

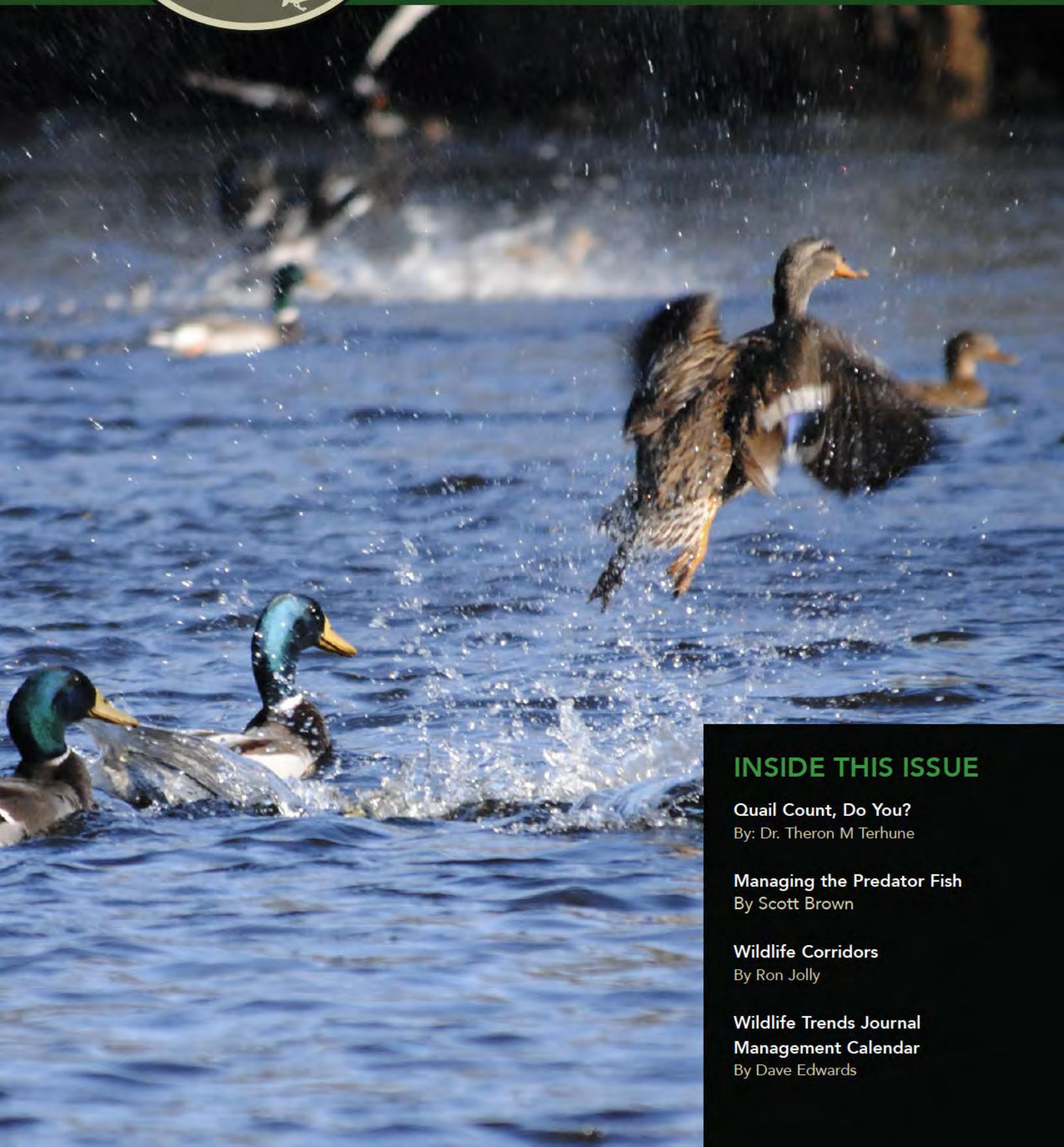
PRACTICAL WILDLIFE MANAGEMENT INFORMATION



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Earl Says...

The Anti's never cease to amaze me. I was watching a spot on a cable show recently about hunting predators and nuisance animals which was actually factual and interesting the other day. They told the story of how destructive these animals are and the many ways hunters and states are dealing with them. But the Anti's never let common sense and facts get in their way.

The reporter told the horror stories about the damages wild hogs make and how in Texas alone they cause over half a billion of dollars in damages to the state. Coyotes are encroaching neighborhoods and stealing family pets. Geese are littering golf courses and parks. The program even mentioned the loss of wildlife in the Everglades due to the introduction of pythons.

When a do-gooder animal rights activist from New York was asked about this she was over the top appalled that we as humans would try to control wild animals. The reporter then asked her what she would do if a rat suddenly ran across the floor, she quite smugly replied that the building should buy a couple of cats! All I could do was shake my head.

As land owners and land managers we live in the real world and it is our job to MANAGE wildlife using our God given common sense. But there will always be nut jobs who live in their own fantasy land.



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Quail Count, Do You?

Useful Monitoring to Improve Your Bird Numbers

By: Dr. Theron M Terhune



It is human nature to count things. Age. Miles travelled. Time. Steps. Money. Calories. IQ. Why do we count these sorts of things? And, to what end? There is archaeological evidence that humans have been counting as far back as 44,000 BC, enumerating things such as property, debts, group members, and prey. A recent study indicated that counting is innate to humans; and, they suggest, the hunter-gather instinct could provide survival advantages over others by ascertaining counts of things like which herd or flock is the biggest, which tree holds the most fruit, and what soils produce the highest yield. Our inherent nature to count bears the question: do you count wildlife on your property? Do you count quail? In wildlife management, monitoring abundance should

seriously be considered if the species seriously counts to you.

Population and harvest monitoring are an important aspect of wildlife management as it can inform and help you to evaluate management decisions. Monitoring programs not only provide an inventory of wildlife but give insight to whether habitat management efforts are producing desirable results or require adjustments as well as identify potential limiting factors. Regarding bobwhite quail, given that they are a “high turnover” species with low annual survival and high reproductive capacity, designing and conducting monitoring programs to facilitate management decisions to minimize mortality and maximize reproductive effort can

Dr. Theron Terhune is a Wildlife Biologist and Research Scientist at a privately-owned property near Wilmington, NC and a Research Fellow at the Spatial Informatics Group – Natural Assets Laboratory (SIG-NAL). He received a B.S. and M.S. degree from Auburn University in Wildlife Science and a Ph.D. in Forestry and Natural Resources at the University of Georgia. Theron has studied gamebirds and fire-affiliated species for more than 20 years during which he has published 65 scientific articles in peer-reviewed journals and 34 popular magazine articles.

help to optimize your bobwhite population.

Population monitoring can be costly and time consuming, so understanding the caveats and benefits of varying techniques is important to ensure prudent use of resources and allocation of staff time. There are two primary types of monitoring, (a) population estimation and (b) an index, each having pros and cons to implementation and use. **Population estimation** is a much more robust, accurate representation of wildlife abundance. However, the effort, time and cost required of population estimation procedures is typically much higher than conducting an index. The procedures for estimating abundance can also be

more difficult and require complicated statistical analysis. **An index**, in contrast, is relatively easy to conduct and requires little statistical prowess to obtain the metric of choice – basically it is a count of the individuals observed (heard or seen). Indices do not provide as accurate an estimate of true abundance but if conducted correctly can provide a good indicator, or surrogate, to population size. These “counts” can be affected by numerous factors which may vary by site such as terrain (e.g., topography), weather (e.g., wind or fog), vegetation (e.g., dense trees), predator context (e.g., raptor abundance), and presence of conspecifics (e.g., other bobwhites). The trick to making indices or “counts” more useful and effective for management purposes is implementing a consistent methodology and accounting for, or minimizing variation associated with, those factors influencing observations as much as possible.

An additional key to successfully integrating monitoring into your management plan is to establish an adaptive resource mindset to management such that you **Plan**, **Implement**, **Monitor** and **Evaluate** in a revolving cycle through time. Planning involves establishing and identifying realistic, measurable goals and objectives for your property. For example, a good objective would be to *obtain one bird per acre in the fall* whereas a poorer objective would be to *have as many birds as possible*. The former is a measurable goal whereas the latter is an ambiguous goal making it difficult to measure success. Habitat management objectives should be linked to the population goals and should

be measurable (e.g., thin to 45 BA or 80 trees per acre), when possible. Knowing where you are and where you are going will facilitate the appropriate management actions required to get there. The planning phase often involves professional consultation to provide guidance and expertise on the potential of a property. Numerous factors can influence a property’s potential in terms of carrying capacity such as soil type, predator context, the surrounding landscape, etc. A professional consultant can help to give realistic, measurable population and management objectives as well as help to evaluate and interpret the

resource (e.g., money, time, personnel) restrictions.

After establishing measurable objectives and setting management goals, implementation of management actions will occur which may vary by season. For bobwhite, however, most habitat management (prescribed burning, mowing/disking, etc.) takes place during the non-breeding season (October – April). Monitoring should be linked to management actions as best as possible both spatially and temporally. This can be accomplished by breaking up the property into management units or many properties use hunting course boundaries as the management units. The last part of the adaptive resource loop is to evaluate the progress, update knowledge based on monitoring results and interpretation, and adjust management actions as needed.

