, so we have to amend and adjust. This allows us to get the most out of the soil and in-turn increase yields. The most common way to do this is by applying lime and fertilizer. If you can get the pH right, then the nutrients you add can be accessed by the plants. Plants with plenty of nutrients grow quickly. In the case of food plots, they produce lots of vertical cover, seeds/mast, and highly nutritious, easily digestible forage for all kinds of wildlife. Agricultural crops/pastures, timber and straw

production increase in volume (bushels/ac, bales/ac, tons/ac) and as a direct result yield better economic returns. Depending on where you are, one of the easiest and cheapest ways of applying the fertilizer portion of the equation is using chicken litter. Many land managers and landowners also gain income through hunting leases and making sure there are sustainable, huntable turkey numbers is important too.

Most chicken producers are looking for economical ways to offload a bunch of chicken poop or "litter" which is a mixture of manure, feathers and bedding. Chicken production, particularly for fryers and broilers, is a pretty quick turn-around. A batch of bitties is grown and slaughtered usually at 5-6 weeks and then a new batch is brought in. Sometimes the chicken houses are cleaned with every new batch of

chickens, other times it might be six months, but either way that's a lot of poop that needs to go somewhere. Returning it to the soil as fertilizer rich in nitrogen, in particular, makes sense while hopefully making a little money. It's usually early spring when driving through the countryside you get a whiff of a very unpleasant smell that seems to encase you from every direction. That my friend is the pungent smell of chicken poop getting spread on agricultural fields, which is a much more common occurrence than ever.

The comeback of the wild turkey is a conservation success story. Their populations are thought to have dropped as low as 30,000 in North America and now are upwards of 7 million, thanks to the efforts of state and federal wildlife agencies across the U.S. and passionate volunteers and staff



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associated with The National Wild Turkey Federation. Wild turkey populations in the Southeast have seen explosive growth, especially through the 1990's. Turkeys trapped and transferred to new areas quickly expanded to fill unused habitat. Wild turkey hunters used to be few and far between as well just because it was so darn hard to hunt birds when there weren't very many. Today many hunters are used to hearing 10 or more birds gobbling their heads off on any given spring day and when those interactions start to drop off, it's very noticeable. Turkey hunters are a passionate lot and the recent reproduction declines and subsequent decline in harvest numbers are concerning to them. They aren't alone. Wild turkey biologists are also concerned.

The Protozoa, The Worm and The Chicken: A Complicated Story of Poop

If you're not into the complicated world of diseases with medical terms, scientific names and what not, then now's the time to skip down to the next section, but if you're like me and totally geeked out about it, party on, Wayne! For the skippers, do, however, at least read the last two paragraphs so you don't miss the important part.

Mother Nature can be incredibly simple and equally complex. Relatively speaking, the pathology of Blackhead Disease (Histomoniasis) is a little complicated and definitely doesn't fall into the simple category. The disease itself actually requires several hosts and time, so there are multiple steps involved before there are any symptoms let alone a dead bird. For those interested in trivia, one unique fact about the protozoa *Histomonas* is that it is



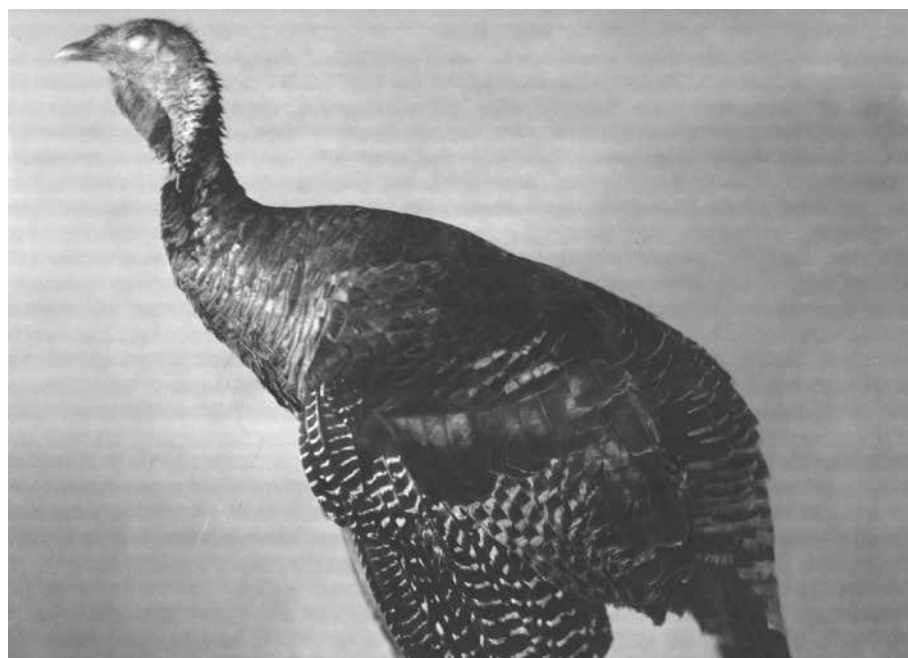
Liver lesions caused by Histomonas infection in a gallinaceous bird.

one of only a few parasites that utilizes another internal parasite in its life cycle.

The term "Blackhead" doesn't have anything to do with the coloration of an infected birds' head, (that's actually avian pox in many cases), but refers to the lesions that sometimes appear on the liver of a diseased bird.

Blackhead Disease is pretty common in poultry and other

gallinaceous birds (chickens, turkeys, chukkers, quail, pheasants, etc.), but affects each differently. Chickens and pheasants are the natural hosts of the protozoa that causes the disease and rarely get sick. But even that has changed recently and now Blackhead Disease is a growing concern for chicken producers as well. Bobwhite quail, Hungarian partridges and guinea fowl are kind



A wild turkey with Blackhead Disease exhibiting listlessness and drooping wings.

of in the middle and sometimes get sick with moderate mortality rates. Turkeys and ruffed grouse are especially susceptible and will usually get sick and die in pretty short-order and with high mortality rates (>75%). That's one reason Blackhead is considered one of the most important turkey diseases. The domesticated turkey industry can be especially impacted by it as it can decimate a whole flock.

A wild turkey infected with Blackhead Disease will appear listless, with drooping wings, and/or ruffled feathers. They will be very tame or confused and won't roost in trees. Infected birds will also have sulphur-yellow colored feces.

