PRACTICAL WILDLIFE MANAGEMENT INFORMATION

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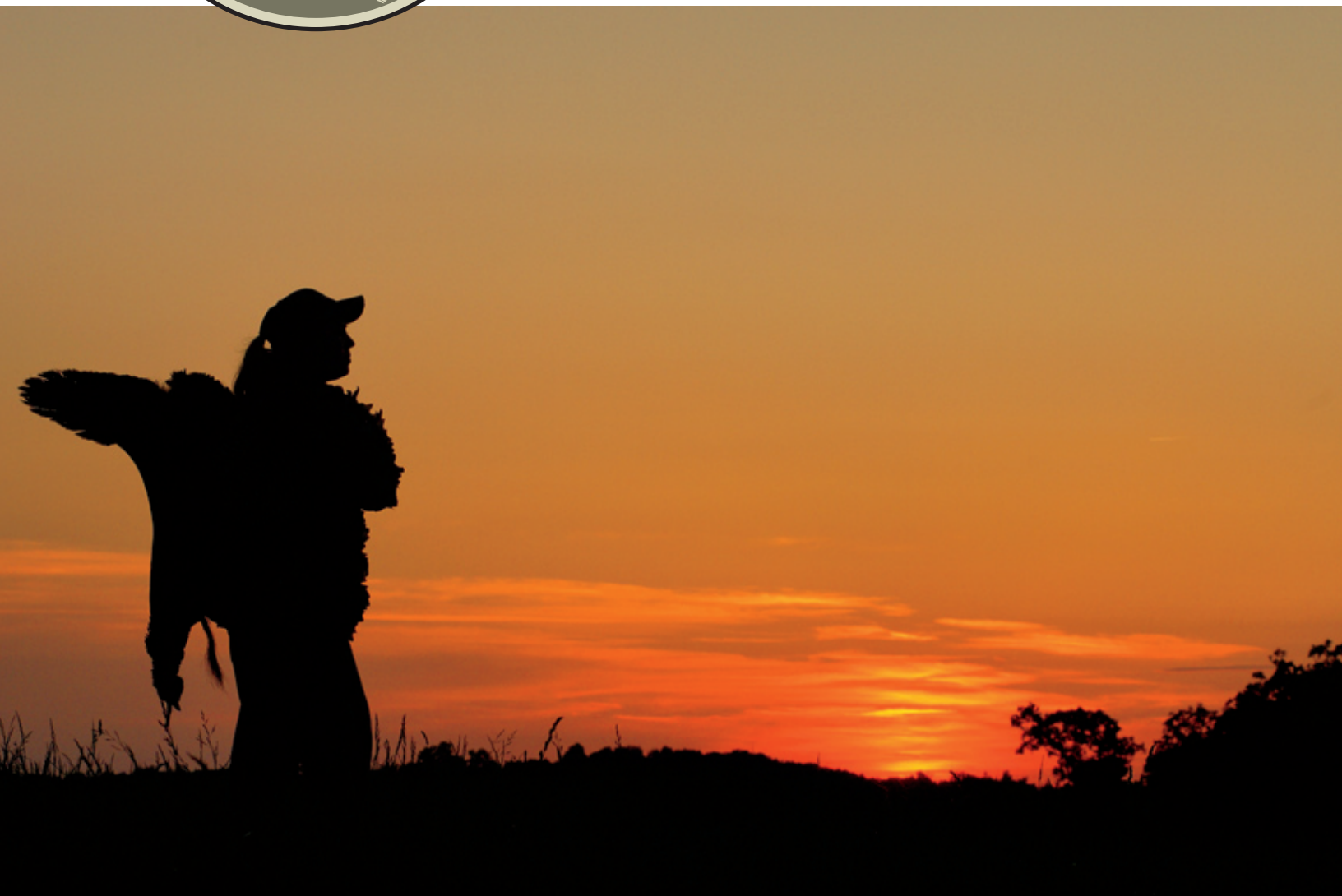

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Correction

In the November/December Management Calendar, Dave Edwards with Westervelt Wildlife Services recommended applying 100 pounds of Nitrogen to fall food plots to provide an extra boost of growth and attraction to the plants. This recommendation was worded in a way that could be misinterpreted. Applying 100 lbs of nitrogen would likely burn your food plot. Westervelt meant to recommend adding 100 lbs. of Ammonium Nitrate (34-0-0) which only contains 34 pounds of nitrogen per 100 pounds.

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So You Want To Grow Turkeys

By Dave Edwards

Dave Edwards is a consulting wildlife biologist with Westervelt Wildlife Services. Contact him at 800-281-7991.

If you have not experienced spring turkey hunting, you are missing out on some of the most exciting hunting available. Spring turkey hunting is more than just sitting next to a tree and waiting for a gobbler to pass by. It is a sunrise pursuit of an unpredictable love sick gobbler roaming the woods gobbling his head off that forces the hunter to be mobile while exercising strategy, woodsmanship, patience, and nerves of steel. It is hard to describe the thrill and adrenaline rush experienced when everything works right and a gobbler closes into range in full strut and thunders out a gobble at eye level with you! At this point, tunnel vision sets in and the hair on the back of your neck rises. One wrong blink at this range could wreck the hunt. It is this thrill that hooks more and more new turkey hunters each year. If you have other springtime hobbies, I do not recommend "trying" turkey hunting unless you are willing to give up those hobbies. It is that exciting and addictive. However,

in order to experience the excitement of spring turkey hunting you must have one thing…turkeys!

As a wildlife management consultant, I have been fortunate to have the opportunity to work with landowners and hunters across the country. Most of my clients are primarily interested in producing quality deer and management efforts are directed towards improving deer habitat and deer hunting. However, many of these same clients enjoy and want the opportunity to hunt turkeys in the spring. Fortunately, much of the same habitat management strategies employed to create good deer habitat results in good turkey habitat as well. While turkeys benefit from deer habitat management, there are a few additional habitat management strategies that will cater to the needs of turkeys and significantly boost the value of your property for turkeys and ensure you have a thriving, vigorous population on your property, and thus good turkey hunting.

Understanding the biology, life history, and seasonal habitat requirements of the wild turkey will help you become a better manager of turkeys and turkey habitat, not to mention a better hunter. There is a ton of information and literature available regarding the biology, life history, habits, and seasonal habitat requirements of turkeys. I strongly recommend seeking out this information and learning as much as you can about the bird you are managing. Without question, you will have a better understanding of their needs and will do a better job managing your property for turkeys. In the meantime, I want to provide you with a brief summary, in layman's terms, of the annual cycle of a turkey population so you will have a better idea of the needs of turkeys and start thinking about what management strategies you can implement that will help you attract and grow more turkeys on your property.

The Annual Cycle

Try to think about what turkeys are doing throughout the year. What biological activities are happening? Knowing this will help you meet their needs. Starting in the spring, turkeys are entering their breeding cycle. Hens are searching for adequate cover to nest in that will protect them and their eggs. Due to the energy and nutrient drain of the breeding season and laying eggs, hens are also spending a great deal of time seeking out and feeding on quality food sources that will build up their reserves. Gobblers are also spending a

lot of time feeding in preparation for the breeding season, but once the breeding begins they have one thing on their mind – hens. Thus, one of the key habitats to ensure you are managing for, particularly if you intend to hunt in the spring, is nesting cover with quality food sources nearby. If you have quality nesting cover and food, you will have hens. If you have hens, you will have gobblers. Consequently, for spring turkey hunters, nesting cover is without question the most critical habitat type to have. This is particularly true for small landowners who do not have much habitat diversity or the opportunity to provide every type of habitat turkeys need on their property. Many of my clients who enjoy turkey hunting have called me in the spring wondering where the turkeys have gone. They saw plenty of them in the fall while deer hunting, but can't find one to save their lives now. Nearly every time it is the result of not having adequate nesting cover – not meeting the seasonal needs of turkeys.

As the breeding season progresses, more and more hens spend most of their time sitting on their nest incubating their eggs and the breeding season trickles to a close. This begins another stage of the annual cycle. Gobblers who have run themselves down from the rigors of breeding season will be feeding heavily on quality food sources to replace lost body weight and fat reserves. Hens who successfully incubated and hatched a clutch of eggs (which only takes 28 days on average) are now mothers and will be seeking out quality cover and food sources high in protein for her brood (newly hatched or group of young turkeys). Hens will travel as far as two miles to find suitable brood rearing habitat. As a manager, this is the next critical habitat component you need to manage. During the first few weeks of life, a diet high in protein is critical for poults. This means animal matter, primarily insects, constitutes around 90% of their diet. Poults will eat anything slow enough to catch and small enough to swallow. A hen and her brood will need areas that host

a lot of bugs and insects while providing protection from predators while feeding. During the first couple weeks of life, poults can not fly, thereby making them easier targets for predators. Thus, good brood rearing habitat is critical to their survival. After about two weeks of age poults are able to fly and will begin roosting in trees. While they are still susceptible to predation at this age, survival rates increase with each day that passes. After about a month of age, the diet of young turkeys is predominantly plant material. A brood of young turkeys will stay with their mother throughout the remainder of the summer feeding and growing.