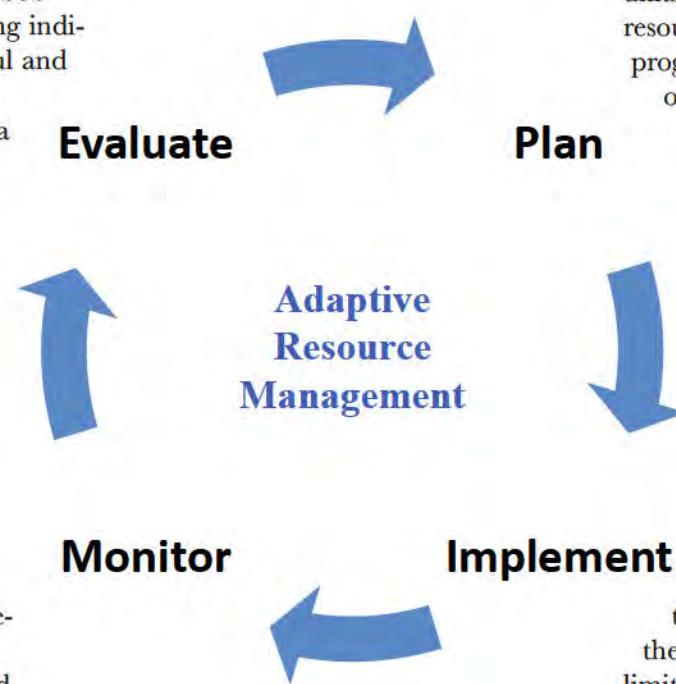


Figure 1- Adaptive Resource Management Cycle. There are variations of this cycle and additional components, or details can be added depending on the desired outcomes and management style.

results. During the planning phase is also where you will decide which type of monitoring will provide the information to adequately assess the progress of your objectives. In most cases, on private lands, population indices are implemented given

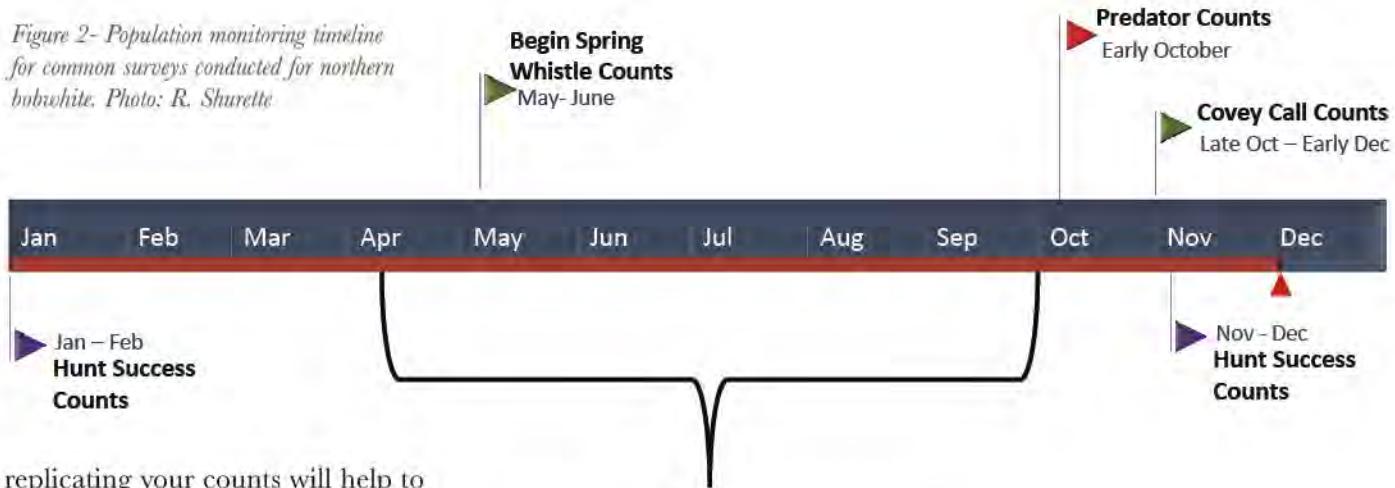
So, for bobwhite management, how and what should you monitor?

Four counts commonly integrated into a bobwhite management plan include (see Figure 2 for timing of counts): (1) whistle counts; (2) covey counts; (3) predator counts; and (4) hunt success. All

these counts are indices in their truest form, so they do have limitations, but they can also be very useful because they have been heavily vetted with research and linked to true population estimates or population demographics.

Counting bobwhite whistles in the spring, pairs or broods during the breeding season, coveys in the fall and number of birds harvested and crippled all provide metrics for documenting, evaluating trends and gaining a pulse on your management efforts, if done correctly. However, developing long-term (several years) data streams and

Figure 2- Population monitoring timeline for common surveys conducted for northern bobwhite. Photo: R. Shurette



replicating your counts will help to improve the reliability of the index, better informing your management decisions.

Spring Whistle Counts

Spring whistle count surveys capture the iconic “bobwhite!” call exclaimed by the male bobwhite as their mating call to attract a hen(s) – it is the call for which the species is so aptly named. Male “bobwhite” or “bob-bob-white” calling begins as coveys break up in late-winter and early-spring but the specific timing of calling depends both on latitude and weather. Mild winters and early heat waves can trigger calling activity earlier than usual and southern latitudes like central Florida will begin calling 2-3 weeks earlier on average than even north Florida. Male calling will then ebb and flow throughout the summer contingent on pair bonding and mating, hatch synchrony or asynchrony and individual mating strategy. Peaks in calling activity during the summer correlate strongly with peak nest incubation and subsequent fall population density (see Figure 3).

Advantages of conducting whistle counts include: (a) the call is easily distinguishable from other birds, requiring minimal training; (b) individual whistling males are easily counted by observers; (c) a long, 3-hour calling window affords one

Brood Counts during bi-weekly Feeding

observer to survey multiple points in a single morning; (d) providing an indicator to breeding population size; and (e) providing a good early indicator of predicted fall abundance (see Figure 3). Common uses of this index are to assess population condition on new properties prior to purchasing or leasing, determining success of habitat improvements, identifying over-winter bottlenecks in survival, determining spring breeding population size, and tracking population trends, especially on low-density (< 1.0 bird per acre) sites.

Research shows that the number of males heard at a point correlates

strongly with the number of coveys heard in the fall such that the ratio is very close to 1:1 when both spring and fall surveys are conducted during peak calling. Each whistling male or calling covey roughly corresponds to 0.1 – 0.2 birds/acre in the fall. For example, 5 males (or coveys) heard per point would equal about 0.75 birds per acre, and somewhere in the 7-8 males (or coveys) per point range would predict 1 bird/acre in the fall (see Table or Figure). Despite the utility of these surveys to forecast fall abundance, the relationship begins to break down (see Figure 4) as the number of males calling per point approaches about 10. At higher

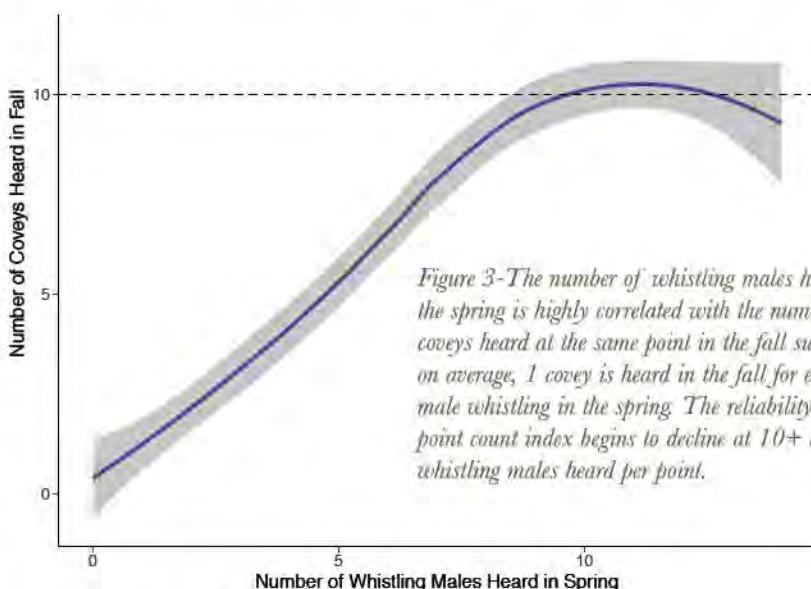


Figure 3-The number of whistling males heard in the spring is highly correlated with the number of coveys heard at the same point in the fall such that, on average, 1 covey is heard in the fall for every male whistling in the spring. The reliability of the point count index begins to decline at 10+ coveys/whistling males heard per point.

densities it becomes difficult to count individual males effectively and density-dependent mechanisms such as more birds calling elicits more calling behavior only exacerbates the issue (for more details on this relationship, see Terhune et al. 2009 and Sisson and Terhune 2017). Lastly, deviation (lower or

higher than) from average demographic rates such as adult survival, nest and brood production, and chick survival can lead to disproportionate correlation between spring and fall counts resulting in lower or higher than expected abundance, respectively.

Fall Covey Counts

Fall covey counts are perhaps the most useful of all the indices described because they can provide a reliable density estimate (e.g., birds per acre; see Figure 4) to establish bobwhite harvest targets for the hunting season. Counting coveys to estimate population size dates to the early-1980's and early 1990's where several researchers (Roseberry and Klimstra 1984, Rotella and Ratti 1986, DeMaso et al. 1992) linked covey call activity to population density using various techniques. The covey call, or assembly call, has 3 phonetic descriptions (a) "hoy-poo", (b) "hoy" and (c) "koi-lee" with the latter being the most referred to.

The "koi-lee" call is used year-round by both males and females throughout the day but most commonly at dawn and dusk. During breeding season, the call is used by the female that is separated from her mate and by an unmated female such that they will vocalize the call in rapid succession for 5-15 times. During the fall, covey calling functions – especially the "hoy" and "hoy-poo" calls – to unite separated covey members and is also