The protozoa that actually causes the disease, *Histomonas meleagridis*, hence the disease name Histomoniasis, requires several stages before causing problems for turkeys. So what in the heck is a protozoa? It's a

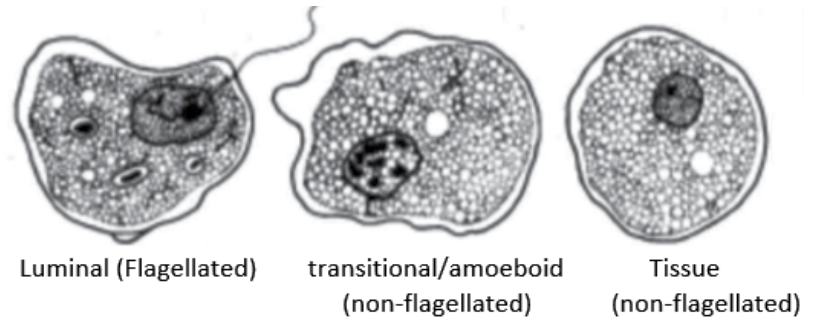


Illustration of the Histomonas protozoa (with and without the tail).

microscopic parasite.

Kinda cute with their little flagella (tail), but protozoans are a group that can cause some issues for many. There's a reason people shouldn't drink water straight out of the stream. Ever heard of Giardia or beaver fever? Yep, that nasty bout of diarrhea was caused by a protozoa. But for Blackhead Disease the protozoa has a bit of a trip before it can make a bird sick.

One way Blackhead Disease is spread is through the fecal-oral route. Yes, poop to mouth. Yuck! Many diseases are spread this way and that's why you should listen to

your mother and wash your hands. Just saying. But lucky for us people don't get Blackhead Disease. Unfortunately for wild turkeys, hand-washing isn't an option. However, this route is not considered a major pathway to infection. The most common way the disease is transmitted is through another organism. Enter two worms and a beetle.

The *Histomonas* protozoa is actually found inside a cecal worm (*Heterakis gallinarum*) that is a relatively common parasite and happily resides in a chicken's gut. A trophy cecal worm is still less

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than a millimeter in size. The infected cecal worm is passed through the feces of the chicken. If the litter is spread in fields, so is the protozoa infected cecal worm. Which is now available to our friend the earthworm who inadvertently eats the much smaller cecal worm containing *Histomonas*. Grayling beetles that are commonly found in poultry litter will also pick up the protozoa and when eaten can pass the disease on. Of course, what turkey doesn't love a beetle or a worm, right?

Here's the real important part and why it's key to discern between types of chicken litter you use. It takes more than 6 weeks for a cecal worm to mature in the gut of a chicken. As I mentioned before, broiler/fryer chickens are slaughtered at 5-6 weeks, not giving the cecal worm enough time

to mature and provide living quarters for the protozoa. However, breeder/layer operations where the birds live much longer have high rates of infection and this is the litter that poses the most concern.

To sum it up, Wild turkeys either eat contaminated soil, infected earthworms or darkling beetles. They may or may not get sick and die.

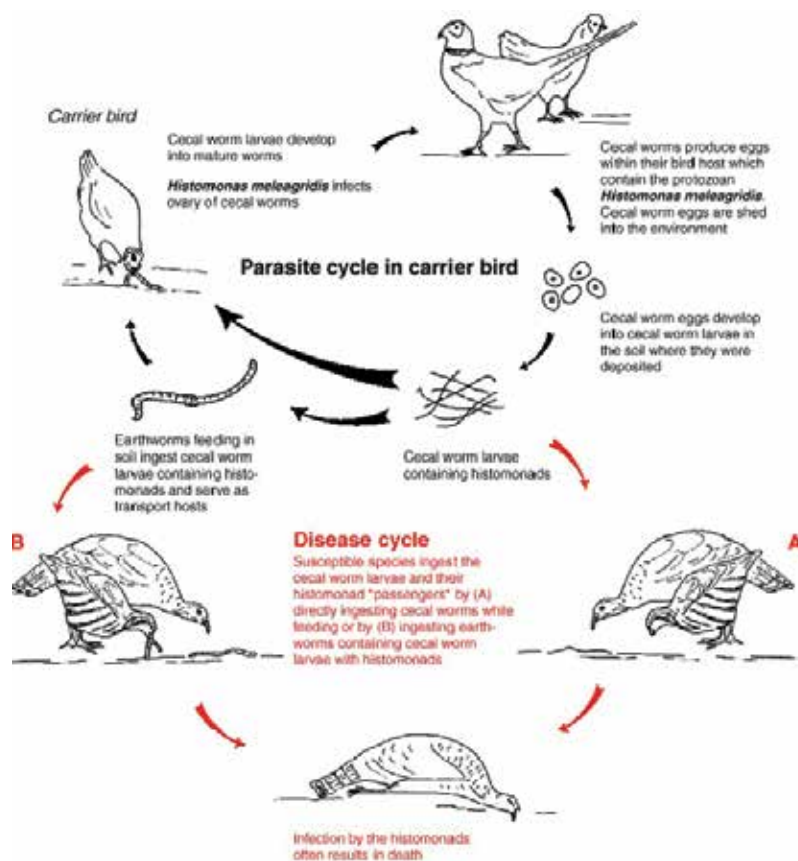
“Eat More Chicken” – Not Just A Slogan Chanted by Cows

The poultry industry has grown significantly over just the past 20 years or so with chicken houses so numerous in some areas you can throw a rock from one to another. According to a 2011 Pew Report (Big Chicken: Pollution and Industrial Poultry Production in America), chicken, once a distant

third to beef and pork, is now the most popular meat in the United States. The average American eats more than twice the amount eaten in 1970. The American poultry industry has matched this change in appetite with an exponential increase in production. For example, in 2007, 8.9 billion chickens were raised and sold as food in the United States, a jump of more than 1,400 percent since 1950. At the same time, chicken farms have grown in size. By 2006, a typical operation produced an average of 605,000 birds in vast buildings of 20,000 square feet or more. The area of greatest chicken production, known as the Broiler Belt, runs from East Texas through the heart of the Southeast into Maryland and Delaware. And in some states, chickens outnumber people 400:1.

Looking at those numbers with litter in mind, according to a University of Georgia Extension bulletin, based on average nutrients, a ton of poultry litter has an estimated value of \$41. A 20,000-bird broiler house will produce approximately 150 tons of litter per year with a potential gross value of \$6,150. A flock of 14,000 breeder hens will produce approximately 150 tons of manure per year with a potential gross value of \$4,300. The cost of transporting poultry litter varies. Litter removed from a broiler house is usually very bulky, increasing its transportation cost per pound of nutrient. The average delivered cost for commercial operators is \$20 per ton of broiler litter; thus, litter can provide an economic benefit for many growers, if it is effectively marketed.