During late summer and fall, it is common to see several hens and their broods together in a single flock with mature gobblers segregated into distant groups or ranging by themselves. By winter, many of the young-of-the-year gobblers (jakes) have separated from the family flocks to form young gobbler groups. Through the fall and winter,

Old fields make excellent nesting habitat for wild turkeys. The field shown receives periodic strip disking and fire to maintain great habitat for nesting turkey hens.

hard and soft mast becomes an important food source for turkeys and they spend most of their time in mature woodlands searching for acorns, beechnuts, dogwood berries or other types of mast. They will also utilize food plots or agriculture areas. The total amount of area used by turkey flocks during the

This turkey nesting habitat was created using herbicide and fire. Thinned pine stands offer great opportunities for landowners to enhance their property for turkeys.

fall and winter varies with the available habitat and quality of food sources. As winter turns to spring, turkey flocks begin to break up just before the breeding season begins which starts the beginning of another year in a turkey population's annual cycle.

Key Habitat Types Needed By Turkeys

Now that we have an understanding of the annual cycle of a turkey population and what they need to survive and thrive, lets talk about how to create habitats that will meet their needs. The following are key habitat types that are needed to optimize the value of your property for turkeys, and management strategies to create them.

Nesting Habitat

Hen turkeys will nest in a wide variety of places that range from a blown down treetop in wide open mature hardwoods to dog-hair thick cutovers. However, quality nesting habitat provides visual protection of hens and eggs from predators in habitat having open overstories and well developed understrories. That is, these areas will have few large trees overhead (which are ideal perches for avian predators) and a thick ground cover. Good nesting habitat is generally characterized by abundant grass, herbaceous and shrub vegetation up to 3 feet in height. To reduce the distance hatchlings will have to travel to good brood rearing habitat, and thus reduce the chances of being eaten by a predator, you should create nesting cover near quality brood rearing habitat (or vice versa). Good turkey nesting habitat can be created by retaining three-to five year- old abandoned fields, utility right-of ways, or field borders, or other areas that provide well-developed herbaceous and shrub vegetation. This type of habitat is created by allowing open areas on your property to go fallow with no mowing or disking activities for a couple of years. The lay of your land and availability of open areas to convert into quality nesting habitat will dictate how large and how many areas you can create. The enemy of a nesting hen is predators. So when designing and creating nesting habitat, keep this in mind and try to create a size and shape that will make it tougher for predators to be successful. Larger areas generally provide the most protection because it allows hens to nest farther from the edges which are predator highways. Having said this, if you have a relatively small property or do not have many openings on your property, work with what you have and take advantage of any openings on your property that you can afford to let go fallow. Once these types of areas are created it will take periodic management (some type of disturbance) to maintain them or they will continue growing on their path to

Wildflower areas provide exceptional brood rearing habitat for turkeys. The flowers attract an abundance of insects that provide a much needed quality food source for poults and hens. If properly managed, wildflower areas can last for several years. Strategic mowing or disking will enhance access to the area for young turkeys.

becoming a forest. The goal here is simply to keep these areas in early successional habitat (the early stages of forest development – before saplings become "trees"). There are many ways to do this, but fire or disking generally produces the best results and encourage the desired grass component. On properties with pine plantations, good nesting habitat will occur during the first few years of regeneration after an area has been clearcut. Coincidentally, the habitats described above as being good

Roadsides offer great places to manage brood rearing habitat for turkeys on your property. This particular roadside (pictured) is being maintained in quality vegetation and wildflowers through periodic light disking.

Habitat Management Intensities for Wild Turkeys

Management Practice	Low Intensity	Medium Intensity	High Intensity
Timber Harvest/ Regeneration Types	Larger clearcut (> 100 acres) / row plant	Moderate clearcut (50-100 acre cut) / Shelter wood or seed treed regeneration	Small clearcuts (< 50 acres) / Shelterwood or Seed Tree regeneration
Basal Area	>120	50-90	40-85
Timber Harvest Rotation	15-25 years	20-45 years	35-70 years
Timber Thinnings	Once or none	Every 5-10 years	Every 4-5 years
Site Preparation for replanting	Shear/pile & disk, broadcast broad spectrum herbicide	Chop/burn, selective herbicide, banded or spot treatment herbicide	Fire, banded selective herbicide
Windrows	Burn	Leave some windrows	Leave unburned
Seedling spacing	6x6, 6x8	8x8, 8x10	10x10, 12x12
Hardwoods	Retain in drains	Retain in drains and mast producing clumps	Retain all mast producers
Fire in upland Hardwoods and Pine areas	None or one every 3 years, clean burns	Every 2-3 years, moderately clean burns (some unburned areas within burn unit)	Every 2-3 years in winter, summer burns every 5-10 years leaving nesting habitat within area
Food plots/ type of crops	1-3% of land / fall only	3-5% of land / mostly fall but some summer	>5% of land / half fall & half summer crops
Amount of Openings (pastures, fields, cropland, roadsides, right-of-ways, etc)	1-3% of land	3-10% of land	>10% of land
Strip disking	None or very little in fields	Some during fall in fields, roadsides, or other openings	Rotational spring and summer disking throughout property in openings, along roadsides, within thinned pine plantations

turkey nesting habitat are also good fawning cover for deer.

Brood Rearing Habitat

Because poults are so susceptible to predation during their first 2 weeks of life when they can not fly, creating quality brood rearing habitat is critical for their survival. Quality brood rearing habitat should provide poults with enough visual protection for hiding while feeding on insects, but low enough to allow the hen unobstructed vision for detecting predators. Because poults have short legs, good brood rearing habitat is also open enough at ground level to allow movement by poults to feed and escape predators. Several types of openings provide good protective cover and food (insects) for broods. Some of these habitats include improved pastures, hayfields, old grass-dominant fields, grain fields, hardwood cutovers, food plots, and utility right-of-ways. Similar to nesting habitat, brood rearing habitat takes time to create because you need at least one growing season to allow vegetation to reach desired heights; at least in natural habitats. Agriculture type habitats such as food plots or agriculture crops can provide excellent brood rearing habitat in a relatively short period of time if crops are left standing and undisturbed. Once established, brood rearing habitat is managed and maintained by fall disturbances such as disking or burning. If left unmowed through the summer, these disturbances often produce desirable grasses and forbes that harbor many insects. If fields are not an option, roadsides and right-of-ways are some of my favorite areas to create and manage brood rearing habitat. Simply widening the shoulder of your roads will provide you areas to manage for quality brood rearing habitat. Creating an ample amount of roadside areas will allow you to rotate management and provide brood habitat throughout your property. That is, while you are creating (disking or fire) new brood rearing habitat along a portion of a road, you are also leaving existing brood habitat along another portion. Besides applying normal management techniques (disking and fire) to create desirable insect-rich vegetation, planting and managing some roadsides for wildflowers can provide exceptional brood rearing habitat. Wildflower areas provide good cover that is generally knee-high and are usually loaded with insects. Managing wildflowers along roadsides will also add aesthetics to your property.

Fall and Winter Habitat

During fall and winter, turkeys are generally in loose flocks and spend much of their time feeding on acorns or other available mast in mature woods. Mature pines can provide excellent fall and winter habitat for turkeys, particularly if wildlife management strategies are applied to promote good food sources. However, mature hardwoods are often preferred winter habitat of tur-

Mature hardwood areas are an important habitat type for turkeys in the fall and winter. They provide quality food sources such as acorns as well as a wide variety of soft mast.

Seasonally Important Foods of Wild Turkeys in the Southeast

Spring	Summer	Fall	Winter
Clovers **Chufa** – and other food plot plants **Acorns** **Grass seed** **Insects** **Green vegetation** (such as new shoots) **Soft mast** (blueberry, blackberry, etc)	**Agriculture crops** **Grass seed** **Green vegetation** **Soft mast** (huckleberry, gallberry fruit, poison oak, blackberry, wax myrtle, wild grape, black cherry, etc) **Chufa** **Clovers** **Summer food plot crops** (Millets, grains, clovers, etc) **Insects**	**Acorns** **Insects** **Green vegetation** **Grass seed** **Pine seeds** **Agriculture crops** **Food plot crops** **Soft mast** (plum, persimmon, dogwood, blueberry, wax myrtle, black tupelo, palmetto berries, etc)	**Acorns** **Insects** **Green vegetation** **Pine seeds** **Beechnut** **Agriculture crops** (remnant corn, soybeans, wheat, etc) **Food plot crops** (clovers, oats, winter wheat, etc) **Soft mast** (gallberry, dogwood, etc)

keys. If you think about some of the best turkey hunting properties you have been, I would be willing to bet that there were mature hardwoods either on the property or close by. Swamps, river bottoms, creek bottoms, and drains often contain a high amount of mast producers such as oaks, beech and other mast-producing species. These areas also often contain less desirable trees such as popular, elm, gum, cypress. Removing these undesirable trees will allow more sunlight and nutrients for desirable trees and will result in more and better quality mast for turkeys. This management strategy is commonly referred to as TSI or timber stand improvement. Upland hardwoods can be managed with fire to promote quality fall and winter habitat. When managing mature hardwood stands, tree crowns should not be so dense that they completely shade out the understory. Overstory trees should develop a full crown, but some spacing between trees assure that sufficient sunlight reaches the forest floor, allowing some understory to develop. At the turkey's eye level, the forest floor should be fairly but not completely open. This type of understory provides visual protection for turkeys for predators, while favoring their keen eyesight for detecting predators. Ideally, hardwood stands containing a diversity of mast-producing trees, interspersed with pines and field edges would be considered excellent fall and winter habitat for turkeys.

Roosting Sites

While I did not mention roosting habitat when describing the annual cycle of turkeys, it is a critical habitat and necessary throughout the year. I know it is quite obvious that turkeys roost in trees, but it is a component of good turkey habitat that can be overlooked by managers, particularly on industrial timberland. Turkeys are not very picky when it comes to the type of tree they roost in, but prefer to roost in trees 30 – 100 feet in height. There is also a preference for roosts that are near or over water which may be a predator avoidance instinct. Retaining mature hardwoods and pines throughout your property will provide turkeys with potential roost sites.