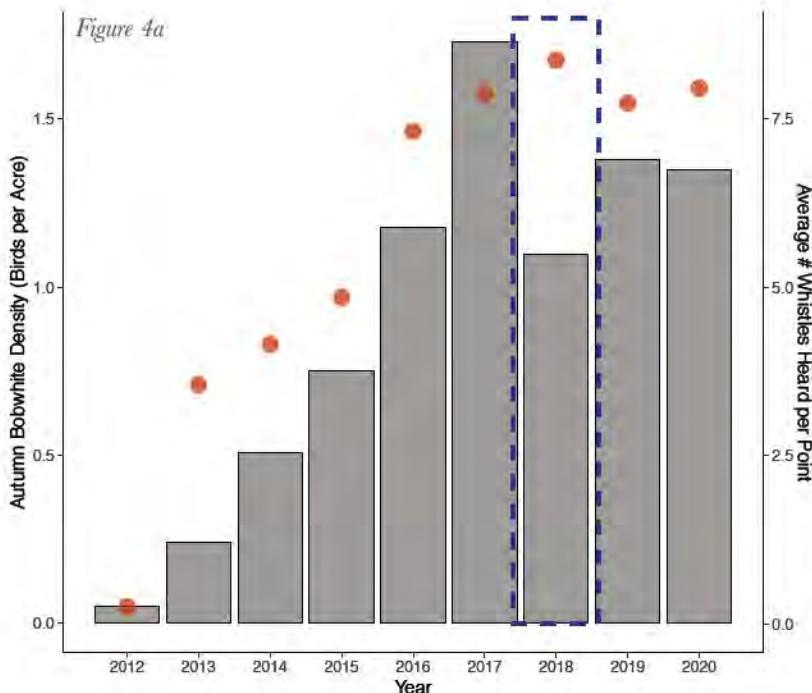


Figure 4b

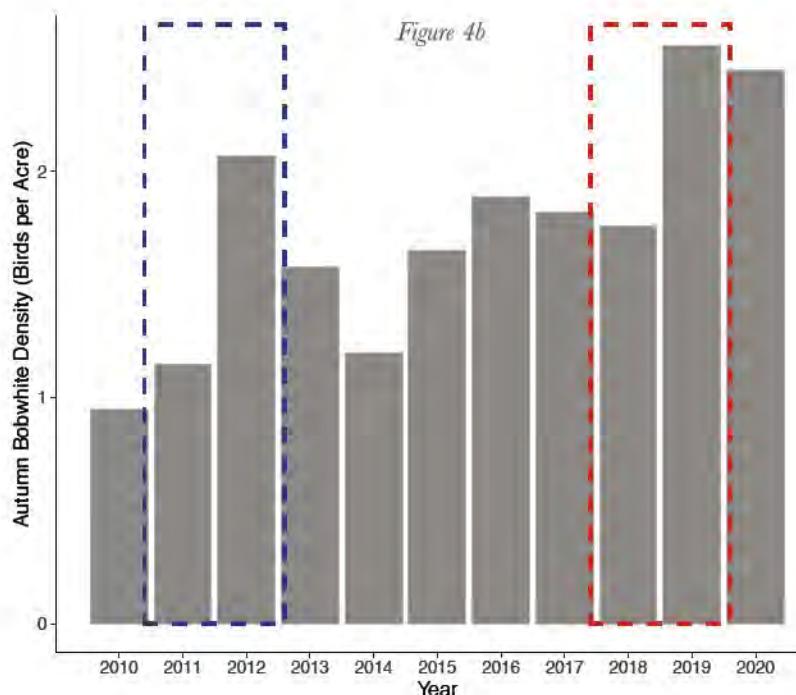


Figure 4a/4b- Spring whistle counts and fall covey counts can be used to monitor management activity and elucidate potential limiting factors. Plot (A) represents an increasing population during the spring based on spring whistle counts (red dots) and fall covey counts (grey bars) where spring and fall count trends align during all years except during 2018 where spring counts continue to increase and fall counts dramatically decreased. This disparity highlights a recruitment issue of birds from the spring to the fall which in this case was a result of poor weather conditions. Plot (B) shows 2 population bumps aligning with management actions taken to improve habitat quality; the population increases 80% from 2011 to 2012 (blue-dashed box) as a result of a large-scale timber thinning and hardwood reduction and 45% increase during 2019 (red-dashed box) following a brood field expansion project.

heard when new birds are encountered. The “koi-lee” call being the loudest of the covey calls is used ostensibly to notify other coveys of their location and to serve as a covey “spacing mechanism” or demarcation of a coveys’ home range. It is this covey calling behavior in the fall that provides the foundation for using them as an index or population estimate when accounting for detection. That said, on sites with high bobwhite density there can be substantial overlap in covey home ranges and distinguishing individual coveys can prove difficult in some situations.

As with any index, numerous factors impact the reliability and utility of covey counts from wind to abundance to topography to barometric pressure to observer experience. Thus, conducting covey call counts during the peak seasonal-calling time (typically sometime between 15 October and 31 November) and optimal weather

conditions (see Covey Call Count protocol for more details). Peak seasonal-calling activity may vary from 1-3 weeks regionally and from year-to-year depending on weather; however, the end of October and beginning of November is a good target for conducting counts during most years. Monitoring the intensity, consistency, duration, and synchronization of individual coveys calling will provide a pulse on calling behavior and help to identify optimal “peak” calling.

Unlike spring whistle counts, there are 2 different approaches used to conduct covey call counts, (1) point counts and (2) grid counts, both of which have pros and cons. Point counts only require 1 observer and cover a larger area (~194 acres) than grid counts. The grid count method, developed at Tall Timbers, is an extension of the point count method to integrate detection of coveys and provide a more robust estimate of bobwhite abundance.

This technique utilizes a square-quadrat sampling approach requiring at least 4 observers (1 observer for centerpoint of each side of the grid), covering a smaller area (60 acres) and is labor intensive for use on a broad scale. A general rule is to conduct point counts on sites with an average density of (<1 bird per acre) and switch to quadrat counts or use a hybrid (point and grid) approach on higher density (>1 bird per acre) sites. On extremely low density (<1 bird per 4 acres) sites, using a playback covey call should be used to elicit covey calling. In general, a good goal is to sample 20-25% of your property for adequate representation and spatial context. For example, if you own 2500 acres adequate sampling effort would require 500 – 625 acres by conducting 3-4 points or 8-10 grids. Distributing your points randomly across your property is ideal and stratifying them by hunt course or management unit is even better to provide

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comparative data across sampling techniques (e.g., covey calls, brood counts, etc.).

Nest-Predator Counts

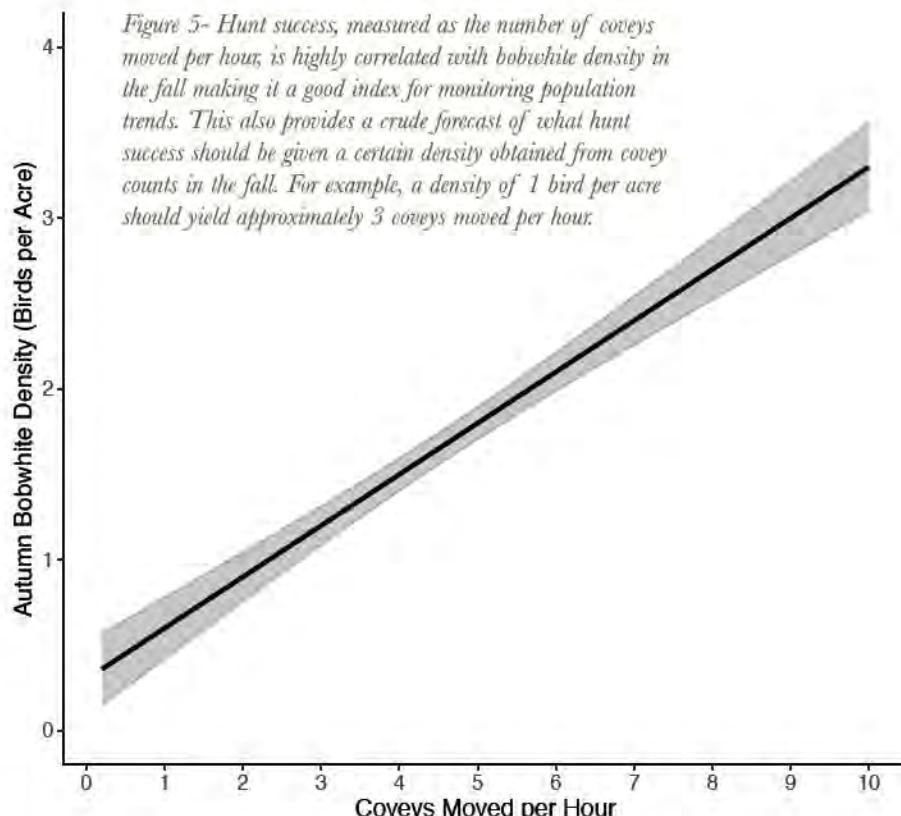
Bobwhites have lots of natural enemies. While avian predators are a large source of mortality for adult birds, mid-sized mammals along with snakes are among the greatest threat to bobwhite chicks and eggs. In addition, research has shown a direct link between the amount of predator activity, measured via the Predator Index, and bobwhite reproduction (Palmer et al. 2019, Jackson et al. 2019, Yeiser et al. 2020). Results from these studies indicate that keeping mammalian nest predators low (<15% predator index) can increase nest success by as much as 10%, nest production by more than 30% and increase chick production as much as 43%. Collectively, this will result in about a 30% or higher additional young being recruited into the fall hunting population on a trapped site compared to non-trapped sites.

As such, monitoring the relative abundance of mid-sized mammalian predators can provide a benchmark to determine whether, under good conditions, bobwhite production and recruitment are not limited by predation – or at least mammalian predation. The beauty about predator counts is they are easy and very cheap to implement, yet it provides valuable information quickly. Although, the predator index can be conducted anytime during the year, they are conducted most often during early fall (October-November) and take just a few days to conduct (see Predator Index protocol for more details).

Other Counts

There are numerous other types of surveys that can be conducted for bobwhite management purposes including evaluating hunt success,

Figure 5- Hunt success, measured as the number of coveys moved per hour, is highly correlated with bobwhite density in the fall making it a good index for monitoring population trends. This also provides a crude forecast of what hunt success should be given a certain density obtained from covey counts in the fall. For example, a density of 1 bird per acre should yield approximately 3 coveys moved per hour.



hawk numbers, and brood counts, to name a few. Regardless of which count you choose to implement, important considerations for success include: (a) keep it easy and simple; (b) be consistent in methodology used; (c) reduce observer bias as much as possible; (d) provide temporal or spatial relevance by using time, distance, or area (e.g., coveys moved per hour, broods seen per mile of feedline) for scaling purposes; (e) replicate counts as much as possible; and (f) do it for the long haul. Integrating counts into everyday management activities such as mowing, feeding, and disking fields is a ready-made opportunity to capture data easily, consistently, and repeatedly.

Hunt success data, often measured as coveys moved per hour, is commonly collected during quail hunts on many intensively managed properties because they correlate well with fall abundance (see Figure 5). However, several variables from

counting bias to weather to dog quality to scenting conditions can limit its applicability to inform management decisions. In the western portion of the bobwhite range rural mail carrier surveys and brood counts are common. In fact, some researchers have suggested that brood counts provide the best information about the upcoming hunting season because it correlates so well with harvest activity, and they are relatively inexpensive. For bobwhite, brood counts are easy to conduct while doing other common repetitive management activities such as mowing roads or supplemental feeding. Brood counts are underused surveys that, as with other indices, can provide an important indicator to productivity and forecast fall population size.