Pretty much all of the chicken houses are located in rural areas and their litter is spread in



Life cycle of the protozoan *Histomonas meleagridis*, which causes histomoniasis

The life cycle of Blackhead disease is a somewhat complicated process, involving multiple stages, players and time.



A private landowner with aspiring wildlife management objectives is literally surrounded by chicken houses. The red circles (24) are NEW poultry houses built since 1993 in a 24 square mile area. There are 12 poultry houses found within one mile of the landowner's property.

agricultural fields and forests where wild turkeys roam. With this growth in the poultry industry and the recent declines in wild turkey productivity, many are concerned that it's a disease issue, specifically Blackhead Disease. Local turkey hunters in these high density poultry production areas frequently lament the lack of

turkeys compared to the past and always point to the increase in chicken houses. I'm not being critical of the poultry industry in anyway here. They and the agricultural industry in general bear a great responsibility in keeping us all fed while having to deal with greater regulations, limited land to operate in and a

seemingly ever growing demand. I'm certainly a part of that equation as there's nothing better than some buffalo wings on the barbie and I make a lot of trips to Chick-fil-A.

More Chickens But Less Wild Turkeys – Are they related?

With the uptick in poultry production there has also been a down turn in wild turkey numbers in some areas of our southern states. In turkey biologist circles it has been dubbed the Southeast Wild Turkey Reproduction Decline and was first addressed in 2011. A study was initiated as a response to persistent declines in annual reproductive indices of wild turkeys based on surveys conducted by member states of the Southeast Wild Turkey Working Group (SEWTWG). The SEWTWG is a collective group of state wildlife agency turkey

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Most poultry houses are located within fields that offer nesting and brood rearing areas for wild turkeys. Litter is also usually spread on these fields.

biologists/coordinators that meets annually. In other words, many of these state turkey biologists were seeing hens with no poults or very few poults compared to the past. There were and still are concerns that this reduction in productivity is an indicator of current or future declines in turkey populations. This may be coming to bear as these states usually see a decrease in hunter harvested birds after several or many years of poor reproduction.

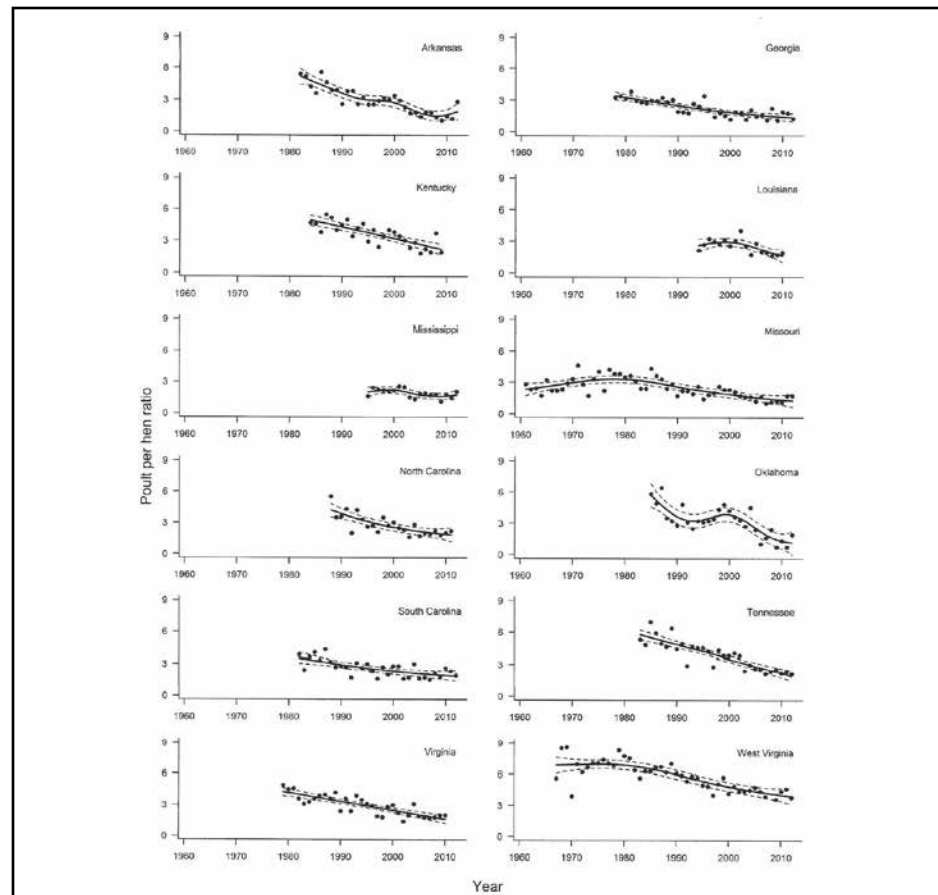
When considering causes of any wildlife declines, diseases are always a consideration. Research out of the University of Georgia in 2008 tested hunter-harvested wild turkeys in southwest Georgia and north Florida for various poultry diseases in an area of high poultry production and found very little that would cause major impacts at the population level. As far as Blackhead Disease is concerned, previous research from the 1990's indicated that as long as broiler/fryer litter was used and NOT layer/brooder litter then all was right with the world because there was just not enough time for the protozoa's life cycle to complete itself. To our current knowledge this still holds true, but based on findings from recent research at the University of Tennessee we

may need to look at this issue more closely. The investigation found several hunter-harvested wild turkeys with active infections of Blackhead Disease. It was a low number of the tested birds, but pretty significant to catch the disease in action since it does generally cause mortality quickly

and at a high-rate. Taking a closer look at this connection is not just because it may be impacting wild turkeys, but also because Blackhead Disease is becoming more of an issue for the poultry industry as well.

What You Can Do

- If you use chicken litter for fertilizer, make sure it's from fryer/broiler operations and NOT from layer/breeding operations. If you're not sure and can't confirm, consider using alternative sources.
- If you're in an area with lots of poultry production, be on the lookout for odd acting wild turkeys. If you see one, keep an eye on it and contact your state wildlife agency. They can guide you on what to do next. If it's legal in your area and you don't



Wild turkey reproduction declines have been documented in several states in the Southeast. (Credit: Byrne, et al. 2011. Potential density dependence in wild turkey productivity in the Southeastern U.S. Proceedings of the National Wild Turkey Symposium)

- mind giving up a tag, go ahead and dispatch the bird.
- If you find a freshly dead wild turkey (or harvest a sick one), use gloves (or plastic bags as gloves), place in a plastic bag and put in a cooler with ice packs (not wet ice). Keep cool until you can contact your state wildlife agency for further directions.
 - Never eat a sick-acting wild turkey and always wash your hands after handling any animal.
 - Participate in any research or monitoring program that will help build our knowledge base, whether it's an online survey or submission of samples from a harvested bird.