Annual clovers generally flower and go to seed in the spring and early summer. Coincidentally, this is when young turkey poults need a diet high in protein, which means insects. Flowers of the clover attract many insects and are choice areas for turkeys to feed. These clovers are easily incorporated into a food plot management program and will benefit deer, turkey, and many other wildlife.

Open Habitats

Turkeys utilize openings throughout the year to feed on green vegetation, seeds, and insects. Openings may include pastures, fields, cropland, orchards, logging decks, roadsides, powerlines, gaslines, newly regenerated areas, and other areas that provide a break from continuous woodland. As a manager, you will need to determine what openings you have available and decide how much and which ones you will manage for nesting cover, brood rearing cover, and/or planted food sources (food plots). Turkeys will use open areas of almost any size, but prefer openings of 5-20 acres. This is likely due to these areas hosting more seed, insect, and other food. And turkey flocks are not able to exhaust the food supply as quickly. Ideally at least 10 percent of your property should be maintained as some type of open land. A tract of land may contain as much as 40-50% open land such as cropland and still be good turkey habitat if other required habitats are available. The primary use of the openings (agriculture, logging deck, etc), will dictate which management strategies will be needed to manage the area for turkeys and preserve "open" land. If the area is not being disked for food plots or farming, fire and light disking are excellent tools to retain desirable open lands for turkeys.

Wildlife Food Plots

Food plots can enhance turkey habitat throughout the year across your property if properly managed to cater the needs of turkeys. Turkeys will feed on most fall food plot species planted for deer. However, managers who think ahead will incorporate clover species into their fall food plot regimes. Many clovers produce their flowers in spring and summer. Coincidentally, this is also the time of year that young turkeys

Chufa is an excellent food plot crop to plant for turkeys. Once mature, turkeys will use chufa plots from spring through early winter in some cases. If properly managed, chufa plots can be maintained for 2-3 years without replanting.

are born and need diets high in protein. The flowers of clover are very attractive and will host a plethora of insects. As the flowers fade, clover will produce seed that can be a great food source for turkeys. Annual clovers such as crimson and arrowleaf are among my favorite clovers to include for turkeys because they produce so many flowers and seeds. However, perennial clovers are a good choice as well because if properly managed they will produce green forage for turkeys well into late summer – and often year around.

Summer plantings also benefit turkeys. Chufa generally comes to mind for anyone who thinks about turkeys and food plots in the same thought. This is an excellent crop to plant for turkeys and can be regenerated for a few years from a single planting if properly managed. Other summer plantings that will enhance your property for turkeys are grains and grasses that not only produce seed to eat, but if left unmowed through the winter will provide excellent nesting and brood rearing habitat in the spring and following summer. These planting include species such as millets, grain sorghum or milo, Egyptian wheat or other similar plantings. These crops are easily incorporated into a deer food plot management program by planting the borders of food plots or fields in these plants. This is often called "field borders". Obviously, the width of your field borders will be dictated by the size of your fields and what you have to work with. Wider is better. Other areas that lend themselves to these type of plantings are roadsides, powerlines, or other similar habitats.

Conclusion

Making your property more attractive and valuable to turkeys is not difficult. You simply need to understand what turkeys need and what their seasonal habitat requirements are. Of all their habitat needs, nesting and brood rearing habitat are among the most important habitat types. These are also the habitats that require thought and effort on the part of the manager. Turkey management is easily incorporated into deer management programs and only requires slight additions or changes to existing strategies to add significant benefits for turkeys. As you experiment with management techniques such as disking, burning, creating roadsides, etc and observe how the habitat and turkeys respond, you will be able to fine tune how and when you apply these techniques to obtain optimal results. Managing turkeys can be quite rewarding, particularly if you are starting with a property that has few turkeys and requires a lot of work. Turkey populations can and will respond rapidly to good habitat management. Lastly, I do not recommend "trying" turkey hunting unless you are willing to give up other spring hobbies you enjoy…it is very addictive!

Scouting Cameras: Product comparisons and basic functions

By Anna Huckabee Smith

Anna Huckabee Smith is a TWS certified Associate Wildlife Biologist with Innovative Wildlife Management Services, LLC out of Mt. Pleasant, SC (IWMS_Smith@comcast.net). She has worked for both South Carolina and North Carolina state governments, first as the SC Department of Natural Resources' Forest Stewardship Biologist and the Comprehensive Plan Coordinator. She then moved on to become the NC Wildlife Resources Commission's first Urban Wildlife Biologist. Smith has a BS degree in Biological Sciences, a Minor in Anthropology, and a Masters in Zoology, all from Clemson University. She is also a 2007 Fellow of the Natural Resources Leadership Institute (North Carolina State University, Raleigh).

Left: There are many types of scouting cameras from which to choose. Credit: Anna H. Smith, 2008

Despite the game-monitoring industry's humble beginnings in the 1980's starting with a simple trip-string counter, Reidt's TrailTimer, the technology has progressed to the point that high-quality photographs of any animal can be taken. With over 20 different manufacturers of trail/scouting cameras, each boasting about their products' special features, how do you decide which to purchase? Some cameras are better than others for research and survey work or property protection. Simple scouting doesn't require a fancy camera, but there are some important features to look for when deciding on a brand. Then there is the fact that some are more user-friendly than others in the design of their keypads, tree attachments, and understandability of the printed directions. Basically, the best way to understand what you need is to first grasp how these cameras function and how models differ from each other.

Most of today's scouting cameras consist of a digital camera system enclosed in a

special housing. CamTrakker® still makes models that house digital or 35mm cameras that can be removed for everyday use, but the majority of units are an all-in-one system. Digital models are quieter than 35mm and reduce the risk of spooking game. Digital cameras are also quicker to access and therefore reduce the time spent around the site where you don't want much scent to be left. Many brands offer a camouflaged cover for decreased discovery by game or trespassers. Most cameras are infrared in nature, meaning that they have the ability to detect the heat given off by an animal. This passive infrared sensor, or PIR, can determine if black body radiation (invisible energy emitted by an object) is passing in front of a cooler surface. "Passive" refers to the fact that the sensor only passively picks up the radiation and does not emit any itself. The heat signature of an animal can often be picked up as far away as 60 feet but the average is 30 to 45 feet. Once the heat-in-motion sensor has picked up the presence of an animal passing in front of the lens, the camera is triggered to take a photograph.

This is where cameras diverge in their modes of picture taking. Another sensor, the day / night sensor as it is sometimes called, determines the amount of light available and therefore what type of photo to take. True infrared (IR) cameras, as advertised as such, use red glowing LED lights that create an illumination ("flash") that is invisible to the animal. The pictures are usually color by day and black-and-white / monochrome by night or in low light conditions. (Sometimes you will see it advertised as "night vision.") Other cameras use the typical incandescent (white light / strobe) flash and produce color photos day and night. The pictures and event data are stored on a memory card that can be plugged into a port on your computer or printer or taken to a photo-processing store for retrieval, editing, and printing. Memory cards used can differ by brand of camera (e.g. Secure Digital or Compact Flash) and storage capacity (the usual is 1.0 or 2.0 GigaBytes for scouting cameras). Be sure to use the type designated by the camera manufacturer for optimal performance.

Flash range is important as well because subjects in the background may be missed if the camera is positioned incorrectly or the flash is too weak. First, make sure that the camera is set

Large bucks captured with a Leaf River® camera.
Credit: Westervelt Wildlife Services

A daytime photo of a 13 member flock taken with a Cuddeback™ ExPert camera. Credit: Anna H. Smith, 2007

An infrared night photo of a bear taken with a Moultrie I-60 camera. Note the data label at the bottom of the picture.
Credit: Moultrie, 2007

Basic components of a digital scouting camera (Moultrie® Game Spy™ I-40 and inset of an M-40). Credit: Moultrie® website (www.moultriefeeders.com) with labels by Anna H. Smith

to take a reasonable photograph of, for example, anything accessing a bait pile, not a large open field. Next, look at the range of the camera you are investigating. High quality cameras advertise flash ranges from 45 to 60 feet. Some manufacturers have considered the possibility that flashes of any kind may spook game so even the red glow of the infrared LED lights may be filtered to remove this light. Reconyx™ RapidFire™ Covert Color IR cameras are an example of this technology. My personal experience is that although predatory species like coyotes and bobcats do shy away from flashes (and cameras in general), deer coming to bait do not seem to care. I have many pictures of deer idly feeding while the camera took multiple shots. Besides, white flash photos freeze motion and enable the landowner to clearly identify individual deer for population surveys. However, for property protection purposes, a no-flash camera is best so that the position of the camera is not given away.

With infrared cameras, there is a trade-off between photo quality and range. Night shots are often less detailed to begin with, but if the range is set on maximum, animals close to the camera may appear white or washed out. There is also the problem of motion blur which would make counting tines on a buck impossible. Sometimes, when infrared cameras are transitioning from daytime to lower light conditions, the shutter speed is slower and blurry pictures can occur, especially if the animal moves quickly. If the range is sacrificed, then a better image results although some animals in the background may not be seen. Another way of increasing the range of the flash is right on your computer within most standard Photoshop® programs. Under the image adjustment menu are options to effectively "add more flash" or increase the brightness of the photo, thereby bringing the background into view.