Take Home Message

A primary goal for landowners and property managers is to maximize bobwhite populations. Beyond habitat manipulation, cultural manage-



Scent Station Set



Opossum Tracks



Raccoon Tracks

The predator index requires running setting 25–60 scent stations to monitor mesomammal activity by counting the number of scent stations hit over a 4–5-day sampling period. Pictures show a Scent station set (left) with no tracks, hit scent station by an opossum (middle), and one hit by a raccoon (right).

ment practices such as supplemental feeding and mammalian nest predator control have been widely adopted to achieve population goals and stabilize bobwhite abundance from year-to-year. Regardless of the count conducted, indices can provide valuable information providing a relative pulse on your population at different times of the year. When set up properly, indices can provide valuable insight to the efficacy of management activity and help to establish harvest goals for your property.

Long-term monitoring does cost time, money and effort that could be spent on other endeavors, but the value far outweighs the cost. Fall covey counts and predator surveys are perhaps the most important for gauging progress and guiding management decisions for bobwhite, while spring whistle and brood counts can help to identify breeding, production, and recruitment shortfalls. Remember, most counts are only indices and not exact abundance estimates so long-term data collection is best to evaluate man-

agement context and understanding population trends. Engaging a wildlife professional will facilitate decisions regarding which counts to use, for which purposes and when, while optimizing your resources and balancing benefits to wildlife. Make your management efforts count by counting your birds!

For more information on how to conduct and/or interpret these counts or for example data sheets please feel free to contact me at theron.terhune@ortonplantation.net

Spring Whistle Count Survey Methodology

Male bobwhites actively call for many weeks during the early portion of the breeding season and typically call for 1 to 3 hours after sunrise, which allows for much flexibility when implementing the survey and allows for survey repeatability.

General Survey Information:

1. Layout survey route such that points are a minimum of 800 m apart.
2. Conduct surveys weekly from mid-May until the last week in July (this can be truncated some but should be run for at least 6 weeks) or until a distinct peak is ascertained.
3. Surveys should be conducted between 15 minutes before sunrise until 2 hours and 45 minutes after sunrise. This 3-hour survey window should adequately encompass the daily calling peak, which researchers have observed to be about 50 minutes after sunrise, and

- this time-period should be most representative of when call count indices are conducted.
4. Surveys should be conducted on "good" weather days. I.e., winds should not exceed 8 mph, generally clear and cloud cover should be less than 60%, little-to-no-fog, and not raining.
 5. The survey route can contain up to 20 points (per observer; more points on a route would require extra personnel to complete during the 2 hour and 45-minute survey period) and the entire route should be conducted on the same morning.
 6. The route should be run from 1 to x (e.g., x=12 if 12 points) and 12 to 1 alternately each week.

Survey Protocol

Timing:

- Begin 15 minutes before sunrise and can be conducted up to 2 hours and 45 minutes after sunrise. If conducting 5 or fewer points, start about 15 minutes after official sunrise.
- Surveys should be conducted every week between the last 2 weeks in May through July. The average count per point for the entire route each week is the weekly call count.

Surveys:

- After arriving at the point wait 30 seconds before counting to account for any vehicle disturbance.
- For 3 minutes count the number of individual male (not each call) bobwhite heard whistling within audible range.
- If possible, but not necessary with trained observers, mark approximate locations of each bobwhite on a map to minimize double counting of the same individual (avoiding double counting is very important)
- During the survey remember to rotate around to face all directions.

Survey Points:

- Points should be at least 0.5 miles (~800 m) apart to ensure independence between points.
- Choose good locations for listening, such as on top of a hill and use the same EXACT point location each week. Also, try to minimize points that may have dense vegetation around it that may reduce the observers hearing ability.

Covey Call Count Protocol

Overview

Point counts are useful at low density (<1 bird per acre) sites and for ascertaining peak calling activity and to evaluate covey calling behavior, but are less reliable for estimating abundance or density, especially as higher densities. Both point counts and quadrat methods, require rigorous observational data collection to improve accuracy and reliability. Some critical considerations include:

- Consistency among observers is critical since observer detection probability is typically applied for all observers. All observers should be familiar (and have adequate training) with and understanding of the technique.
- Be conservative on your counting.
- Conduct covey call counts during peak calling (typically late October and November)

Covey Call Protocol

Published research indicate that the effects of bird density, weather, and season may influence the accuracy of covey call counts. Thus, it is recommended to follow specific guidelines to collect data in such a way to account for variation in calling behavior. Covey call counts (grids or points) should be:

- Randomly placed on a property using a stratified random sampling design or similar approach.
- Conducted when calling rate variability is low and call intensity is high (i.e., during peak calling). Monitor calling rate and intensity using point counts to ascertain onset of peak calling activity (indicated by synchronization across points and 2-3 distinct calling waves);
- Restricted to the first calling period before sunrise.
- Conducted in a manner to minimize weather effects by conducting surveys on mornings when:
 - Cloud cover and fog is low (<50%)
 - Wind speed is low (<6.5 kmh or <4 mph)
 - Steady or slightly rising barometric pressure (<0.05 in/Hg drop in the 6 hours prior to the survey)
 - No raining

Note: Surveys conducted on mornings that do not meet the above requirements or when it is raining must be discarded and redone. Ideal conditions are a clear, cool, "bluebird morning" with little-to-no wind

Point Count Method

1. Each observer should use an independent datasheet with concentric-circle distance bands (50, 100, 250, and 500 meters) with an overlaying aerial photo or land cover for the given survey point to facilitate distance and location determination. It is extremely important to record the estimated distance of each calling covey as accurately as possible.
2. On the morning of each survey, observers should arrive at their point no less than 35 minutes prior to sunrise. Like quadrat counts, disturbance/unnatural noise at the points should be kept to a minimum to maximize calling behavior.
3. At the onset of covey calling, record each covey's location on the datasheet/map once in the appropriate direction and at the appropriate distance from the survey point. It is important to minimize counting the same covey twice.
4. Covey calling will usually cease by sunrise, so observers should remain at their survey point until 10 minutes past official sunrise.

Grid (quadrat) Count Method

1. On the morning of each survey, observers should arrive at their point no less than 35 minutes prior to sunrise. On average, calling will occur approximately 20-25 minutes before official sunrise but will fluctuate slightly from day to day depending on weather conditions and time of year. Disturbance/unnatural noise at the points should be kept to a minimum to maximize calling behavior.
2. Once at the survey location, and prior to covey calling, the observer should orient the datasheet in the direction they are facing (toward the center of the grid, i.e., an observer on the northern-most point should be facing south, an observer on the southern-most point should be facing north, etc.) and be prepared to record all coveys heard.
3. At the onset of covey calling, record each covey's location on the datasheet/map once in the appropriate direction and at the appropriate distance from the survey point. It is important to minimize counting the same covey twice. Note: it is common for multiple bobwhites within a single covey to call, so bobwhites estimated to be within 20 meters of each other should be considered members of the same covey. Covey calling will usually cease by sunrise, so observers should remain at their survey point until 10 minutes past official sunrise.
4. Immediately following the covey call count, all quadrat observers should meet to compare notes and use triangulation to enumerate total number of calling coveys in the grid/quadrat. ONLY count coveys heard not coveys seen but not calling. A minimum of 2 observers is required to "count" a covey unless the covey was in direct vicinity (<50 m) of an observer.
5. After observers agree on "confirmed" coveys to be counted, record the total number of coveys counted inside and outside the grid, and record the appropriate weather data.

**** Note: Each survey grid should be completed on a morning with good calling conditions; counts conducted on mornings with poor calling conditions should be redone. In addition, conducting surveys multiple times is a good practice if time permits and the average count should be used (NOT the highest count).*

Density Calculation

Point and grid counts can provide a density estimate, but the accuracy of the estimate will depend on multiple factors and especially detection of coveys. Since detection can be difficult to calculate for the "non-science" folks, detection is often not accounted for in the density calculation.

Calculation without detection:

$$\text{Density} = \frac{\text{Total # Coveys Counted} * \text{Average Covey Size}}{\# \text{Acres Surveyed}}$$

where the average covey size should be obtained by flushing coveys with dogs and the number of acres surveyed is 60 for each grid and 194 for point counts.

Calculation with detection:

$$\text{Density} = \frac{\text{Total # Coveys Counted} * \text{Average Covey Size}}{\# \text{Acres Surveyed}}$$

where the detection is estimated from other techniques such as distance sampling or occupancy analysis.

Predator Index Protocol

General Survey Protocol:

1. Conduct the survey during October or November.
2. Using a map or Geographic Information System (GIS), randomly places scent stations throughout the property at least 500 yards apart along roads, firebreaks, and other linear travel lanes. On average, 25 stations will cover 1000 - 1500 acres.
3. Use 25 - 60 scent stations per property, but on smaller properties use fewer scent stations rather than packing them in too close.
4. If possible, place scent stations on alternating sides of the road within 2 yards of the road edge.
5. Each scent station should be cleared of vegetation using a hoe, weed eater, or council rake. Hint: a stirrup or d-loop hoe work great for removing vegetation quickly and efficiently.
6. Once vegetation is removed to bare ground, sift a fine-textured sand mixed with mineral oil to improve track identification.
7. Place 1 fatty acid in the center of each station.
8. Visit each station every day for 3 to 5 consecutive days without rain. It is okay to have a 1 or 2 interruption due to weather but attempt to choose days where rainfall chance is low.
9. Record species' tracks each morning for each scent station (see sample data sheet for more details).

Calculating the Predator Index

$$\text{Predator Index (PI)} = \frac{\text{Total # Visits}}{\text{Total # Scent Station Days}}$$

- a. Total Number of Visits - Sum the total number visitations by raccoons, foxes, skunks, opossums, armadillos, and bobcats for all usable (rain-free) days.
- b. Total Number of Scent Station Days - The number of scent stations multiplied by the number of rain-free days sampled (e.g., if you ran 40 scent stations for 5 days the total number of scent station days would be 40 stations *5 days = 200). For each scent station rained out or destroyed (e.g., by hogs, tractor, etc.) then subtract it from the scent station total for each day it was destroyed.