Additional Resources

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Text & Photography
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. Contact him at scott@southernsportsmanaquaticsandland.com or (336) 941-9056.

Growing quality or trophy largemouth bass generally does not just happen. This bass is from a large open system with a Relative Weight of 85%, which is average.

Once in a while we meet a landowner who can financially engage all the recommendations we provide to make the very best lake possible under their specific environmental conditions. Unfortunately, as most of you know, fish and wildlife management is not cheap. From high quality consulting, to equipment, to products. As a lake manager we often have to work within the landowner's budget. We provide a list of options and prices and then the landowner with our advice can pick and choose which options he can pay for at that time. I am frequently asked the question, "what would you recommend if money was no object?" For the purpose of this article I will use the largemouth bass as the target species, since it is the most highly sought after freshwater species and most managed for across the country.

Physical Traits

Physical aspects of a lake are important to creating the optimal sport fishery. In my opinion, the optimal size waterbody where all management techniques can be implemented is 25-50 acres in size. Any larger and it starts becoming harder to manipulate water chemistry and other parameters. Whether you are building a new lake or can drain and modify your existing lake, creating as much shoreline as possible is the goal. Largemouth bass, and much of the forage species, are littoral zone (edge/shoreline) species, and the more shoreline present the better. Straight shorelines are undesirable. To increase shoreline presence islands can also be added.

Shoreline slope can vary, but do not make a lot of it less than 1-to-3. The less the slope, the

more shoreline plants you will have. You want some vegetation, but not to where frequent herbicide treatments are necessary. Allow the water depth and water color to manage the plant growth, not spraying.

Lake depth, since we have unlimited funds for aeration, can be 15-20 feet deep. The bottom should not be like a bath tub. The bottom should be irregular with rises and drops. Instead of creating visible islands, have the bottom come up to create underwater islands of areas 4-6 feet deep and then drop off again. If you maintain a three-foot visibility, water three feet deep or less will have vegetation problems. When creating this perfect bottom, do not isolate deep holes, but interconnect them all with canals so the water does not become trapped and moves around the lake and can

be mixed with sub-surface aeration.

Adding a boat ramp (gravel or cement), that can be used during wet weather as well as dry is advised. Clear any trees and/or stumps that may hinder launching boats that may scratch vehicles or damage tires. Also, adding docks and/or piers for access to water, swimming, or to dock boats are always advisable. Docks can be places for inexperienced anglers to fish where fish are congregated at a feeder and getting snagged is less likely. Have electricity at one dock for boat battery charging while on water without having to pull your boat out.

Water Chemistry

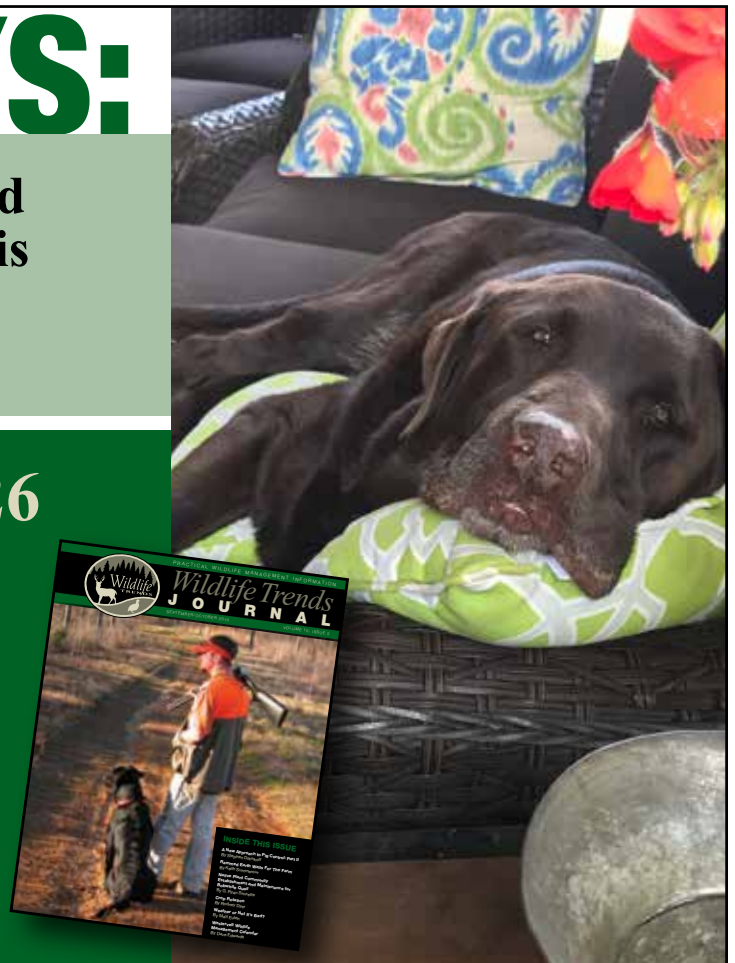
When having water chemistry sampling performed, have it done in both the morning and afternoon, and during all four

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seasons to understand the fluctuations during the day and between seasons. Large fluctuations in pH can stress fish and may be a limiting factor in fish growth if this occurs. Extreme daily fluctuations may also kill fish. The pH, alkalinity and hardness are all interrelated and affect the ability to manipulate or naturally have an algae bloom. The presence of an algae bloom shows a waterbody can have an increase of up-to 400% more fish than one without. A pH between 6.5 and 9.5 is desirable and 4.5 to 10 is acceptable. Alkalinity 50-150 mg/l is desirable and 20-400 mg/l is acceptable. A hardness of 50-150 mg/l is desirable and anything above 20 mg/l is acceptable. If these Parameters are below the acceptable ranges, adding agricultural lime in the fall at one to two tons per acre will move these readings up most likely into their desirable ranges. Depending on the influence (water coming in) of your waterbody, these parameters should be checked every three to five years. Once we have these parameters into the desirable ranges, fertilization can begin.