Some cameras offer additional features such as video clips that range in length of footage from a few seconds to a few minutes. These videos are also affected by lighting and tend to record in color by day and are unavailable at night, although some of the newest models are beginning to offer a black and white video capacity under low light / night conditions. A few models allow the user to set a timer to record a video snapshot at the same time every day or once every hour, essentially giving the viewer a time-lapse account of, for example, the leaves changing color in the fall or a bird's nest over time. The illumination range for videos is often less than that of still photos sometimes by 20 feet.

Picture resolution differs from camera to camera and from night and day shots. The higher the resolution in megapixels (a pixel = a picture element), the more refined the image and therefore the higher the quality. If you are planning on enlarging your scouting camera photos and hanging them on the wall, then you will need a high resolution like 6.0 megapixels. Remember, though, that even if the advertised megapixel count is high, that typically decreases with night shots. For example, the Cuddeback™ NoFlash has a 3.0 megapixel daytime resolution but a 1.3 megapixel resolution at night. However, for deer camera surveys and typical scouting needs, a lower resolution like 2.0 or 3.0 megapixels will do just fine. Many cameras offer adjustable resolution and sensitivity settings. The lenses of scouting cameras are generally not auto-focus which would be too noisy and cause a delay in picture taking. Therefore, a fixed-focus lens is used which doesn't require high performance media. Besides, higher resolution pictures require more storage space on the memory card.

An important feature to consider when shopping for a scouting camera is trigger speed or the time it takes from the detection of an animal to when the camera takes the picture. This takes place in a fraction of a second. If the camera is too slow, then you may only get rump shots of deer or the landscape since the subject has already passed by. To test the trigger speed of a camera

you may already own, set it up and let the camera stabilize. About 10 feet from the front of the camera, start walking across the field of view at the pace of a deer, about 2 steps per second. Afterwards, review the picture to see where your image occurs relative to the edge of the photo to determine how fast the camera is photographing the subject. To accurately conduct a deer camera survey, a fast trigger speed will be necessary to insure that individual bucks can be identified and none are missed in the frame. Wide-view cameras can also increase the likelihood of capturing fast-moving animals.

Before buying a camera, go to the manufacturers' websites and compare photos taken with different cameras realizing, of course, they will only showcase optimal pictures. Word-of-mouth is also a good source of information on camera functionality. There is also something to be said about good tech support and warranties. Perhaps the biggest complaint noted on product rating websites is scouting camera battery life. This is highly variable from product to product and how often the camera is triggered. When the camera's sensitivity is set too high, more pictures equal more drain on the batteries. Cold temperatures also decrease battery life. In addition, infrared flashes use less power than incandescent flashes. Most game cameras use 4 to 6 D-cell alkaline batteries but some use C-cell, nickel-metal hydride (NiMH), or lithium. Other cameras may even utilize rechargeable AA batteries. Unless you are expecting to leave your camera(s) out year-round, a 10-day deer camera survey in the fall or winter should not require a change of batteries. Most camera manufacturers advertise 21 days, 60 days, or 150 days of battery life for cameras that provide various functions. One month with regular usage is about the average life-span.

Another complaint about trail cameras involves fogging of the glass over the lens. Although no manufacturer would formally recommend this, some suggest using an anti-fogging compound on the glass covering the lens (NOT directly on the lens). Also, positioning the camera so that there is good air circulation helps reduce condensation. Built-in image viewing displays also can cause aggravation as they can be hard to see in bright light. Most are nonfunctional in extremely cold climates (below 0°F). Instead, some hunters in cold regions use hand-held viewers that plug into the camera unit once on site.

Price is always a big factor when determining which camera to buy. Prices vary from $100 to $1000. Some manufacturers have not changed their

BRAND	PRODUCT	FILMING	FLASH	MAX RANGE	RESOLUTION (in megapixels)	BATTERY TYPE	PRICE	SPECIAL FEATURES
Reconyx, Inc.	RapidFire™ Professional PC85	photos & video	Infrared; 1/5 sec trigger speed	60 feet	3.1	Options: 6 C-cell alkaline, NiMH, or 3V lithium batteries	$ 700	Programmable sensitivity; time lapse option; password protection
Moultrie	Game Spy™ I-60	photos & video	Infrared	45 feet	6.0	6 D-cell batteries	$ 300	Laser aim; upgradable software; built-in viewer; beacon locator with remote
Nontypical, Inc.	Cuddeback™ ExPert	photos & video	Incandescent; 7/10 sec trigger speed	60 feet	3.0	4 D-cell batteries	$ 350	Programmable sensitivity; time lapse option; password protection
Bushnell Outdoor Products	Trail Scout Pro™	photos & video	Infrared	45 feet	Adjustable: 3.0, 5.0, 7.0	4 D-cell batteries	$ 370	Password protection; video with sound; game caller; laser aim
Leaf River Outdoor Products	DC-6SS	photos & video	Incandescent	45 - 60 feet	6.3	4 D-cell & 3 C-cell batteries	$ 280	White light for aiming; large viewing screen

basic design in 5 years since they feel they have perfected their product while others continue to tinker, improve, and add more features each year. Some of those special extras available for certain cameras include additional viewing software, tripods, battery life extenders such as solar panels and auxiliary battery kits, security locks, special tree mounts, TV jacks / cables for viewing on TV, laser aiming devices, and even wireless capabilities. The Smart Scouter™ can transmit photos to your cell phone or computer anywhere in the world as long as the user has the appropriate Alltel or Sprint wireless plan. Bushnell's Trail Scout™ camera incorporates a game caller that can be programmed to broadcast 8 different calls to attract animals within view.

Personally, I have found that simpler is better, as long as quality is not sacrificed, and accomplishes all I need for my research, survey, and scouting needs. I personally own two Cuddeback™ cameras and have been impressed with Moultrie's customer service. Once the mystery is taken out of scouting camera anatomy and function, shopping for the right one that fits your needs becomes easier. Then you can relax and check out all those extra features that distinguish one brand from another. *NOTE: A product comparison table has been provided with this article that showcases some of the more popular cameras on the market. It is for example purposes only. These cameras should not be compared to each other as if each were the top-of-the-line model for their respective manufacturer. Many other models exist for these and other companies not listed and a thorough investigation is warranted before making a final decision on what camera best fits your needs.*

The new Bushnell® Trail Scout Pro™ with game caller. Credit: Bushnell® website (www.bushnell.com)

Resources:

Samuel, D. *Just Say Cheese! Whitetail Journal, April 2008 issue. Pp. 22-30.*

Sutton, K. *Game Camera Buyers Guide. Bass Pro Shops Outdoor Library (http://content.basspro.com).*

Websites and/or tech support hotline for Bushnell, Leaf River, Moultrie, Nontypical Inc., and Reconyx, Inc.

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SEHunting.com

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ENCHuntingLands.com

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Greatoutdoors.Forestargroup.com

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Trophy Bass Management: Part 1

By Jeff Slipke

Jeff Slipke is chief biologist and manager of Southeastern Pond Management's Jackson, TN, office. Jeff received a B.S. degree from Iowa State University, M.S. from South Dakota State and a Ph.D. from Auburn University where he conducted research on reservoir fisheries and population dynamics for eight years before joining SPM.

Trophy bass are impressive, but rare creatures.

There probably is no other topic in the freshwater fishing industry that conjures up more excitement and fascination than catching giant bass. Let's face it; truly giant bass are rare creatures. Most people have never seen a bass over 10 pounds in real life. I electrofish ponds on almost a daily basis, and I don't see that many fish over 10. And when I do, I get as excited as the client I have on the boat with me. Heck, maybe even more excited.

Catching a trophy bass takes on an almost mythical aura for some folks; akin to harvesting a record-class whitetail or bull elk. For many, it is truly the fish of a lifetime. But, like everything else in this world, there are exceptions to the rule. For a select few pond owners, catching a trophy bass is a relatively common occurrence. How can that be? What are they doing that others are not?

Before going any further, it is appropriate to define what a trophy bass is. George

Perry's infamous world record would certainly be considered a trophy bass. After all, at 22lbs 4oz it is the bass by which all others are measured. In recent years, a number of huge bass caught in Texas and California have come close, but no one has yet certified a bass that has broken Perry's record set in 1932.

The definition of a trophy depends to some extent upon the individual and the situation. What about the 3lb "whale" your son or daughter caught with a Snoopy rod while fishing for bream? That's certainly a trophy for a young angler. What about location; do we define a trophy differently depending upon where you live? After all, each state designates a "record" bass and these vary considerably by geographic region. What about the designation fisheries scientists use to categorize a bass of trophy length (i.e., 25 inches long)? A 25 inch bass with a relative weight of 110 (see *Wildlife Trends* Volume 7, Issue 3) weighs right at 10 pounds. This is probably as good a definition as any, but it is still half the size of George Perry's world record! For the sake of this discussion, I will use 10 pounds as my definition of a trophy bass. By the way, I have personally angled a number of bass in the 8 and 9 pound class, but I still have yet to catch a legitimate 10. For those of you who have, you know you have reached an angling milestone.

The goal of most pond owners is a well-balanced fishery that offers a high catch rate of quality-sized bass and bream, with the potential to grow and catch an occasional trophy. In fact, most of the ponds we manage fall under the umbrella of "balanced" fisheries. Managed properly, balanced ponds will support bass populations typified by a relatively high abundance of 2 to 4 lb fish, but also yield an occasionally trophy bass. That said, achieving the goal of balance is a significant task in and of itself. It requires, among other things, manipulating pond fertility, selective harvest and periodic monitoring.