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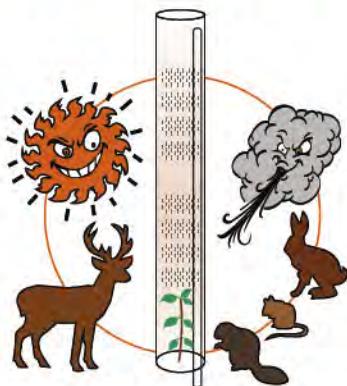
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Managing the Predator Fish

By Scott Brown



Scott Brown is a Biologist and regular contributor to Wildlife Trends Journal with over 35 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 tazmanlabs@gmail.com or (336) 941-9056.

It was discovered this small pond had gizzard shad present, so some striped bass hybrids were stocked, and this was the result. Due to its location farther north, the gizzard shads grow slower allowing the predators to consume more forage before they get too large for consumption. (photo credit: Mr. Dehler Hart)

When it comes to your lake and top-level predators, some lake owners may only have largemouth bass to deal with, while others may have largemouth bass, black crappie, channel catfish, and/or striped bass hybrids, along with some undesirable predators like bowfin and/or gar. A lake's productivity, which includes green water, can dictate how many of these species you can have and whether they can be successfully managed. The more productive, the more manageable it is having

some or all these species. Managing predators comes down to forage. Yes, you must have good water quality and good habitat like all species, but forage for large predator fish is usually the limiting factor. Some large predator's diets overlap, while some do not, but they all eat fish and the fewer predators there are, the more forage you have the better.

First, to accommodate multiple desirable predator species, the waterbody must be large enough.

If the waterbody is less than one acre, I recommend channel catfish (usually do not reproduce) or the channel/blue cross (does not reproduce) and bluegill only. Adding striped bass hybrids (they do not reproduce) or female only largemouth bass can be performed in place of channel catfish. Non reproducing predators in small ponds is appealing, as you can regulate their numbers. All ponds become imbalanced with too many small (stunted growth) predators and not enough forage when the



Threadfin shad (top) and golden shiners (bottom), along with bluegill, are the main forage species in most private lakes.

top-level predators are reproducing without reduction in numbers.

Many managers prefer to have at least 20 acres to stock black crappie, where I say if you only have bass and crappie, with the right habitat and forage base, five acres or larger will work.

The largemouth bass life history is similar throughout the Southeast, but there are subtle differences as you move north. Life expectancy is a good example, where a Florida largemouth bass that is 12 years is near the end of her life and one in Maryland near 20 years is not uncommon. Spawning begins around 60°F and continues into the low 70's during the spring. I know from personal experience, around 68°F is peak spawning temperature in Florida, but is slightly cooler as you go north into Georgia. The

male creates the nest in 3-8 feet deep water (depends on habitat and water visibility), coaxing the female to come lay her eggs. She will lay between 30,000 and 50,000 eggs and has been documented laying 100,000 eggs. Once a female reaches approximately age six, she will begin producing fewer eggs. After fertilization, the male will remain on the nest and guard it until they hatch and stay with the school for a few days until they disperse. The question is always asked, "Does fishing beds hurt the population?" This depends on the number of large fish you have in the population and how frequently hooking mortality occurs. Once the bass hatch, cover becomes very important for largemouth bass survival from predation and where small organisms grow for young bass to consume. Females after age

two grow faster than males and are the trophies. Males have been documented up to about five pounds, but most are small, under three pounds. Both males and females reach sexual maturity (start spawning) around two years old. They have been documented as young as one and as late as three years old to reach sexual maturity. The color of largemouth bass greatly varies depending on the type of water color it lives in. It ranges from a pale greenish yellow with no markings to almost black markings and dark green body.

Largemouth bass growth rates vary immensely from geographic areas and are dictated by genetics, forage and cover availability. The Florida strain of largemouth bass may take 8-10 years to become a double-digit fish, while claims of the Florida/Northern cross can reach weights of four to six pounds in two years, but may not or barely reach double digit weight before dying. The Northern largemouth bass can and does reach double digit size, but may take 15-17 years or more to reach that weight. Whatever the genetic makeup of your largemouth bass population, abundant forage throughout its life and cover are required to grow big bass.

The most common catfish stocked in both public and private waterbodies and raised for food fish, is the **channel catfish**. The channel catfish grows quickly in a pond with supplemental feeding and under most situations will not reproduce in small, manmade waterbodies. It is easy to control numbers when channel catfish are stocked in most private lakes and ponds, and occasionally need to be restocked when numbers become depleted. Historically, every lake and pond owner wanted channel catfish stocked so they had a fish to eat. They are relatively easy to



catch, which makes it appealing for novice and youth anglers. I have seen them caught on anything from artificial lures, stink bait, liver, hotdogs and live bait (worms, nightcrawlers, minnows, crayfish, bream, golden shiners and threadfin shad). Their growth can be accelerated by supplementally feeding commercial fish feed. Routine feeding also concentrates them to increase angling success.

The **blue catfish** was started to be used for pond stocking a few decades back in Texas and the central part of the country and now that has expanded. Very large catfish do not continue to grow on fish food or 2-4-inch bluegill, they need 5-8-inch bream, 1-2 lbs. gizzard shad and anything else they can swallow that provides protein to continue growing. Any good fish manager knows big fish require big forage, and lots of it.

Depending on where in the country you are, and how long your

growing season is dictates how fast or big your catfish may get. Generally, the farther north you are, the slower catfish will grow, but they will live longer, and will get to bigger sizes than fish in the South.

The **hybrid striped bass** was developed in the mid 1960's in South Carolina and have become a popular sport fish throughout the Southeast. Hybrids grow rapidly during their first two years of life with adequate forage. The typical size of hybrid striped bass caught generally range from two to five pounds, but fish near 10 pounds have been documented. The usual life span of hybrid striped bass is five to six years.

Hybrid striped bass are seldom found in shallow areas or areas with dense vegetation, they prefer deeper, open water with adequate dissolved oxygen. They frequent cooler water during the summer months and greatly slow their feeding down when water

When initially stocked, channel catfish eat mostly fish feed, but as they reach larger sizes their diet switches from all feed to live fish and maybe some feed.

Channel catfish love big bluegills and golden shiners in their diet and this pond had an abundance of both without any largemouth bass present.

temperatures become too warm. They do tolerate warmer water temperatures than the white or striped bass. Generally, they are most active in periods of low light, such as dawn and dusk, and in summer they tend to concentrate in deeper areas of the water for cooler temperatures. They are attracted to flowing water and will

congregate near an inflow looking for food. Their diets consist of mostly appropriately sized small fish. Threadfin shad, small gizzard shad, and brook silversides (glass minnows) being the most common prey species. They will move close to shore and target bluegill and golden shiners if offshore forage is unavailable. The key is appropriate size forage that occupies open water where they inhabit, as the hybrid striped bass has a much smaller mouth than its largemouth counterpart. If individuals are removed for table fair or were stocked five years or longer ago, restocking is required at that time.

The hybrid striped bass is less tolerant of poor water quality and higher water temperatures than many other sportfish species. We have found the one key to them being successful is a strong threadfin shad population. Threadfin generally stay out in open water, in schools, and remain



The hardest part about largemouth bass management and other predators is keeping numbers down so remaining ones grow faster to larger sizes than unmanaged populations.

small in size so many year classes of hybrid striped bass utilize them as forage. Obviously, they will compete with other species that target threadfin shad, such as crappie and largemouth bass. There have been some raised to consume pellet feed with over 40% protein, however, these fish have a high mortality rate and have proven difficult to catch with artificial lures or live bait. We have observed them consuming both feed and fish in some situations. We have even observed anglers catching them on worms and chicken livers while targeting other species. This indicates that under certain circumstances, the hybrid stripers will resort to bottom feeding.

This was always observed where fish feed (floating/sinking mix) was being used.

Managing predator fish starts with the forage species and sizes present. When managing any fish, start with assessing what they eat and their habitat. If a forage base cannot be created or maintained, the predators will not grow, and become overpopulated and stunted, or if not reproducing, will grow slowly until they die out of the population. Monitoring forage from electrofishing, during fish feeding, predator stomach content analysis (cutting fish stomachs open) is the best way to identify what forage species is present and

which predator species are targeting which forage species. It is not uncommon for a predator rich fishery needing an occasional booster stocking of either mosquitofish, bluegill, golden shiners or threadfin shad being the most common but also trout, tilapia and crayfish. Again, the right forage available in all sizes to accommodate each predator's size is critical to continue excessive growth into the quality size classes. You may be lucky and have other species not listed previously like lake chubsuckers, other smaller bream-like species, or various minnows. Then there are the occasional forage such as frogs, snakes, baby ducks, various insects (this year fish are getting fat on cicadas, so not all bad things are all bad). But those are not steady diet items, there may be a small growth spurt from insects or frogs, but you want your desirable predators on full feed, all the time with no interruption of protein supply through their entire life. That is how quality and trophy fish come to be.

Stocking predators is tricky. In new lakes we usually recommend stocking forage 6 to 12 months before the predators. This gives the forage time to establish, hopefully reproduce and numbers are high, some forage individuals are too large to be consumed and go on to reproduce when predators are introduced. Typically, all the predators are stocked from 25-100 per acre depending on your goals. Even with a good forage base established we understock to allow the new predators to grow at an accelerated rate and hopefully not consume all the forage, but leave some to naturally reproduce for a few years without supplemental stocking intervention. If both largemouth bass (male and females) and/or striped bass hybrids or



Here is a prime example of not the right size forage. This is a perfect shiner for a quality largemouth bass, but too big for this 14-inch bass that is emaciated due to lack of appropriately sized food.

black crappie are going in, we stock 25 per acre of each species. We repeat the hybrid stocking every two years, which allows you to constantly have quality hybrids to catch as they grow up as opposed to boom or bust every 5-7 years. If stocking female only largemouth bass, non-reproducing catfish, etc. a low rate stocking every two-to-three years is also recommended. When introducing a new predator into an existing lake you must identify the other predators, if they have enough forage, identify the forage available and will the forage base present support a new predator? When introducing a new predator, we also stock additional forage species already there or introduce a new native forage species to offset the additional number of mouths to feed. This also needs to be addressed when moving quality



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This robust bass has a much higher Relative Weight ratio than the average bass, which means he is getting all the food he needs to grow faster than average and eventually larger than average. Lower predator numbers and increased forage numbers means increased predator growth rates.

largemouth bass from a lesser waterbody to your prize lake. You are introducing more mouths that may need bigger forage that may not be at their new home. You need to know before you add them and add forage accordingly. If the proper sized forage is not already present, it will not be until you supplementally stock.