A fertilization program needs to be conducted in a disciplined manner. Once it's started in the late winter/early spring, it has to be checked without gaps and not stopped until late fall/early



This large bass caught her a large black crappie. That is somewhat unusual, but we do see it more in high quality lakes. Any forage to keep bass growing is good.

winter when the growing season ends. There are many pond fertilizer brands on the market or you can still perform it old school with a regular mix as opposed to a specially formulated pond brand. Since money here is no object I recommend a fertilizer especially designed for ponds where application is much easier than using regular fertilizer. Either way, follow the instructions. More is not better than the label prescribes. Maintain visibility between 18 and 36 inches. Any time you check visibility and it is > 36 inches add the prescribed amount per acre. Always have a lot more on hand than you will need. You do not want a need for

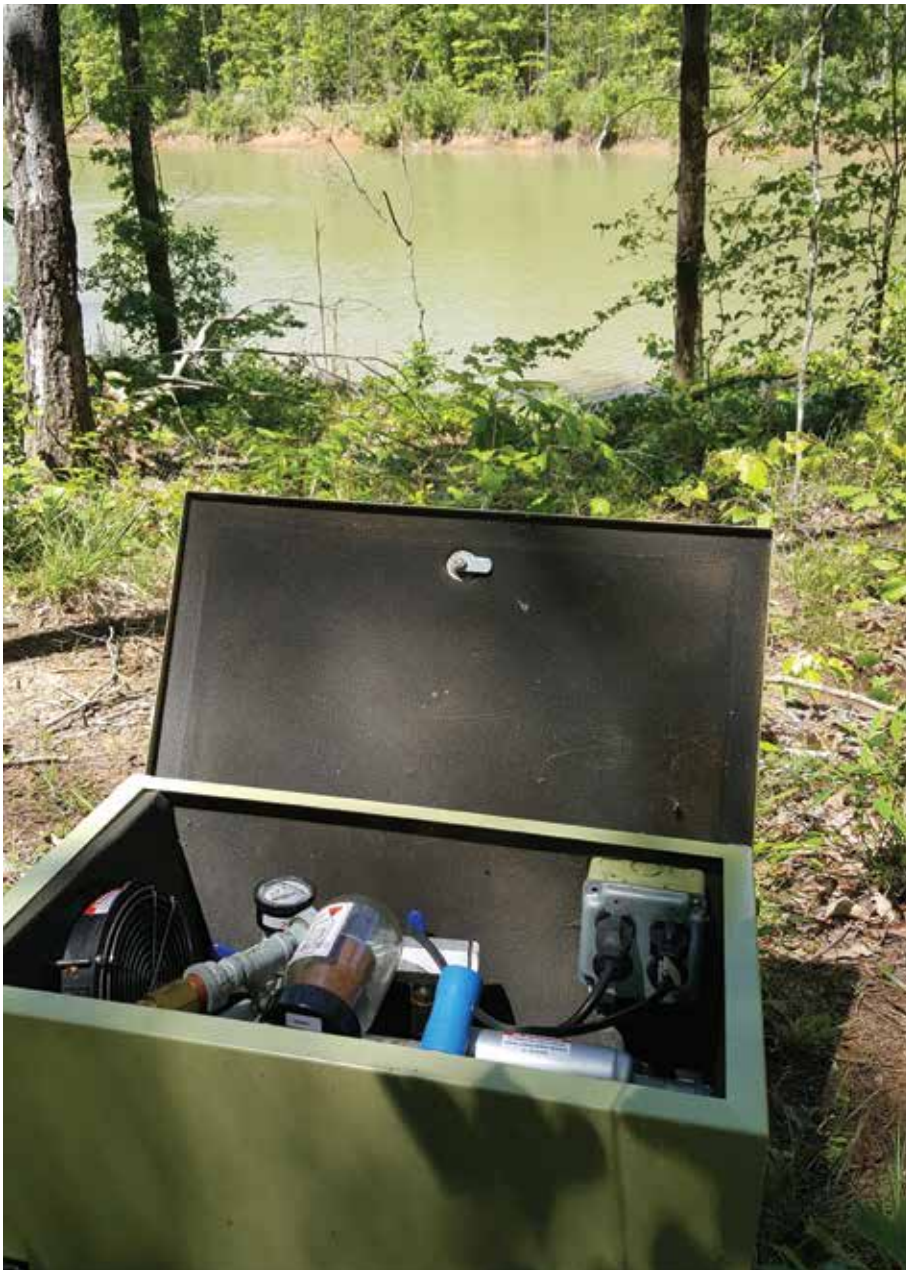
it and it is not there, but on order. While you wait for fertilizer the water will begin to clear and nuisance shoreline and submerged vegetation, as well as filamentous algae, will begin to grow and require spraying when it was unnecessary.

Maintaining a good Dissolved Oxygen (DO) level is critical. During summer and winter lakes stratify (become layered) where higher DO water is at the top and lower or non-existent near the bottom. To prevent this layering and add DO to the water, bottom aeration can be added. Besides adding DO, this mixing will create good water quality throughout the water column and allow fish to use all the depths, not just the top 6-10 feet during summer and winter. This mixing opens up more acre feet of area and habitat to fish, increasing the waterbodies carrying capacity. How big of an aeration system required will be determined by how many acres and how deep it is. The deeper, the less bubblers you will need.

Maintaining constant good



Forage of all sizes and various species is required to grow high quality largemouth bass. Big bass require big forage. To get there they need forage of various sizes throughout their entire life.



One addition to help a lake is an aeration system. It adds Dissolved Oxygen and de-stratifies the water column so the entire water column can be used by fish and not just the top so-many feet.

water quality and eliminating stress to fish promotes better growth and longer life. It will also allow your lake to support more fish/forage to aid in largemouth bass growth.

Habitat

Shoreline and offshore habitat aids in harboring all sizes and species of fish at some point throughout the year. Desirable, native plant species that are easily controlled are best. With a

new lake, you have the opportunity to plant what you want where you want it. Aquascaping a lake is no different than landscaping, but it's around and in water. The exact same rules apply with creating a layout where plants grow together creating both quality fish habitat and aesthetics around the lake. As soon as you start to dig a lake, plants will start to grow around it. Usually these species are undesirables and most likely exotic species.

Trying to dictate what species will grow around a lake from the beginning is easier than managing undesirables after they move in and switching to desirables. These plants can be obtained from specialized aquatic nurseries or from nearby donor sites. Create a planting map on which species will go where, considering each species, desired water depth, amount of daily sunlight needed and soil requirements. Since money is no object, planting more individuals than if on a budget is recommended so it fills in quicker. Along with buying larger plants, they tend to have a higher survival rate. Be careful not to relocate an exotic or nuisance species into your lake. Establishing routine aquatic vegetation treatments will help keep any potential problem vegetation, including filamentous algae, in check. With a fertilization program there is always some filamentous algae growth and not allowing that to become an issue is best.