However, there is a contingency of pond owners whose primary objective is the production of trophy largemouth bass. These guys want to grow really giant bass and lots of them. They don't want to settle for an occasional giant, they want giant bass to be the norm. This is where pond management diverges a bit from the more traditional methods used to manage a balanced fishery. Trophy bass management is more intensive, both in terms of factors to consider and cost per acre. But for many, the rewards are well worth the added effort and expense. Like everything else in life; the more you put into it, the more you get out of it.

Ponds managed for trophy bass will not provide angler catch rates as high as those typical of a pond managed for balance. Because each and every pond can support a finite biomass of bass – a level that is largely determined by the fertility of the water – trophy bass ponds, by necessity, will support a

Trophy bass management is a bit more intensive than managing for a balanced fishery, but the results can be well worth the added effort and expense.

lower density of bass. However, the average bass will be much larger that those found in a balanced fishery. There is definitely an inverse relationship between the density of bass in a pond and the average size of the bass.

There are a number of factors that must be considered to successfully manage a pond for trophy bass production:

- Age, Growth and Mortality
- Nutrition
- Genetics
- Latitude
- Pond Size
- Water Chemistry/Fertility
- Harvest
- Sex Ratios
- Habitat
- Luck?

The remainder of this series will examine each of these factors in more detail. Hopefully, this information will help you determine if trophy bass management is right for you. I'll begin with a discussion of how the interaction of age, growth and mortality factors into the trophy bass formula. Discussion of the other factors I have listed will be addressed in future issues of *Wildlife Trends*.

Age, Growth and Mortality

Fish population dynamics are governed by three dynamic rate functions: growth, recruitment and mortality. The interaction among these three factors determines how a population of fish is structured. With regard to trophy bass management, I want to concentrate on growth and mortality over the typical lifespan of a bass. I will do this by referencing Figure 1 below.

There are certainly exceptions, but in general, the maximum age of a bass in southern ponds is about 12 years old. Additionally, the natural mortality rate for a given bass population in the southeast is about 25% per year. As a side note, most pond owners don't realize that about one-fourth of the bass in their pond die from natural causes each year.

The result of a 25% natural mortality rate is identified by the blue line and the left y-axis (Figure 1). To simplify the discussion, I arbitrarily started with 100 bass at time zero. Therefore, you can think of this in absolute numbers, number per acre, or the percentage of a particular cohort (age-group). As you can see, by year 6 about 20% of a given cohort of bass are left in the population; by year age-9, about 10%; by age-12 very few. Stated another way, of all the bass produced in a given year, roughly 3% will still be living 12 years later. This certainly makes intuitive sense. After all, it should be obvious that bigger, older bass are much rarer in a pond than smaller, younger bass. So as bass in your pond grow and become older, a portion of them die each year; leaving fewer fish that will even have a chance to make it to trophy size.

Now look at the red curve and the right hand y-axis. This is a growth curve computed from a large sample of bass collected from Lake Eufaula, a well-known trophy bass fishery on the border of Alabama and Georgia. As you can see, it takes the average bass in Lake Eufaula nearly its entire life to reach the length at which it might

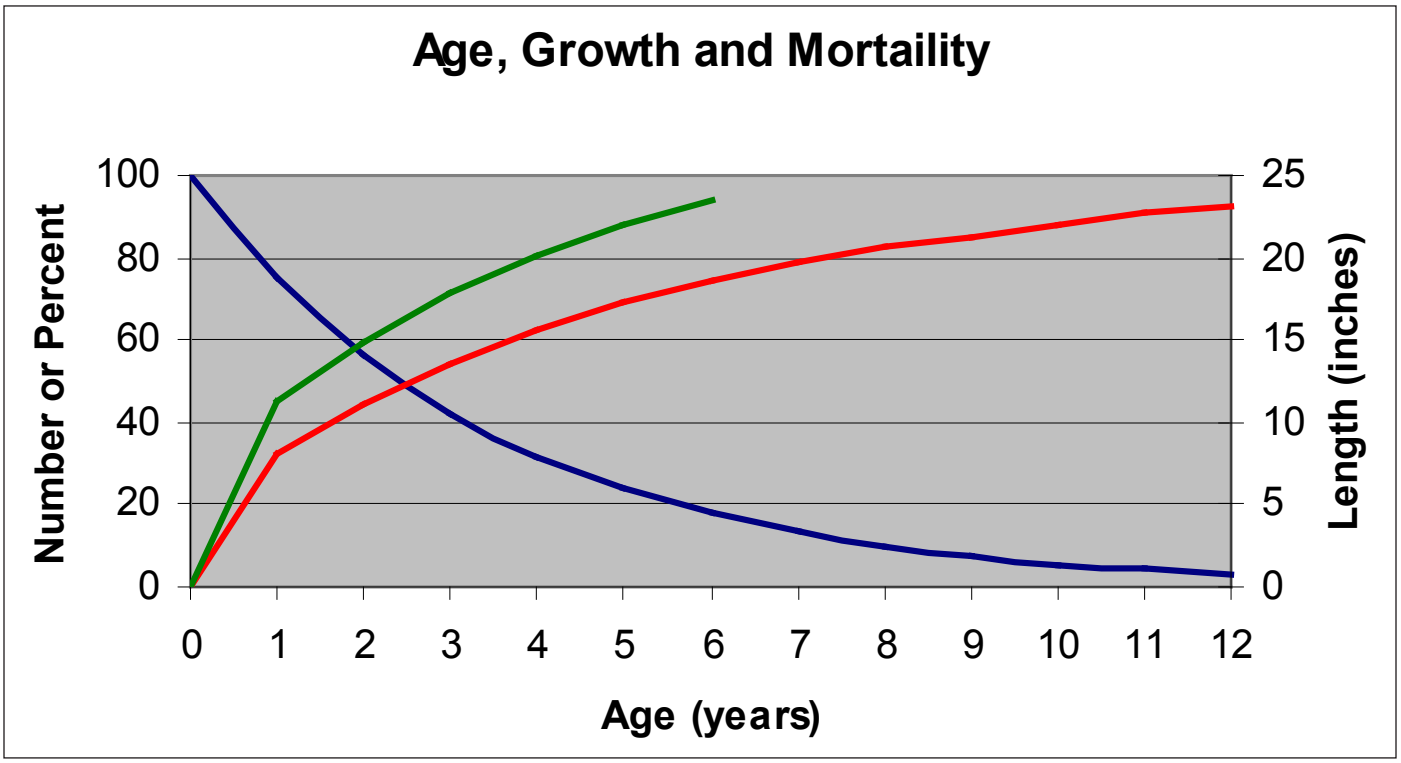

Figure 1. The interaction of bass growth and mortality illustrates the importance of maximizing bass growth early in life. The slower a bass grows, the more likely it is to perish before ever reaching trophy size.

weigh 10 pounds. By the time a bass has reached this size, she has very few sisters her age left in the population. By the way, really big bass are nearly always females…more on that in a future issue.

Now look at the green curve, this is from a 40-acre pond in Alabama, at almost the same latitude. However, this pond is aggressively managed for trophy bass. It was stocked with bass fingerlings in 2001 so that's the reason for the short curve terminating at age-6. Notice how the bass have grown in 6 years to a length it takes 12 years in Eufaula. Notice too, how many more fish remain in a particular cohort simply because the fish aren't as old and have not been subjected to the forces of natural mortality for so long. The result is not only more trophy bass per acre, but also more trophy bass that still have years left to grow even bigger. So the bottom line is; the faster you can get bass growing early in life, the better your chances of producing a trophy fishery.

There is nothing quite like the thrill of setting the hook into, and landing, a really big bass!

Three-year-old bass.

From this example, it should be obvious that growth rate is the primary factor to consider in the production of trophy bass. The faster a bass grows, the better chance it has of reaching trophy size before the grim reaper comes calling. Also, the better chance it will attain truly gigantic proportions like 12lbs, 15lbs or even larger! A 12 year old bass that weighs 10lbs is not likely to get much bigger, whereas a 10 pounder that is only six years old just might make it to 15lbs plus under optimal growing conditions.

It all sounds pretty simple so far. Increase the growth rate of bass and get ready to start adding pages to the record book. So what is the best way to maximize bass growth and ultimately start producing legitimate trophies? Again, there are a number of factors to consider. Of those factors previously mentioned, nutrition is undoubtedly the most important. That, along with genetics will be the topic of discussion in the next issue. However, all of these variables factor into the trophy bass equation in some way and we will address these in subsequent issues of *Wildlife Trends*.

As we progress through this series, please keep in mind that there is no cookie-cutter formula for maximizing the production of trophy bass. Although the primary factors that dictate bass growth rate come into play in every pond to one degree or another, every pond is uniquely different in some way. A factor that limits the growth of bass in one pond may not be limiting in another pond. Therefore, it is always advisable to seek the advice of a professional fisheries biologist. They can help you stay on course with your trophy bass management program, and help you allocate your resources most efficiently.

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SUPERWEEDS: It's Them or Your Wildlife Habitat

By G. Ryan Shurette

G. Ryan Shurette is an Ecologist/ Botanist with the USDA Forest Service.

Cogongrass forms a thick mat of thatch that can displace all native vegetation. It has fluffy white seed-heads in spring.

Over the past few years you have probably heard quite a bit of talk about non-native invasive plant species (NNIPS). These exotic plants cost the United States *billions* of dollars annually! So what does this mean to your wildlife management? The fact is there are some exotic species that have the ability to turn your whole property into a monoculture of themselves, and then there are those that have been there longer than you have and have never seemed to be a problem. There are wildlife species that can tolerate certain changes brought on by some invasives, and some that can't. And then there are endless other factors like soils, land use practices, and light availability that could drastically affect how NNIPS will affect your land and your management. This article will address some of the important issues dealing with NNIPS and wildlife habitat management.