The most common lake management mistake is not removing enough predators that are naturally reproducing in the lake. Yes, this can be a difficult task, but not removing those fish annually will result in not having the quality of fish you desire. Many people just do not want to clean fish, or the ones needing taken are too small and they do not want to remove them. In some states, removal with electrofishing is legal, some require a permit and some do not allow it and they must

be removed with legal methods at daily bag limit rates. Check with your state regulations before removing large numbers of fish. We have had clients come to us complaining that the largemouth bass population results in their lake is far less than expected, but when asked how many little bass, as instructed, that they have taken out, it's almost always none or not nearly enough. In some instances, depending on how much you fish and how many bass should be removed annually, you may remove every largemouth bass you catch all year that is below the size established by your lake manager, which may be 10, 12 or 14 inches. Again, the total number per acre needing removed annually depends on your lake's productivity. This number will range from 10-25 per acre, and possibly higher, ANNUALLY. With predators that do not reproduce, you may harvest

as you desire, but in smaller ponds, keeping count to know when the right time to restock is important.

Your lake may have some undesirable top-level predators such as **gar** and **bowfin**. These are only consuming forage that the desirable predators in the waterbody could be consuming. If these are caught it is best to remove them, as one less mouth to feed is good for the remaining ones.

Pickeral are what we call owners choice. Some eat the larger ones, some owners just like knowing they are there. We have never seen a lot of large pickerel in our client's waterbodies. You will never remove all of one species from angling, electrofishing or even seining, but it will help the desirable top-level predators remaining with an increased food source.

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Wildlife Corridors

How Corridors Connect the Dots for Wildlife on Your Property

By Ron Jolly
Photos by Tes Jolly



Human expansion and urban sprawl are a fact of life in the United States today. As infrastructure crumbles in large cities and people are forced to live in close quarters the natural tendency to escape continues to expand the boundaries of these municipalities. Interstate highways, railways and shipping canals crisscross the landscape disrupting wildlife movement and fragment habitat necessary for wildlife expansion and migration.

Increasing concern for the welfare of native flora and fauna reached its pinnacle in 2019 with the introduction of House Bill S 1499 in the United States Congress. This bill establishes a National Wildlife Corridor System and provides for the designation and management of

such corridors on federal land and water. Indian tribes can nominate a corridor within their land to be included in a Tribal Wildlife Corridor. It also establishes a Wildlife Corridors Stewardship Fund to receive donations for the management and protection of corridors and establishes a wildlife movements grant program to encourage the passage of fish, wildlife and plant species across the landscape or seascape.

House Bill S 1499 has been read twice in the United States Senate and is currently in committee awaiting passage. In the meantime, 14 states have introduced similar bills dealing with wildlife fragmentation and 8, Maine, Virginia, New Mexico, Colorado, Utah, Wyoming,

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Grassland corridors can be established by allowing native grasses and vegetation to regenerate. Manage grassland corridors with mowing, fire and herbicides.

California and Oregon have passed legislation to establish, manage and protect wildlife corridors. Recently, Florida's legislature unanimously passed sweeping legislation to protect, manage and preserve migration paths and travel ways for animals such as the Florida panther and black bear, keeping them from becoming isolated and inbred.

Many prominent scientists believe one in five wildlife species in the United States is in danger of extinction and that habitat fragmentation is a primary cause. According to renowned biologist Dr. E. O. Wilson: The National Wildlife Corridors Conservation Act would provide the most important step of any piece of legislation at the present time in enlarging the nation's

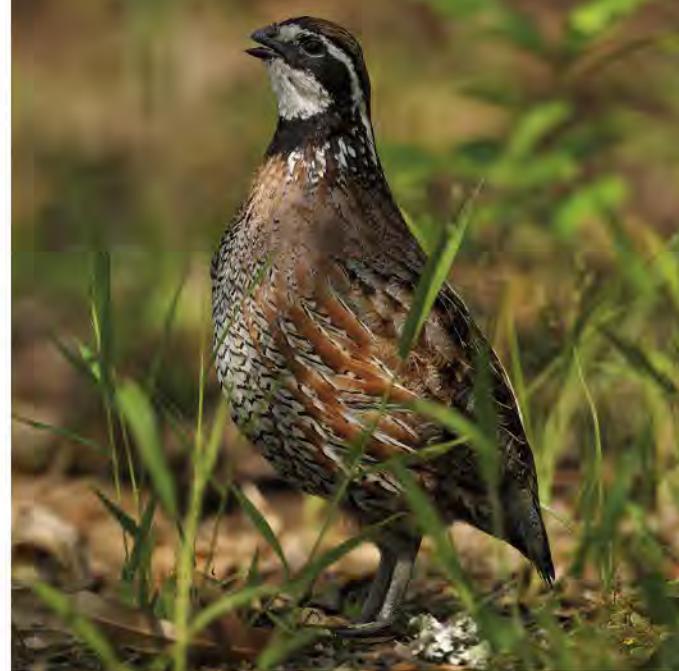
protected areas and thereby saving large swaths of America's wildlife and other fauna and flora.

These continental efforts are the beginnings of solving many of the issues facing wildlife today but there are things private landowners can do to create and manage wildlife corridors on your property.

It Begins in Your Backyard

Owning a piece of property and managing it for wildlife is high on the list of many hunters in America today. My wife Tes and I realized that dream with the purchase of our east-central Alabama farm. The diverse habitat of swampland, upland timber, hardwood bottom-land and open pasture made the property very attractive to deer, turkeys, squirrels, rabbits and a wide variety of birds, reptiles and small mammals.

Say the word conservation and you open a conversation that is very popular in the United States today. In fact, conservation means something to almost every landowner or manager and the reason is clear. Sound conservation practices have changed the landscape and produced record numbers of deer, elk, waterfowl and turkeys. Our goal was to maximize the productivity of our land for turkeys, deer and all wildlife. Early on we recognized the big obstacle to achieving maximum productivity on our property was the pasture land that comprised almost one-fourth of the acreage.

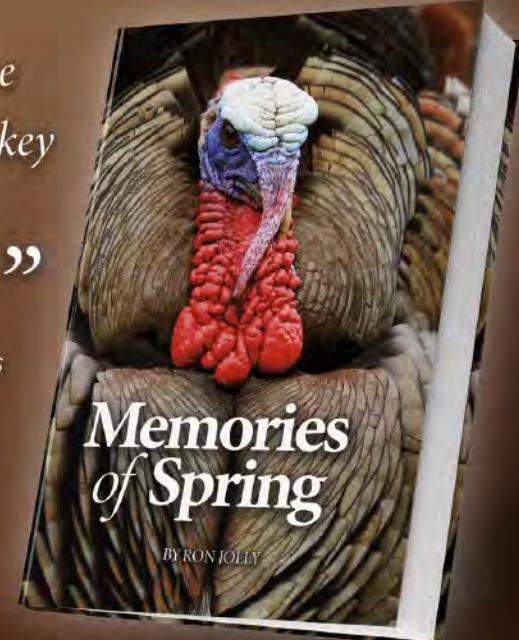


Bobwhite quail utilize corridor habitat for cover, nesting, brood rearing and foraging.

To solve the problem, we began converting pasture into wildlife habitat in small-block increments.

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First, we planted 30 acres of loblolly pines. Several years later we planted another 20 acres of pines. Then we planted 10 acres of mixed oak varieties. Another 12 acres were developed into food plots. The final 20 acres were lightly tilled and allowed to naturally revegetate and a 70-foot-wide strip of loblolly pines was planted to create a corridor between grassland and a four-acre food plot. This process took 10 years to complete but today the entire farm is wildlife friendly. As a result of this work and planning we had created corridors that wildlife could use to traverse the property without being exposed, bedding and nesting cover and natural food sources.

What Is a Wildlife Corridor?

One of the greatest threats to wildlife populations is habitat fragmentation. Human expansion, along with agricultural and urban development, is destroying large blocks of wildlife habitat. Wildlife corridors provide a balance between expanding human populations by creating habitat beneficial to wildlife and connecting fragmented

areas. They also increase survival of wildlife by increasing food sources, providing cover and decreasing the chance of predation.

A wildlife corridor is a feature that connects two or more isolated habitats. They can consist of trees, vegetation, water and/or geographical features such as ravines, gullies or canyons. Corridors can be created or exist naturally. They provide safe travel for wildlife from one habitat to another.

Locations for wildlife corridors are most easily determined by studying aerial photographs or detailed topographical maps of properties or landscapes. The goal is to determine how isolated blocks of habitat can be connected by establishing cover between them or through them.

Types of Corridors

Woodland—Woodland corridors are planted or occur as naturally regenerated trees that connect one stand of timber or woodlot to another. They can comprise of trees or shrubs similar to the blocks

of timber they connect or planted to totally different species of trees. The wider the corridor the better but a minimum of 25 feet is recommended. We planted strips of loblolly pines to connect timber stands of our Alabama farm. Pines grow fast and provide cover in a short period of time. Later they can be thinned to allow sunlight to reach the ground. Periodic burns stimulate the growth of native vegetation.

Grassland—Grassland corridors can be established along field borders, fencerows, waterways or as entire fields. They can be planted to native warm season grasses such as big bluestem, or indiangrass. Beneficial cool season grasses such as timothy and orchardgrass may be used. Legumes and forbs such as wildflowers are also beneficial. Check with your extension agent for grasses that grow best in your area. Grassland corridors can also be established by allowing native grasses and vegetation to regenerate. Plowing or disking the ground releases the native seed bank and hastens the process. A minimum

Hardwood strips that bisect large areas of open terrain create wildlife bridges for deer, turkeys and many other wildlife species.



width of 25 feet is recommended and the wider the better. Maintain these grassland corridors with herbicides to control broadleaf vegetation or periodic prescribed fire.