To enhance spawning for bass and bream, place gravel beds throughout the lake in 2-5 feet of water. Placing areas of #57 gravel three inches deep, covering hundreds of square feet, will add quality nesting areas. It will also add areas for small invertebrates to thrive and small fish to feed. It is easier to add these when the lake is drained and dry and you can drive on the lake bed, but they can be constructed from a boat if necessary.

Offshore fish attractors also increase habitat presence. With an aeration system in place, you can place these in all depths around the lake. Creating a group of 7-10 or more artificial trees marked with a duck decoy



*The double-edged sword, we want lots of females in the population to grow big, but they are also the ones spawning out the eggs.
These bass fry are approximately 10 days old*

does well. Artificial materials are more expensive but work better because they never decompose or have to be refurbished. Approximately 2-3 of these groups per five acres will be a good start.

Shoreline and offshore fish feeders will help congregate fish for the novice angler while increasing growth rates of bream, shiners and channel catfish, and increase the lake's carrying capacity. Feeders spread out along the shorelines, on docks and out in the lake on floating platforms (need to be filled with a boat) all will spread the supplemental feeding around, reaching most of the fish population.

Fish

Bass, like many game and fish species we manage, grow and multiply partially by the environment they are in and their genetics. If your lake is new, you already have a decision to make; Northerners, Florida/Northerner cross or straight Florida largemouth bass to stock. The make-up of your lake may decide for you which to stock. If your lake has the chance of getting bass from another nearby waterbody or system then

stocking what's there is probably the best action. Possibly stocking pure Florida's knowing someday Northerners may get introduced and for a short time you will have Florida/Northerner cross is to your liking. If your waterbody is isolated and no chance of local fish getting into it, stocking the pure strain Florida bass is recommended. With unlimited forage they can reach double digits within six years and has the potential to reach weights into the mid-teens or higher. If more bass in the 6-8-pound range is desired then

the Florida/Northerner cross is your option. Whichever genetic bass you choose, having unlimited forage throughout their life cycle is necessary to reach their full potential.

Every species of fish stocked into the lake should be there to help reach your objective. In this dream lake it's the largemouth bass. If black crappie are not present, do not stock them. If they are already there they will benefit from the intense bass management. All fish species present or stocked need to help with the growth of largemouth bass. Our goal is to fill the lake with a lot of high quality bass. Providing forage (food) throughout a bass's life cycle is necessary for it to reach its maximum potential in growth and numbers. In the case of forage, more is better. We need forage for bass one inch long to 28 inches long, from January through December every year. Good bass forage species include bluegill, threadfin shad, golden shiners, fathead minnows, mosquitofish, tilapia, trout and crayfish. Some of these species



As a by-product of intensely managing largemouth bass, some quality bream and black crappie will be present in the fish population.

may only need stocking once and others will need stocking annually. The bluegill is the main forage species. I like a variety of species because the bass can feed in different areas, get different sizes, various protein levels, and that alleviates some of the pressure off the bluegill to where it is self-sustaining. Threadfin shad in a green lake this deep should survive winters and be self-sustaining, but if not, they can be stocked annually or replenished in spring after years of a die-off. The golden shiner is another self-sustaining species, but should it get over-preyed upon it can also be stocked annually or when numbers get low. The shad and shiners are also favorite forages in small lakes for the black crappie. Mosquitofish and fathead minnows will self-sustain under the right conditions. If mosquitofish (easier than fatheads) do not establish I recommend stocking fathead minnows annually to help the bass under 10 inches. Again, these small fish will also benefit any large bream and black crappie. The tilapia and trout are stocked to provide forage during specific times of the year. Tilapia get stocked in early spring and die-off in late fall or early winter. Trout are stocked in fall and die off in spring. When stocking trout remember the bass feeding will slow during colder weather, so over stocking is a waste as any non-eaten individuals will die the following spring. We have witnessed this too often where too many trout were purchased only for them to be wasted as a winter forage. In this case more is not better. Crayfish survive better with rocks or vegetation to hide and live around. They can be stocked

annually or when it is noticed they are no longer part of the bass's diet.

With any intense largemouth bass management, harvest is necessary. In highly productive lakes the target slot to harvest fish will move and may include more size groups than a typical recommendation. It may also include fewer fish, but bigger than normal. The harvest is to remove biomass (weight, not numbers) and target size for



This robust bass has a Relative Weight of 107%, which is exceptional and a welcome sight in high quality largemouth bass management.

removing fish where the bottleneck occurs. Instead of 30, one pond fish (approximately 14 inches long), the target may be 10, three-pound fish (20 inches long) if that is where the slow-down in growth is. Electrofishing and harvest data combined will identify the target sizes of bass needed to be removed. In productive lakes 20-30 pounds per acre will need to be removed. That is up to 750 in a 25-acre lake and up to 1,500 bass in a 50-acre lake. That is a lot of bass needing removed and getting close to that number but falling short is better than not removing any. Coming up with ways to remove them takes some work and thinking how to maximize desired harvest of target size. All the money and habitat cannot overcome lack of bass removal. It is a task as

important as anything previously mentioned.

Black crappie and bream will also flourish in a highly productive lake and their harvest numbers can be high of quality fish (bream > 9 inches and crappie > 12 inches). Species such as gar, bowfin and pickerel when caught should be removed. These species only compete with the bass.

You have read me write about all mentioned management

strategies here, but normally it is in different forms addressing individual issues. Most lake owners don't do or cannot afford EVERYTHING that is at their disposal to improve their lake. I answer folks that ask, "Is that impossible?" My response is always the same, "Anything is possible, but there may be a hefty price." Most clients pick and choose what to do, and that's understandable. There are a few lake owners out there that have implemented everything I mentioned (and probably more strategies) and I commend you and you should consider yourself lucky because that's not the norm. If you do everything, your chances of growing high-quality fish is greatly improved, and you will definitely produce the best individuals for the genetic make-up of your fish.

Wildlife Trends Journal Management Calendar

By Dave Edwards

June/July 2018

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Adding chufa to your food plot plan adds diversity and with proper management will persist and provide a great food source for a few years.