It helps sometimes to remember the following concept…unless you're managing

for exotic wildlife, using exotic species to build the bulk of your habitat probably is not the best answer. The wildlife species we have here in the Southeast are used to feeding, hiding, and living in the native trees, shrubs, and herbaceous vegetation found here. Many wildlife species (from butterflies to bobwhites to whitetail bucks) actively seek specific kinds of native trees or plants, to which they have adapted, throughout the year for different reasons. If these native habitat components have been displaced by NNIPS, then the wildlife often moves on as well. Some animals you manage for may be tougher than others when it comes to trading beggarweed for kudzu, but you must know that some critters just won't stand for it.

What makes a plant dangerous to your wildlife habitat?

First of all, let us examine the ecology and nature of invasive plants. Not all invasives, of course, are non-native. Take our common saw-tooth blackberry (*Rubus argutus*) for example, a native shrub in the South. After you harvest a stand of timber, this species can respond vigorously via seed and sprouting as a result of the removal of the canopy and the increased light. This is the blackberry's strategy for getting ahead of the game. But this response is considered a part of the natural system of the South and because saw-tooth blackberry is native and most other natives have co-adapted with it, they can deal with it through natural cycles, succession, and disturbance. At some point the blackberry is limited and does not completely dominate the stand. In turn, not all non-natives are invasive. It's hard work to grow a good stand of silver queen roasting ears, and cultivated varieties of corn don't usually make a crop from year to year unless you invest some effort. But the true NNIPS, the real bad guys, are smart and usually tough to get rid of. Species like cogongrass have an arsenal of strategies for choking out your wildlife habitat.

Cogongrass (*Imperata cylindrica*), originally from Southeast Asia, is a super-weed quickly spreading northward from the southeastern coastal plain, and is definitely one NNIPS all wildlife managers should invest the time to learn about and defend against. One of its threats, a strategy common to many "stand-replacing" NNIPS, is the aggressive growth attack. It grows and spreads very quickly because it outcompetes virtually all of the native species we have. It physically bullies its way through stands of bluestem, wiregrass, or whatever else gets in its way. It builds an amazing mass of starchy rhizomes that it uses for the following year's energy source. These rhizomes have sharp and hardened tips and can penetrate pine roots. On top of the ground it generates a dense (and also very flammable) mat of thatch that can

While bicolor lespedeza produces abundant seed that are eaten by quail, it can often spread through open timber stands and displace quality foraging, nesting, and brood-rearing habitats.

Kudzu quickly spreads through open fields or timber stands, erasing native wildlife habitats.

NNIPS	Habitat Negatively Affected	Recommended Herbicide Treatment*
Cogongrass	Open and semi-shaded upland stands and edges, open and moderately shaded drains, edges, food plots; Quail/Turkey brood and nest, WTD mast, cover and forage, Other species	Foliar application of 1% Arsenal AC and 4% glyphosate solution with surfactant in growing season
Kudzu	Open sunny stands, drains, thinned stands; Quail/ Turkey brood and nest, WTD mast, Other species	Foliar application of one of the following solutions with surfactant: 3% Tordon K, Escort XP (4 oz. per acre), 1.5% Milestone or .5% Transline prior to flower
Privets	Open or closed stands, bottoms, drains, edges, food plots; Multiple species forage, brood, nest, Other species	Foliar application of 1% Arsenal AC or 3% glyphosate solution with surfactant, Basal application of 20% Garlon 4 in oil, or Cut-stump application of 20% Garlon 3A or glyphosate
Japanese stilt grass	Semi shaded or shaded drains and bottoms, edges, food plots; Quail forage, Other species	Foliar application of 2% glyphosate with surfactant prior to seeding
Japanese climbing fern	Open and semi-shaded upland stands and edges; Quail/Turkey brood and nest, Other species	Foliar application of 1% Arsenal AC or 4% glyphosate with surfactant in growing season
Sericia and bicolor lespedeza	Open and semi-shaded upland stands and edges, food plots; Quail/Turkey brood and nest, WTD forage, Other species	Foliar application of 2% Garlon 4, 2% glyphosate, or .25% Transline with surfactant prior to flower
Invasive roses	Open and semi-shaded stands, drains, edges, old fields; Quail/Turkey brood, nest and forage, WTD forage, Other species	Foliar application of Escort XP (1 oz. per acre) or 1% Arsenal AC solution with surfactant
Pasture grasses	Old fields, edges, food plots; Quail/Turkey brood, nest and forage, Other species	Foliar broadcast application of 1%Arsenal AC and 3% glyphosate
Wisteria	Open and semi shaded stands, old fields, edges, food plots; Quail/Turkey brood, nest and forage, Other species	Foliar application of 2% Tordon K, 4% Garlon 4, or .5% Transline solution with surfactant
Tallow/popcorn tree	Open and semi-shaded uplands and drains, old fields, edges, food plots; Quail/Turkey brood, nest and forage, WTD forage, Other species	Foliar application of 1% Arsenal AC, Basal application of 20% Garlon 4 in oil, or Cut-stump application of 15% Garlon 3A
Princess tree/ Paulownia	Open and semi-shaded uplands and drains, old fields, edges, food plots; Quail/Turkey brood, nest and forage, WTD forage, Other species	Foliar application of 2% Garlon 3A or 2% glyphosate solution with a surfactant, Basal application of 25% Garlon 4 and oil, or Cut-stump application of 25% glyphosate or 50% Garlon 3A
Golden bamboo	Open and semi-shaded uplands and drains; Quail/ Turkey brood, nest and forage, WTD forage, Other species	Foliar application of 1% Arsenal AC and 4% glyphosate solution with surfactant
Giant reed	Edges and open drains; Quail/Turkey brood, nest and forage, WTD forage, Other species	Foliar application of 1% Arsenal AC and 4% glyphosate solution with surfactant
Elaeagnus	Edges and open stands and drains, food plots; Quail/Turkey brood, nest and forage, WTD forage, Other species	Foliar application of 1% Arsenal AC, Basal application of 20% Garlon 4 in oil, or Cut-stump application of 10% Arsenal AC or 20% glyphosate solution
Japanese honeysuckle	Open and semi-shaded uplands and drains, old fields, edges, food plots; Quail/Turkey brood, nest and forage, Other species	Foliar application of 3% glyphosate or 4% Garlon 4 solution with surfactant

bog down a cat dozer. If ignited, this thatch burns so unnaturally hot it often kills the overstory trees that are present in the stand. With no surviving saplings or canopy trees, and without the ability to regenerate from seed (the cogongrass thatch quickly grows back after a fire, choking out native tree seedlings), native woodlands can eventually turn into biological deserts.

The foliage of cogongrass is coarse and full of silicates; unpalatable to wildlife. And although I found no current research looking at cogongrass in regards to insect production, I have generally observed lower insect numbers in established cogon stands. A reduction in insect biomass has major implications in regards to brooding and foraging habitat for species like quail, wild turkeys, and many non-game bird species. Even if there were lots of bugs in a patch of cogongrass, its structure is generally too dense for most ground dwelling birds to negotiate or to use for winter seed-scratching habitat.

Any type of soil disturbance, including disking, grading, or that associated with timber harvest generally increases the likelihood of NNIPS introduction and/or spread. This is typically the case with cogongrass. Cogongrass rhizomes, which can readily sprout into new infestations, are easily broken off and moved around by these types of activities. Cogongrass also makes a lot of small, fluffy seeds that can be dispersed by the wind or hitch a ride on a tractor, bush-hog, or automobile. In a nutshell, cogongrass has a very good strategy of making it hard on your native wildlife habitat. Many other NNIPS have their own suite of weapons that will be arriving in your area soon, if you don't have them already. So having a plan to deal with them would be a wise move.

Prioritization for NNIPS management

Some species of NNIPS (like cogongrass) will probably warrant more attention than others. And it is generally a good idea to take care of small isolated infestations of a particular species located in or around an area planned for disturbance, (timber sale, agriculture operation, etc.), before diving into large and widespread (saturated) infestations. If you do have a significant amount of NNIPS on your land already, treatment prioritization will be very important. Depending on your location and existing

Previous page: Table 1. Common NNIPS found in the southeast, the habitats they can affect, and some common herbicide treatment recommendations.
** Herbicide recommendations derived, in part, from USDA Forest Service Technical Report SRS-62, Nonnative Invasive Plants of Southern Forests by James H. Miller, 2007.* **Caution:** *Always consult the herbicide product label for safe and legal application rates as some herbicides can affect non-target vegetation.*

infestations, combating your weeds can be a fairly significant effort and expense. However, these costs are usually increased by waiting longer. Your prioritization will likely be influenced by the wildlife species you manage. You are probably already pretty familiar with the specific habitat requirements of your target wildlife species. Once you know your wildlife's needs, (or you want to manage for all potential wildlife species), the next step is to become familiar with NNIPS. You can run a web-search of the invasives in your local area, contact your local chapter of the Southeast Exotic Pest Plant Council (www.se-eppc.org/), or ask your County Extension Agent to provide information about local NNIPS issues. Once you see where your issues are, (where there is overlap in what habitats are affected by the NNIPS you have or are at risk of having, and the habitats you want to protect), you can draw some lines in the sand. An inventory map of what NNIPS you already have will also be a good tool to start with. It doesn't have to be a perfect inventory, just something to use to help you determine what needs treating and what got treated. Herbicide will most likely be your first line of defense. Research of the major types of herbicides may also be needed depending on your level of expertise. A summary of herbicide recommendations can be found in Table 1.