Shrubland—Shrublands are not often considered vital wildlife habitat. In reality, many species, including bobwhite quail, whitetail deer, rabbits and many species of birds and small mammals, depend on thickets for shelter and cover. Cedar thickets, abandoned fields and cutovers are good examples of shrublands. To establish a shrubland corridor plant dogwoods, crabapples and viburnums or species native to your area. The Wildlife Group Nursery and Mossy Oak Native Nursery™ are excellent sources for trees, native seeds and grasses needed to create corridors. Open ground left untilled or mowed will naturally populate with saplings in 3-5 years. Manage with periodic prescribed burns, disking and/or mowing.

Wetland—Rivers, streams and wet drains serve as natural corridors for all sorts of wildlife. These corridors, especially their banks and channels, should simply remain undisturbed.

In most cases it is cost prohibitive or impractical to connect swamps, sloughs or wetlands with identical habitat. Woodland, grassland or shrubland corridors are sufficient. Before establishing one of the corridors in wetlands, choose plants that tolerate wetland conditions. The easy way to establish a wetland corridor is to mark off the desired width of your corridor and allow it to naturally regenerate. This will ensure plant species suited to the soil will become established.

Brushy corridors through planted pine plantations provide edge cover and safe travel routes, browse and nesting cover for deer and other wildlife.



Geographical—Canyons, gullies, and ravines between two isolated habitats are often used by wildlife to travel from one to the other. Animals use the contours of these features for security when traveling. These naturally occurring features are most commonly found in the western United States.

These are the widely accepted types of corridors and we have three of

Planted pine strips bordering food plots offer wildlife security and travel ways from one habitat to another,

the five on our farm. The woodland corridor is a 70-foot-wide stand of planted pines that connect mixed hardwoods and pines. To manage that strip we plan to thin the pines before they shade out understory growth. This will allow sunlight on the ground and new annual growth.





Wetlands such as creeks, swamps or sloughs are excellent wildlife corridors. Little to no management is required for these features.



Planted pine strips between food plots and grassland habitat create travel ways and provide security and escape routes for animals using both.

The grassland corridor on our farm is old pasture land that we allowed to regenerate natural growth pines, shrubs and grasses. It is approximately 300 feet wide and provides an abundance of natural forage, browse and cover for wildlife moving between two stands of planted pines. We manage this corridor with a one-year rotation of fire in

late winter and mowing in summer after turkey nesting and before fawn drop.

The wetland corridor is a strip of mixed pine and hardwood timber on either side of a small creek that runs from planted pines to hardwood timber bottomland. When this corridor needs enhancement,

we plan to thin the timber along that drainage to allow more under-story growth.

Other corridors are established along property line fences by allowing under-story shrubs, briars and saplings to grow unchecked. Field edges are feathered and allowed to grow natural weeds, grasses and briars. Open strips were left when planting pines. Allow these strips to revegetate in native plants. When the pines are in mid-rotation there is practically no under-story and deer tend to avoid them. These strips encourage deer to cross the plantation via the brushy, grassy strip. Manage these strips with mowing and prescribed fire. These features offer wildlife increased native food sources, escape cover and nesting habitat.

Hunting Wildlife Corridors

In addition to benefitting many species of wildlife, corridors offer great opportunities for hunters. Cotton-tail rabbits literally live in corridor habitat as do bobwhite quail and many non-game birds. Turkeys utilize them as nesting cover and gobblers often troll their edges when hens are on the nest.

Deer hunters can take advantage of corridors by positioning stands or blinds where they can intercept deer traveling from one area to another. I find them especially productive just prior to, during and just after the rut. They are excellent locations for trail cameras. Over time, obvious game trails are established. These trails show where most deer travel through the corridor. Place your cameras on these trails. Use the reconnaissance from the trail cameras to determine what is using the corridor and when. Play the wind and place a pop up ground blind or treestand on the favorable end or side of the corridor. It is a waiting game so patience is key.

Shrubs, briars and grasses left to grow along fencerows on one or both sides provide browse and security cover that encourages deer to use them as a travel way from one habitat to another.

Summary

There are countless benefits of having wildlife corridors on your property. The key is understanding where they should be and creating a plan that develops practical habitat that is wildlife friendly. Understand, this takes time. In our case it took 10 years to convert pasture land that comprised almost a quarter of our acreage into productive wildlife habitat. With proper construction and management, corridors become permanent fixtures that help maximize the potential of your property by connecting one viable habitat to another.

The end result is a property that is completely wildlife friendly. Game movement from one part of the



farm to the other is predictable and animals are comfortable traveling between them. This increases hunter success and landowner satisfaction. After all, the goal for today's land owners and wildlife managers is making the land you

own and manage the best it can be for all local wildlife. Corridors are one more feature you can develop that helps you achieve those goals by connecting all the features of your property for the wild things that call it home.

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Wildlife Trends Journal

Management Calendar

Dave Edwards



Mow and fertilize existing perennial clover plots.

Although a great food source for deer for the past several months, perennial clover generally looks its worst in late summer due to summer heat and often very dry periods of summer. However, as fall approaches with cooler temperatures, the clover should start recovering from the stress associated with heat and drought. Mowing and fertilizing your clover plots after a couple fall rains will give it a boost and will ensure good growth through the fall. Do NOT mow the clover too low. Just above the clover plants is good (clipping the flowers and other weeds). Also, do not use a fertilizer with nitrogen. Clover makes its own nitrogen. Adding nitrogen will only

feed undesirable weeds. If needed, you can broadcast additional clover seed in areas that are not doing well.

Now is a good time to hold a preseason meeting to ensure everyone is aligned on this year's harvest plan, work needs, and rules.

As with most things, communication is the key to avoiding issues. A preseason meeting can help ensure everyone that will be hunting the property understands the goals, the plan, the rules, and any work needed before the season starts (e.g., food plot planting, stand management, gates/fences, camp prep, etc.). This meeting is particularly helpful for those that are in leased hunting clubs (regardless of whether the club consists of 5 or 15

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Mowing and fertilizing perennial clover plots will give it a boost and ensure good growth through the fall.

members). However, even if you hunt your own land with friends and family, a preseason meeting is helpful and simply provides an opportunity for everyone to catch up, relay info, and develop plans to prepare for the upcoming season. If you have a wildlife biologist helping you, this is a great time to have them join the meeting to share the status of the deer herd, trends in harvest or hunter observation data and provide recommendations for this season. This also allows folks the opportunity to ask the biologist questions about the management plan. I make the circuit to many clients this time of year. We call them camphouse seminars. Not only do I share their data and harvest recommendations, but typically

share and discuss topics that may be of interest for that particular landowner/club. I have found that when hunters understand why a recommendation is made, they are more apt to implement it. For example, let's say I made a recommendation of harvesting 25 does this season. Without any other supporting info, a hunter simply hears we need to harvest 25 does.

However, once I explain how balancing the sex ratio, through doe harvest, translates to healthier bucks with better antlers, they tend to more aggressively implement the recommendation.

Start preparations for fall food plots.

It is difficult, if not impossible, to establish successful food plots without planning and adequate soil preparation. Planting quality food plots is a process that may span over several months, not a weekend. There are several factors that influence the success of a food plot program. Among the most important are establishing a well thought out food plot plan, ensuring proper soil fertility and pH, ensuring hardpan does not exist, preparing a firm, smooth seed bed, only planting under favorable conditions, and controlling weeds. Each of these activities plays an important role in the success of your food plots. Here are a few tips on planting this fall:

- Test soil early and apply required lime (preferably at least 6 months prior to planting). It takes time for the chemical process to take place and effectively change the soil pH. If you didn't lime in spring or early summer, go ahead and apply it now...better late than never.
- Use the results of the soil test to create the best fertilizer blend for your specific soil needs. Many people use balanced



Preparing food plots should be done well ahead of planting dates.

fertilizers such as 13-13-13 because they are easy. However, it is well worth your time to custom blend fertilizer to match your needs versus applying a balanced fertilizer that often requires applying extremely high amounts of some nutrients to compensate for the lack of others in the soil – which results in wasted fertilizer/ wasted money.

- Order seed and fertilizer as early as possible to ensure it is ready when you are.
- Ensure plots are relatively smooth. This takes time and should be done well ahead of planting dates. If you are broadcast planting, simply drag the field just before planting to loosen the soil to provide good seed-soil contact. Once broadcasted, cultipack the field to “mash” the seed into the soil (If you’ve never seen or used a cultipacker, check them out. In my opinion it is a “must have” implement that has many applications in food plot planting). Do NOT drag food

plots if they are somewhat unsmooth or if you planted small seed such a clover. Dragging will result in burying seed too deep.

- Have seed beds ready, but don’t fall into the trap of planting too early. September is often a very dry month. Mid-October is ideal in most areas of the Southeast. This is when we start getting regular cold fronts that bring rain. Planting too early normally results in disease (mostly army worms), poor planting success due to droughty conditions, or if you receive adequate rain the food plot is knee high and less attractive to deer by the time gun season arrives.
- Adding annual reseeding clovers such as crimson or arrowleaf into your fall plantings will increase the quality, nutritional value, and longevity of your food plots. With proper management, these clovers will produce food well into summer then regenerate again next fall which will save you money on seed costs.

- Use exclusion cages to monitor deer use and plot performance. An exclusion cage is a small “tube” of fence staked to the plot that prevents deer from eating the crop within the exclusion cage which allows you to assess plot growth and deer use of the plot. Cages are normally 2-3' foot in diameter and 3-4' tall. I've seen many food plots where the manager thought the crop did not do well, where in fact it did but deer simply mowed it down and never gave it a chance to grow.

Check and lubricate gates & locks

Servicing gates and locks are often overlooked, but is something that needs to be done at least annually. Unattended or poorly working gates can pose unnecessary safety hazards. The first order of business when servicing a gate, particularly one that is not used often, is to inspect for and eradicate wasps and their nests. Nothing can put a damper on a day in the woods like getting stung by a wasp at the gate! Next ensure the gate functions properly. Is it easily opened and

swinging level? Are the hinges in good working order? Make notes of parts needed to make repairs if you do not have them handy. To reduce the chances of running into a “no-shoulders” (snake), ensure the gate is free of tall weeds and vines by weedeating or using herbicide (recommended). Lastly, inspect and oil the lock, locking mechanism, and hinges of the gate. Lastly, ensure posted signs are in good condition and are clearly visible. Don't hesitate to replace old posted signs as newer signs send a message that the property is being used.