Service clay target throwers

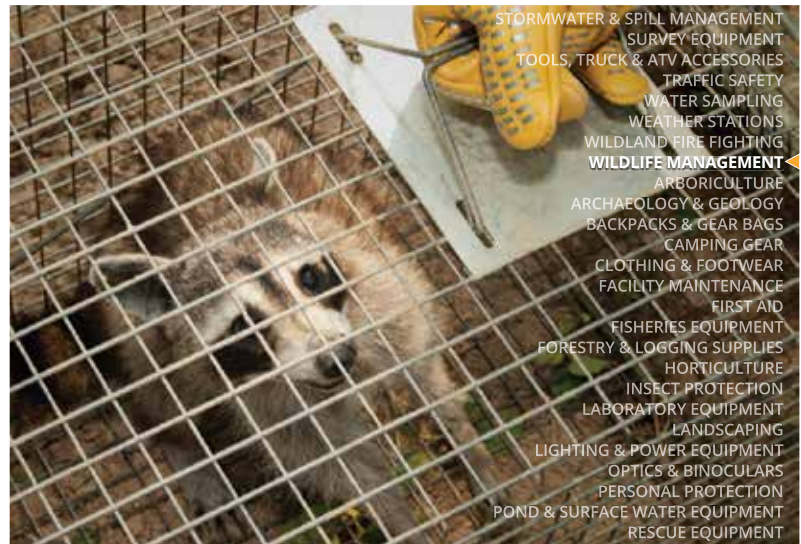
Whether you have a full 12 station sporting clays course, a 5-stand shooting range or just a trap machine on the camp porch, regular maintenance of this equipment is needed to keep everything working. Let's face it, maintenance of trap machines is not fun or gratifying. As such, performing this maintenance seems to be low on the priority list for most owners until it's time to shoot. It is quite frustrating when friends or family come out to shoot and a machine(s) malfunctions or simply doesn't work. Through experience in managing several sporting clays courses and 5-stand shooting ranges, I've learned that regular maintenance significantly reduces "down time" and helps machines last longer. If your machines are actively used throughout the year, it's a good idea to check and service them each month to ensure proper operation. Each machine should be cleaned, lubricated, tested, adjusted, and if necessary, replace any worn parts. Two of the most common problems encountered are battery and controller wire issues. Batteries are similar to a boat in that you "use it or lose it". The longer they sit idle the more problems you can expect to experience. If you don't have solar trickle chargers for your trap machine batteries consider adding these. Solar chargers are relatively inexpensive and keep batteries charged and active through trickle charging. They also eliminate the need to remove and

transport batteries to a power source for charging. My life changed when I discovered wireless remote controllers for trap machines. I have no idea why squirrels and other rodents are so attracted to controller wires, but they regularly find and chew them which shorts the connection. Installing wireless remotes eliminates the need for a wire to run through the woods from the machine to the shooting station – and removes potential problems. Wireless remotes also allow you to easily move trap machines for different shots/

angles without having to deal with a long wire to controllers at the shooting station. Like any equipment, preventative maintenance on trap machines will result in fewer problems and longer machine life. Like the Nike advertisement – If you want your trap machines to work when it's time to have fun - Just do it.

Plant chufa for turkeys

Chufa can be planted in May or June in the Southeast, but most plantings occur in June when summer rains start. Monitor chufa plots for



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competing grasses and weeds and apply herbicide accordingly to control. Adding chufa to your planting program can be quite rewarding if you like to see or hunt turkeys. Turkeys primarily utilize chufa in the fall, winter and spring once the tubers have developed. If your turkeys have never seen chufas, you may need to lightly disk a strip through the patch in late winter to expose tubers. Once turkeys find them, you will not be able to keep them out. A word of caution – raccoons and hogs like chufas as well and can pose problems in some areas. Chufa patches can often be regenerated the following spring by lightly disking the areas. There has to be adequate chufa seed remaining to regenerate an adequate stand (there's often more left than you

may think). To regenerate the stand, lightly disk the plots once in April, again in May, and once more in June. The key is to continue disking each month regardless of how nice your plot is growing with chufas – it's going to kill you, but do it. Be sure to rotate your chufa patches every 2-3 years to avoid nematode problems.

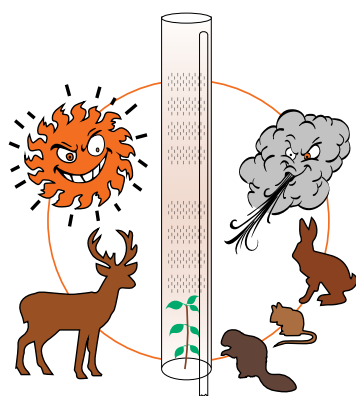
Widen roadsides to create roadside management areas

Summer is a great time to create roadside management areas throughout your property. Creating roadside management areas can add wildlife and aesthetic value to your property. Regardless of how intensely you manage these areas, they will create more “edge” habitat which

is preferred and used by most game animals. To create a roadside management area simply clear the understory and undesirable trees along a roadside, lime/ fertilize as needed, and periodically mow to maintain control of encroaching trees species and maintain a relatively low understory (avoid keeping a “manicured” look by mowing roadways often – this does not offer as much wildlife value). How wide you make the area is site specific, but 10-20 yards wide is generally wide enough to accomplish the goal. Be sure to leave desirable mature trees within the managed area. These trees will provide shade to conserve moisture in the summer and will add aesthetics along the road. If you desire to intensively manage your roadsides you can seasonally disk or burn them to

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promote desirable weeds, and/or install wildlife plantings such as clovers, sorghum, or wildflowers. Wildflowers provide both esthetics as well as bugging areas for turkeys. Managing roadsides not only increases the aesthetics of the property and adds wildlife value but will increase wildlife viewing opportunities.

Take care of new fruit trees or other tree plantings

Many landowners, wildlife managers, and hunters incorporate fruit trees into their wildlife management program to provide additional food sources and aesthetics to their property. Many have taken great care in deciding where to plant these trees, dug the appropriate sized hole, loosened the surrounding dirt, added time released fertilizer and moisturizer packets, firmly packed soil around the root ball, and added a tree tube to protect the tree and enhance growth – then walked away to later find the tree died. Due to the transplanting process itself, which causes a good bit of stress on a tree, some trees simply do not make it. However, in many cases the tree died from a combination of being stressed from transplanting and not being taken care of (TLC – tender loving care). Simply planting the tree is not enough in many cases. After planting a tree in late winter, tree survival is much higher if you ensure weed competition is eliminated (normally done via application of herbicide) in the immediate area of the tree. Weeds compete with the trees for nutrients and water.