If white-tail deer are your major management concern, you may be able to tolerate some exotic species without seeing any declines. In fact, deer actually like to eat many exotic plant species, but there are thresholds with every species as to how much is too much over their home range. And unfortunately that's where the problem lies with NNIPS; they don't usually know when to quit spreading and the costs often outweigh the benefits. Chinese privet (*Ligustrum sinense*) is quite common across the Southeast and deer will utilize it heavily for browsing in winter months, especially when acorn mast is low (Stromayer et al. 1998), as well as for cover. Privet foliage averages around 12% crude protein and has been suggested to be an effective management component for deer. Japanese honeysuckle (*Lonicera japonica*) and kudzu (*Pueraria Montana*) are also browsed by deer and both can average around 16%, although kudzu is only available in the growing season. Deer may even sporadically graze exotic sod-forming pasture grasses like tall fescue (*Lolium arundinaceum*), again with a similar protein content, depending on the season. But again, these NNIPS are sometimes stand-replacing, and can occupy the space of native plant species that build the habitat of other wildlife species. Whitetail deer do have limits as to how much they can adapt to, and a property dominated by NNIPS is generally not a preferred situation.

Many other species are generally much less tolerant of

NNIPS infestations. Bobwhite quail, for example, prefer native herbaceous understories occurring in an open forest structure (lots of available sunlight). Most areas will have a wide variety of native species already growing on the site or in the seedbank. An abundance of native grasses like bluestems (*Andropogon* spp. and *Scizachyrium* sp.), panic grasses (*Panicum* sp.), native paspalums (*Paspalum* spp.), lovegrass (*Eragrostis* spp.), threeawns (*Aristida* spp.), and Indian grass (*Sorghastrum* spp.) creates excellent nesting and foraging cover for quail. The conditions provided by these native bunchgrasses are completely different than those produced by exotic pasture grasses. Native legume and forb species (including beggarweeds (*Desmodium* spp.), native lespedezas (*Lespedeza* spp.), tephrosias, (*Tephrosia* spp.), crotons (*Croton* spp.), and others generate lots of high protein seeds that are utilized by quail. Ideal brood-rearing habitat (commonly achieved by fall and winter disking) typically includes lush native pioneers like partridge pea (*Chamaecrista* spp.) and ragweeds (*Ambrosia* spp.). This diverse native understory system, often maintained by periodic prescribed fire and/or mechanical disturbance, is also a prime target for NNIPS.

Many NNIPS can spread quickly in open uplands due to the ample sunlight and frequent fire or other disturbance. Depending on soils and other factors even species like bicolor lespedeza have the potential to outcompete

Native annuals like partridge pea (Chamaecrista fasciculata) provide excellent brood-rearing habitat and nutritious winter seed for bobwhites and can be planted or naturally encouraged by fall disking or burning.

and shade out natives. While bicolor makes lots of good seed, quality nesting and brood-rearing habitats, (typically the more limited requirements), can sometimes be displaced by it. Many quail managers have found that they can not effectively control bicolor on clay soils in open, burned pine stands. And once it is established, it is extremely difficult and often expensive to exterminate due to several season's worth of seed in the seedbank. However in certain situations, for example where it is adjacent to dense (shady) timber stands or on some very sandy soils, bicolor may be physiologically limited and can persist without causing too much of a problem.

Cogongrass, kudzu, Japanese climbing fern (*Lygopodium japonicum*), sericia (*Lespedeza cuneata*), tallow tree (*Triadica sebifera*), privets (*Ligustrum* spp.), invasive roses (*Rosa* spp.), and many other NNIPS are all bad news for quail management, because of their ability to outcompete and displace the native understory. Although quail may occasionally use some of the coarser NNIPS (like privet or rose thickets) for escape cover, the NNIPS would be better traded for native structure like sumac (*Rhus* spp.) or bramble (*Rubus* spp.) patches. These natives won't overrun your brooding and nesting habitat.

Each species of wildlife with its own unique habitat requirements will be affected a bit differently by each NNIPS, depending on the severity of the infestation. Again generalists, like wild turkey and white-tail deer, are usually more apt to tolerate the changes, and habitat specialists, like quail and Bachman's sparrows, for example, may not be able to cope as well with a large percent of their preferred habitat being affected. Quail may be able to tolerate a few of the less invasive exotics, like Brazilian vervain (*Verbena brasiliensis*) which does not generally dominate the understory, but as a general rule the fewer NNIPS the better for bobwhites.

Non-native wildlife plantings

So what about wildlife food plots? Don't we usually plant them with non-native plant species? That is a true statement but hopefully we are planting them with non-natives that are *not* invasive. While some invasive plant experts recommend using only native species and planting absolutely no exotics in forest settings, there are many non-native species that are valuable as forage and harvest attractants that probably have their place in good wildlife management programs. Some common wildlife food plot species like wheat, oats, white clover, corn, browntop millet, milo, sunflowers, and cowpeas don't usually pose a problem for most locations. However, there are tons of species labeled and recommended for food plots that you should thoroughly examine before planting. Some wildlife plantings recommended by various entities, including the seed companies and even conservation-type agencies with good intentions, can often be time bombs, depending on what setting you stick them in. In many cases on both public and private lands, what we once thought was "the greatest idea ever for wildlife food" we are now struggling to get rid of by investing significant time and money in herbicide applications. Autumn, Russian, and thorny olives (*Elaeagnus* spp.) are also sometimes recommended for wildlife, but can become problems in the long term, largely due to dispersal of the seeds by birds. Even some of the common food plot grass species like perennial rye (*Lolium perenne*) and orchard grass (*Dactylis glomerata*) have persistent, invasive tendencies, and some managers have drawn the line and are opting for less persistent species for their deer and turkey plots. Quail and other small seed-scratching birds are especially sensitive to grasses and other NNIPS that form dense barriers of foliage or litter because they either render edible seeds unobtainable or shade out the native seed-producing plants.

NNIPS Treatment

Although there are several means of control for various NNIPS, usually the most effective, and often the most economical, is using a chemical herbicide program. Simply mowing, cutting, or burning may be somewhat effective on some of the wimpier NNIPS, but the superweeds are probably going to require repeated herbicide application for their control. As we discussed earlier, NNIPS like cogongrass and kudzu have large rhizome reserves that are hard to reach, even with herbicides. The rhizome tissue and carbohydrate that remains after treatment sprouts right back the following spring. Others like privet, tallow tree, Japanese stilt grass (*Microstegium vimineum*), and bicolor produce mind-boggling numbers of seed that can be tough to deal with. That is why monitoring and re-treatment is essential in an effective NNIPS control program.

Following the eradication of an infestation, native pioneer species will usually quickly re-colonize the treated spot. However if the area is large or if there is significant erosion potential, native or desirable non-invasive vegetation can be planted for stabilization until native species can return.

Summary

On many properties or farms it will be near impossible to eliminate all NNIPS. But by prioritizing the habitats in greatest need of protection, being familiar with NNIPS and treatment options, and having a consistent control plan, one can successfully manage wildlife habitat amidst the hordes of non-native invaders out there. By responsibly managing exotic wildlife plantings and working with neighboring landowners towards a common goal, the chances of long term NNIPS control are greatly increased. In addition to protecting and maintaining quality native wildlife habitats, a NNIPS-free forest and/or farm is healthier, more aesthetically pleasing, and worth more money when it comes to selling or leasing for hunting or farming purposes.

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Several exotic food plot species like cultivated annual sunflowers, wheat, and oats can be used without much risk of becoming invasive, others like to stick around for awhile so use caution in which species you choose to plant.

Management Calendar

By Dave Edwards
Westervelt Wildlife Services

February 2009/March 2009

Start planning & preparing for summer projects.

Good planning and preparation ensures you will have everything needed and be ready to initiate projects this summer. I heard a saying that has stuck with me over the years that always reminds me to plan – "People don't plan to fail, but often fail to plan". Planning also allows you to prioritize projects, create a budget for the up coming year, and develop timelines for completion to help you stay on track. Many landowners simply tackle projects as they come up or as they think of them. This strategy can work, but without planning they may overlook or run out of money before addressing a more needed project. Spring is a busy time for us at Westervelt helping landowners determine their property's needs. We conduct what we call "property management reviews". During this consultation, we review projects that had been completed the previous year, review harvest data or other information that provides insight to how the wildlife we are trying to manage is doing, re-assess progress towards goals, assess the habitat and property in general to determine its limiting factors, and develop a prioritized list of activities that need to happen to help the landowner achieve his goals. While this is a professional service we provide, it is a process that I feel all landowners should go through each year, whether they hire a professional biologist or not, to keep them on track.

Plant supplemental fruit trees and/or other wildlife friendly plantings.

Supplementing your property with plantings of oaks, chestnuts, pears, crabapples, plums, autumn olive, etc. is a great way to enhance both the esthetics and wildlife value of your property. Late winter through early spring (before spring green up) is the best time to plant most wildlife friendly trees/ shrubs. Planting a variety of trees/ shrubs will ensure that a variety of food sources are available throughout the year. The plantings should be strategically placed around food plots or fields, along roadsides/ intersections, or other areas that will receive adequate sunlight. If quail management is one of your goals, and your property has lots of open land, you may consider establishing hedgerows for additional quail habitat. Hedgerows are often created using wildlife friendly plantings such as plums, drawf chinquapin or sawtooth

oaks along with other shrubs. Hedgerows can be enhanced by planting adjacent strips of partridge pea or food strips of corn, Egyptian wheat, sorghum, or millets this spring/summer. The Wildlife Group is an excellent source for obtaining beneficial wildlife trees/shrubs as well as getting advise on planting strategies and tips.