Prepare skinning shed for deer data collection

Deer season is right around the corner. Collecting information from deer harvested on your property can provide valuable insight to the status of your herd, the progress of your management strategies, and assist in making harvest decisions that will improve the deer herd and ultimately the hunting. Making sure your skinning shed is fully stocked and ready should be an annual pre-season activity. At a minimum, you should be collecting age (jawbone), weight, antler measurements, and

reproductive data. Supplies needed include jawbone extraction tool, pruning loppers, wire basket to air-dry/store jawbones, sharp knives, permanent markers, pencils, weight scale, gambrel/rope for hanging deer, flexible measuring tape, instructions on how to collect and store harvest data (recommended if more than one person will be collecting the data), and harvest data sheets to record the information collected. General preparations may include sharpening and lubricating pruning loppers, calibrating weight scales, inspecting and/or replacing rope or cables used to hang deer, ensuring water source is working properly, and stocking/organizing the data collection area. The Quality Deer Management Association (QDMA) or Forestry Suppliers are great places to purchase supplies to collect harvest data including harvest data sheets. Collecting and analyzing harvest data is often the backbone to the success of a deer management program.

Manage dove fields in preparation for the upcoming season.

With much experience planting and managing dove fields over the years, I've found that the most successful dove fields have a few things in common. First, they have an abundance of food (seeds). Dove are primarily seed eaters and consume very little insect matter or green forage. Among the various seeds available to dove, grass seeds and grains comprise most of their diets. Secondly, the seeds must be readily available to the dove. Dove prefer to feed on the ground in open cover where they can watch for approaching predators. Dove have short legs and are not strong scratchers (like turkeys) so they avoid areas with dense ground cover and rough vegetation. Finally, the field must be located in an area



Preparing the skinning shed should be part of your annual preseason tasks.



Ensuring bare ground within a dove field allows dove good access to food.

used by dove – similar to being in a flyway for waterfowl.

Although it can be done, August is a little late to begin thinking about planting a dove field unless you are in the Deep South and preparing for the last phase of the season. However, the most commonly planted crops for attracting dove include various millets, sunflowers, wheat, sorghums and other small grains. Assuming you have a good crop growing that will mature as the season approaches, let's discuss a few ways to ensure the seed is readily available and will attract the most dove possible. First, let me caution you to check local baiting laws. Most states allow manipulations of crops so that seeds that were grown on that particular field are available to dove. Here are a few strategies I use when possible. First, always keep disked strips of bare ground through the field. As mentioned, dove like clean/bare ground to land in and easily walk around. They also use these strips to pick up grit (small pebbles and sand) used in their digestive system. Freshen these strips up through the growing period and hunting season as needed. A week or so before the season, I burn sections of the field to remove vegetative cover of the

crop and expose the seed on bare ground. If crops are mature but still green, apply an application of glyphosate (Round Up) a week or so before burning to brown the crop ensuring it will burn clean. I often use the bare dirt disked strips as firebreaks – so think these through before installing them earlier in the process. Plan how much of the field to burn according to your anticipated hunting schedule. For example, if you plan to have one "blow out" hunt when the season opens, prepare and burn the entire field (or whatever is needed). However, if you plan to hunt through the various phases of the season, save some of the field to burn later just before hunts are scheduled.

A few other tips:

- Top-sowing or broadcasting without covering the seed is not considered a normal agricultural practice and is illegal in most states.
- Dove prefer to land in clear areas. Maintaining disked bare ground strips will ensure easy access for dove (and hunters).
- Plant dove field with a variety of plantings that will have varying

maturity dates (e.g., browntop millet, Japanese millet, and sunflowers). This will ensure continued attraction throughout the season.

- Too much shooting pressure will cause dove to move to other areas. Limit shooting to 1 hunt per week.
- Manipulating portions of the field by mowing, chopping, burning, or disking a week or so prior to hunting will help expose seeds to attract dove to the field.
- When planting the field, sowing handfuls of Egyptian wheat at potential "stand locations" can create great cover for hunters. However, this needs to be done at planting time.

Prepare duck blinds - so they can weather in

August or early September is a good time to inspect duck blinds and "re-camo" to make sure they are ready for the upcoming season. Before initiating flooding, check duck blind structures and make any repairs or modifications needed. Because blinds are located in wet, muddy environments, rotten wood is a common problem and will need to be replaced from time to time. If your blinds are camouflaged using vegetation, now is a good time to "re-camo" or "re-brush" the blind. A newly brushed-in blind made during the season on a pond that ducks have been using will stick out like an elephant in your living room. Before flooding takes place, it is also a good idea to install stakes or something else to identify obstacles to avoid when accessing the blind. Obstacles may include stumps, stump holes, logs, deep beaver or alligator runs, etc. You will be thankful these are marked when you are wading to the blind in freezing weather before daylight.



Now is a good time to inspect duck blinds and “re-camo” to make sure they are ready for the upcoming season.

Service tractors, ATV's, and other mechanical tools.

Because early fall is a busy period for equipment use such as tractors, ATV's, and chainsaws, late summer is a great time to perform routine maintenance, repairs or service. I recommend developing a maintenance sheet that includes all your equipment and keeping records of service. This will ensure that equipment is taken care of and will be in good working order for the fall activities such as food plot planting and preparing your property for hunting season. Don't forget about tractor implements such as grain drills, mowers, or harrows. We even keep a maintenance sheet for small tools like weedeaters and pressure washers. I have learned that preventative maintenance (maintenance done before something breaks) saves lots of time and money.

Begin flooding duck ponds in early September.

Teal are typically the first ducks coming down the flyways as they migrate south for winter. Although

it depends on where your property is located, you should expect to start seeing teal in late August through mid-September. To accommodate these waterfowl and/or to attract them for the early teal hunting season, flood at least 30% of your duck pond(s). To be most attractive, make sure there are some open water areas within the flooded area. The main reason for not flooding the entire duck pond is to delay seed deterioration caused by flooding. Seed deterioration rates, or the amount of time it takes for a seed to breakdown after being flooded, vary among different plant species. Most native wetland plant seeds are well adapted to flooded conditions and will last up to 3 months under water. However, most agriculture crop seeds breakdown much quicker. Thus, you only want to flood enough of your pond to provide early arriving teal with a food resource. Begin flooding the remainder of the pond in late October for the main flight of ducks. This will ensure the seeds you've worked hard to produce will remain longer into the winter to

provide food and attract ducks. If you have never shot early season teal, you're missing out. Teal respond to calling and work decoys well and they fly in fast, tight flocks which makes for some fast and furious shooting – notice I said shooting and not killing!! – they are tough to hit!

Mow access lanes through quail hunting areas.

Generally speaking, areas that are being managed for quail hunting are disturbed regularly by fire, disk-ing, and/or applications of herbicide to control undesirable vegetation to promote quality quail habitat. Consequently, the understory habitat in these areas seldom grows taller than 3 feet. However, even with such low growing vegetation, navigating and hunting these areas with bird dogs and other hunters (particularly kids) can be challenging due to the relatively thick nature of this vegetation. While prescribed fire, disk-ing, and herbicide applications are best suited for creating quail habitat, mowing can be used to increase the huntability of the habitat. That is, mowing access trails through quail habitat will allow easier access for hunting. How and where you mow trails is a personal preference. Some people like straight line/checkerboard mowing which results in a systematic appearance and is easier for hunters to figure out where other mowed lanes are while working dogs. While it depends on the situation, I prefer randomly mowed lanes that wind through the habitat. This strategy results in a more natural look. Regardless of the method you use, mowing these trails just before the growing season ends (late summer) will allow the vegetation to grow a little before hunting season/dormant season arrives. I generally try to time this mowing when I feel there are 2-3 weeks left of growing season. The result will

be trails that are easily walked but do not appear as though they were just mowed providing a more natural/aesthetic look within the quail hunting areas.

Develop a pre-season deer harvest plan that will maintain or improve your deer management program.

Now is the time to develop deer harvest plans/goals for the upcoming season. Monitoring the status of your deer herd is the backbone to the success of your deer program. Hopefully, you have been collecting harvest data (weights, measurements, ages, etc.), hunter observation data, as well as conducting camera surveys. Collectively, this information is used to make educated deer management decisions that will help you achieve the goals of your program and experience better hunting. Without this information, you are simply guessing and/or hoping the hunting on your property will get better. Though it may not be the most exciting part of deer hunting (neither is cleaning out and repairing shooting houses), collecting and analyzing information about your deer herd will result in better management decisions and ultimately better hunting. If you haven't already done so, work with your local state agency wildlife biologist or hire a wildlife consultant to review your data and information to help develop harvest recommendations before hunting season starts. Using your data and trail camera photos, an experienced deer biologist/manager can provide valuable insight to the status of your deer herd and provide recommendations to maintain or improve herd conditions. For deer biologists, assessing deer management programs and hunting is more than a hobby or passion – it's their profession. It's what they do day in and day out. Based on their experience and your information, a deer biolo-

gist can often prescribe recommendations that will significantly improve the hunting on your property.

Install trail cameras to capture photos of deer

Depending on where your property is in the whitetail's range, antler hardening (shedding of velvet) has already taken place or will shortly. Late August or early September is a great time to begin installing trail cameras around your property to capture photos of bucks. During this period, bucks are congregated in loose bachelor groups allowing you to photograph multiple bucks together. Where to place the cameras depends on local food sources and deer activity. In some cases, attracting deer to a camera site with scattered whole corn is most effective. However, mineral licks that were created earlier in the year often make great camera locations, particularly if you have experienced wet conditions. Other locations that may be effective in late summer or early fall include entrance trails to large agriculture fields, along the edge of smaller food plots of perennial

crops, summer food plots, or small water holes (if weather is warm and conditions are dry). Naturally, most hunters are anxious and excited to plug the SD card into a computer and run through the photos to see what kind of bucks they have, which is what I do. However, take time afterwards to do a little analysis of the photos. By counting the number of bucks and does in the photographs you can get an idea of the existing adult sex ratio which will help you make harvest decisions. Estimating the age of the bucks you photographed will shed light on the buck age structure. Obviously, a full-scale camera survey will provide the most accurate and comprehensive information about the deer herd, but "random" trail camera photos certainly have a story to tell and can help you better understand the status of the deer herd on your property. All of this allows you to make better management decisions that lead to desired results. Photos from trail cameras will also help reduce "mistakes" when judging bucks from a deer stand where judgments are often made in seconds while your heart is racing 200 beats per minute!



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