Speaking of which, it is important to monitor rainfall and water trees when needed during their first year after being transplanted. Most trees have been propagated and grown in a nursery where they grew in ideal conditions – adequate nutrients, water, and sun. Some trees do not fare well with the struggles of the “real world” where a sprinkler is not providing daily water. Thus, taking a little extra care of them during their first year will help them adapt and

develop a root system that can better handle periodic droughts. Another helpful tip is to place 3-4” of mulch around the base of the trees. Mulching will reduce weed problems due to the unfavorable germination conditions under the mulch (no sunlight) and will also conserve soil moisture. I mention this in the June/July Calendar because this seems to be when the highest mortality occurs, which makes sense due to the very hot and dry conditions during this time.



Providing TLC to newly planted trees during their first year will enhance growth and survival.



Dove field preparations should begin by June or July. Planting dates will depend on the soil moisture, crops you are planting, and the time required to produce seed

Start preparing and planting dove fields

Dove field preparations should begin by June or July. Planting dates will depend on the soil moisture, crops you are planting, and the time required to produce seed. Common dove field crops include a variety of millets (e.g., dove proso, browntop, Japanese, pearl, etc.), sunflowers, grain sorghum, corn, and wheat. For best results obtain soil samples and apply required lime and fertilizer before planting. A mistake commonly made is planting too late. Commonly planted dove field crops generally take between 50 and 90 days for seed to mature. Know the maturity period for the

crop you are planting and plant accordingly. Keep in mind that soil conditions and rainfall will play a role in when crops are planted. Don't hesitate to plant when conditions are right even if your crop will mature 2 weeks before dove season. While seed of planted grains offer attractive food sources for dove, maintaining a clean disked strip or two through the field offers dusting areas for dove. These are strips that you do not plant, rather simply keep plowed through the summer and into dove season. Dove find these bare dirt areas attractive which will keep them in and around your field until grain seed is mature. It also offers landing

areas and access to seed once it matures as well. Another trick that I have used many times with great success is to include/spread pea gravel (very small gravel) along roads that are within the dove field area. Dove "eat" the smallest particles of gravel to assist in digestion (used in their gizzard to break down seeds and other food parts). This is the reason dove are often seen "feeding" along roadsides.

Complete draining duck ponds and prepare for planting

Those managing moist soil areas/duck ponds (i.e., native vegetation vs. planting agricultural crops), should have

started the spring drawdown around 45 days after the last frost. Slow drawdowns, those that take 2-3 weeks, are desired because they result in a more diverse wetland plant community than rapid drawdowns. A diverse community of wetland plants will provide many different types of food sources (seeds and insects). By May or early June,

drawdowns should be complete allowing native moist soil plants to establish and actively grow. Herbicides can be a useful tool to remove undesirable vegetation if it becomes a problem and is dominating the pond. Button bush and sesbania (wetland shrubs) can be beneficial, but should be kept in check and not allowed to comprise more than

25% of the pond.

If you plan to plant an agricultural crop rather than manage the native vegetation, leave the pond flooded until closer to planting time. That is, drain ponds you plan to “plow and plant” a few weeks before you start plowing and preparing the soil for planting. Leaving the pond flooded until this time will



Water control structures and valves should be inspected, maintained and repaired annually.



Summer is the time to adjust, move and repair duck blinds

provide weed control and will reduce tractor time later. Drying time will vary depending on your soils. It is better to drain early than to wait and not be able to work the ground because it is too wet and chance running out of growing season. My personal favorite crop for duck ponds is rice. Rice, however, requires more time and effort to manage and takes about 120 days to produce seed (depends on variety used) so you need to plant early. For best results obtain soil samples and apply required lime and fertilizer before planting. Japanese millet is also a favorite of ducks and is easily grown by duck pond managers. In fact, Japanese millet can be top dressed or broadcasted onto mud flats of a wetland or beaver pond. Japanese millet is a strong

re-seeder, meaning that it will produce seed that will germinate the following year.

Take advantage of dry duck ponds – maintenance, repairs, and build hunting blinds

Unless you are keeping water on a duck pond to act as a weed screen until it will be drained later this summer for planting, now is a great time to make needed repairs to water control structures, catwalks, hunting blinds, and levees. While the pond is relatively dry, I often lubricate and check water control valves to ensure they work properly. This is also a good time to remove muck that builds up in front of drain pipes or along pond edges. In some cases, re-leveling with a tractor may be needed. If you use flash board riser type water control

structures, pull and clean all the boards – make repairs where needed. This is also a great time to inspect duck blinds and perform routine maintenance or repairs as needed, or build new ones. From a habitat management standpoint, this is also a good time to inspect the pond for undesirable vegetation such as sesbania, willows along the dam or levee, etc.. A chainsaw, machete, and/or herbicide applications are the tools of choice for removing these trees.

Road maintenance – “limb” roads through herbicide applications

Summer is a great time to “knock back” vegetation along interior roads of your property. There are essentially two

methods commonly used – physically removing limbs & brush mechanically or applying an herbicide to kill vegetation along roadsides. If aesthetics are important to you, using loppers, saws, and other tools to physically remove overgrown limbs and brush from roads is the way to go. However, this method is labor intensive. When manually “limbing” roadsides I often use a tractor with a bucket and a gas powered pole saw. An efficient set up requires 3-4 people. One person drives the tractor, one is in the bucket cutting limbs with the pole saw, and the others are behind dragging limbs/brush into the woods and cutting smaller brush that the tractor misses. Applying herbicide along roadsides is a great way to accomplish the same results, but as vegetation

dies it will be visible along the roads for a period of time. That is, once the vegetation (e.g. brush and limbs of larger trees) are sprayed they will die turning brown. Though it is unsightly for a couple months, the herbicide method produces better long term results. When choosing the herbicide method, it is important to make sure you use an herbicide that will kill the intended species you are trying to control and that it is not “soil active” meaning that it gets transported to the soil and will kill entire trees or shrubs (unless of course this is your goal). I often use Garlon (tricloper) or RoundUp (glyphosate) to “limb” roads. These herbicides only kill the portion of the tree or shrub you spray. That is, it does not kill the entire tree. Parts that are sprayed generally die within a

few weeks or a month after the application and limbs will drop shortly afterwards. Herbicide method generally results in a cleaner roadside because it gets sprayed on all the vegetation within the zone you are trying to control, whereas using the pruning method, only the limbs that are physically removed are taken out. Again, it is very important to read and understand the label of any herbicide before application. Limbing roads not only removes limbs and brush that scratch your truck and equipment, but it makes traveling roads safer by increasing visibility, allows more sunlight to reach the road to reduce time needed to dry, and it results in better quality wildlife habitat along roads due to the regenerating vegetation.



Depending on crops being planted, duck pond planting preparations should be begin in June & July.



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