Although deer season has just ended, February is the best time to scout for new deer hunting locations for next season.

Because deer have been exposed to a great deal of hunting pressure over the past few months, they are using areas that they are most comfortable in and feel safe. If you find out where they are "hiding" now, you will know where to find them next season once the hunting pressure builds and deer seem to disappear. During February the weather is still cool (or cold), leaves are off the trees, and buck sign such as rubs and scrapes is still fresh. Although you will have to touch them up before the season starts next year, late winter is a good time to trim shooting lanes around deer stands. Relocating stands now also allows deer to get used to seeing them over the summer.

Spring is a good time to check soil pH and lime food plots if needed.

To check the soil pH, simply collect soil samples and send them to a soil laboratory (see previous *Wildlife Trends* article on how to properly collect soil samples). Your local farmers cooperative will often have soil collection bags and will also know where you can send the soil to be tested. Although there are exceptions, most crops grow best in a relatively neutral soil pH of 6.5 – 7.0. Thus, lime is often needed to enhance the soil (this is particularly true in sandy soils). Because it can take several months for lime to effectively change the soil pH, checking the soil in the spring will give you ample time to enhance the soil before the fall planting period. Remember, ensuring proper soil pH is often more important than what you plant or how much you fertilize. In fact, proper soil pH is essential for fertilizer to be available to the plants. Although lime can be spread anytime of year, applying it at least 6 months before planting will allow time for it to enhance the soil.

Make preparations for spring turkey season.

One of the best ways to ensure you have gobblers in the spring is to manage your property throughout the year to promote quality nesting cover (see turkey habitat management article in this issue for more detail on creating nesting habitat). Where do you think gobblers will spend much of their spring? - Where the hens are. Where are the hens? -Where the best nesting habitat exists. I have worked with landowners who had gobblers on their property all year except during the spring. After closer inspection, their property didn't have good nesting habitat and the

hens had moved to adjacent properties carrying the gobblers with them. Quality nesting habitat is created by maintaining a patchwork of early successional habitat throughout your property. Burning, herbicide applications, strip disking, timber harvest, and roadside management strategies are all tools that can help you create quality nesting habitat for turkeys. Besides the key element of creating nesting habitat, what are other things you can do to enhance turkey hunting on your property this spring?…something you can do now. Creating strutting areas in strategic areas around your property will help put turkeys where you want them to be. A mower, disk or fire are the tools of choice for this task. Fire is my preferred tool if it can be used. Strutting areas are simply areas that have relatively little or open ground cover that will be attractive to turkeys for breeding courtships. I often create these areas between roosting and nesting areas and preferably near a food source such as an old field, chufa patch, or food plot. Areas that often lend themselves well to creating strutting areas are powerlines, old fields, food plots and roadsides. Lastly, mowing hunter access trails will help you slip into areas to hunt without making a bunch of noise. If these trails go through thick habitat, don't be surprised if turkeys use the same trails.

Initiate Late Winter/Early Spring Strip Disking

Strip disk areas to enhance quail and turkey habitat. Disking can be done along roadsides, in or around old fields, and within thinned pine plantations or mature longleaf stands. Disking strips 10-30 feet wide in late winter and early spring will stimulate the growth of desirable native quail food plants such as partridge pea and beggarweed. The new succulent vegetation that grows in the strips will also attract insects. These areas can be managed by re-disking every other year. Maintaining a balanced pH and applying fertilizer within the strips will enhancement plant growth. The time of year you disk will often dictate the types of plants that colonize. For example, winter disking produces heavy-seeded quail foods such as partridge pea and ragweed, while disking in April increases the production of important seed-producing grasses such as panic grass. Disking in June favors green vegetation that attracts insects and a number of major seed plants that turkeys and quail readily feed upon in the fall. In general, seasonal disking can provide a diversity of seed producing plants for quail and turkeys as well as quality browse plants for deer.

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

Place 4"-6" of sawdust or wood shav-

ings in the bottom of the box for nesting material (I prefer shavings verses sawdust because they do not absorb moisture as easily which causes rotting and mold – check with a wood shop that uses a planer for shavings. Cedar chips that are used for dog bedding can be good nesting material as well. Erect new boxes before February in highly visible areas near good brood rearing habitat. Adequate protective cover is essential for brood survival. Brood habitat should include a dependable source of water with plenty of shrubs and emergent vegetation for food and cover. Wood duck boxes should be cleaned out and inspected at least once per year. Word of caution – always be careful when opening wood duck nest boxes. Many other animals use the boxes. Animals that are commonly found in wood duck boxes include gray squirrel, flying squirrel, rat snakes, screech owls, and flycatchers. Building wood duck boxes, putting them out, and checking them after nesting season to monitor use is always a fun project to include kids. There is a lot of hands on work and makes them feel good about helping animals…plus it teaches them good stewardship.

Late winter is a great time to conduct dormant season prescribed burns.

As you probably know, prescribed fire is an exceptional tool for managing wildlife habitat. With the exception of longleaf pine/coastal plain areas, most understory burning in the Southeast is conducted during the winter dormant season. Acceptable relative humidity, temperature, fuel moisture, and steady, persistent winds often occur during this period. Try to conduct burns before turkeys start nesting (Mid-March in most areas). Cool season or winter burning is not only a good way to reduce fuel loads and control undesirable hardwoods in a pine stand (which reduces the chances of a wildfire that can be detrimental), but is also a great way to stimulate new understory plant growth which will result in quality food sources for wildlife. Fire rotations (interval of time between burning the same area again) vary depending on your goals, habitat types, and property limiting factors but are generally every 2-5 years to promote quality wildlife habitat. It is also a good idea to strategically plan your burns to create a diversity of habitats across your property. Landowners often feel they need to burn large acreages to make a difference. This isn't so. Although larger burns are often initially needed to promote quality wildlife habitat, after the property is in shape, I actually like small burns of 5,10, or 15 acres in size. These create great pockets of quality natural foods that are accessible by

wildlife, yet leave close by quality cover. Always check local burning laws and consult with an experienced burn manager before lighting a woodland fire. The U.S. Forest Service or your state forestry commission are great sources for obtaining more information regarding burning in your area.

Leave duck ponds flooded until early spring.

Although duck season may be over, leaving your duck ponds flooded will benefit migrating waterfowl by providing energy rich foods for their flight back north. Pond drawdown and timing will vary depending on your management strategy (natural moist soil management or agricultural plantings). If you are planting agricultural crops for waterfowl, you leaving the pond flooded through early summer will help control weeds. Just be sure to drain and allow to dry in time to plant your crops. However, if you are managing for natural moist soil plants, such as in a beaver pond, you will need to start pond drawdown in the spring to allow desirable native moist soil plants to germinate and grow. Slow drawdowns (over a 2-3 week period) are often desired because they will result in diverse emergent wetland species composition. Quick drawdowns result in decreased plant species diversity and are often composed of undesirable species.

Collect shed antlers.

By mid-March, whitetail bucks across the country have shed their antlers. Collecting antler sheds can be a fun spring activity for the whole family. Shed collecting not only provides a great opportunity to spend time with your family, but also provides some insight to the quality of your deer herd. After a few seasons, compare the quality of sheds found from different years. If your program is moving in a positive direction, you will notice that the antlers are getting larger each year. Key areas to concentrate your searches include food plots, fields, around feeders, and along trails where deer must jump (over fences, ditches, etc). Unfortunately, many of us find them in our tractor tires!....which means you're doing something right!

Fertilize and monitor perennial clover plots

Perennial clover plots will start growing rapidly once spring green up begins and daily temperatures exceed 65 degrees. Because clover produces its own nitrogen, apply a fertilizer that does not contain nitrogen, such as 0-20-20, during early-mid spring to provide adequate nutrients for clover growth. If you add nitrogen, you are simply feeding competing grasses. Although I strongly recommend pulling soil samples and applying fertilizer accordingly, a "normal" fertilizer application rate for clover in the spring is 200 lbs./acre. Once the growing season begins, monitor the plot for undesirable weeds and grass. Pre-emergent herbicides are a fantastic tool that will kill weeds before they have a chance to become a problem. If you are unable to apply pre-emergent herbicide, mowing will help reduce undesirable weeds (do not mow too low…your mower should be set to cut just over the clover). However, if weeds and grasses persist, apply selective post-emergent herbicides for control. Although herbicides are more expensive than mowing, they are often the most effective. Mowing is used to give the clover a better chance to outcompete the weeds while herbicide kills the weeds.

Fertilize select roadside areas to increase browse and nutritional value for wildlife.

Roadsides and right-of-ways generally have more native plant growth than areas within the forest. This is because of the additional sunlight these areas receive. Coincidentally, areas along roadsides are usually areas that are easy to manage by disking, mowing and fertilizing to enhance the quality and quantity of plants beneficial to wildlife. Once spring green up begins, select areas that have wildlife friendly plants such as ragweed, greenbriar, honeysuckle, etc, and apply fertilize to enhance their growth and nutritional value. If you are fortunate enough to have a side broadcasting spreader, simply drive down the roadside broadcasting fertilizer. If you have a typical cyclone spreader, select areas you want to fertilize, then back the tractor up to the spot and spread the fertilizer. This method obviously takes more time than a side broadcast, but it more common. Although some people take soil tests to assess soil nutrient levels to determine how much fertilizer to apply, a general application is 200 lbs per acre of a balanced fertilizer. With fertilizer costs so high these days, I certainly recommend taking a soil test to ensure you do not spread nutrients that are not needed.




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