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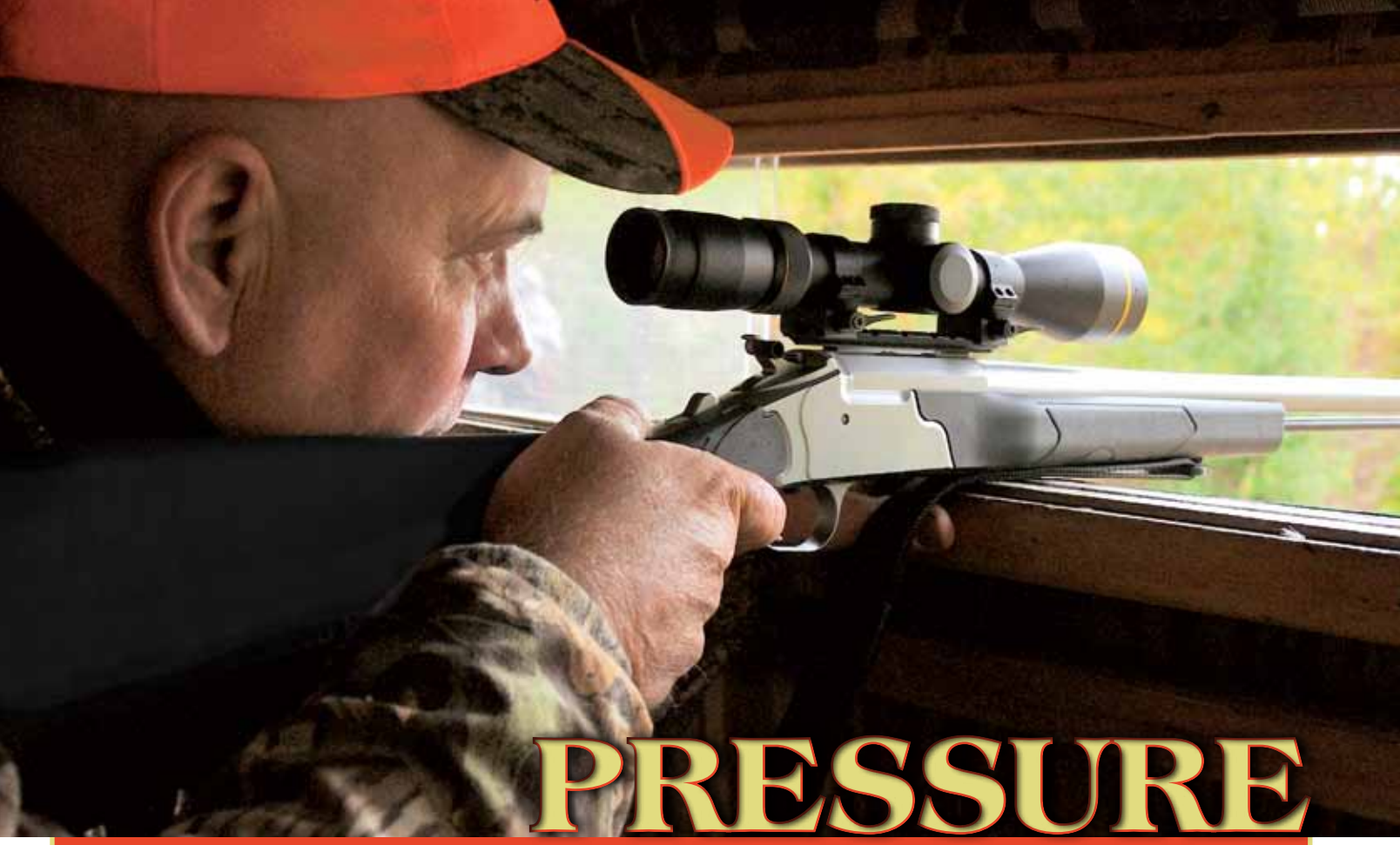


PRESSURE

A unique research project focused on buck movements around food plots and stand sites. The findings may encourage many hunters to re-think their strategy for stand choices and pressure patterns.

By Clint McCoy

In between the occasional deer sightings, text updates from my hunting buddies, and checking in on the latest college football scores on my iPhone, I find that my thoughts drift during those long sits on stand. Reflecting on past hunts, enjoying the peacefulness of a crisp, cool morning, or taking time to thank our Creator for the masterpiece He has put together for us to enjoy are just a few of the journeys that my mind has taken while waiting for an unsuspecting deer to wander into bow range. Most of the time, however, I find myself, as I'm sure many hunters do, thinking about deer.

I got so many trail-camera photos of that big 8-pointer back in August, but now he's disappeared. Where did he go, and why did he leave?

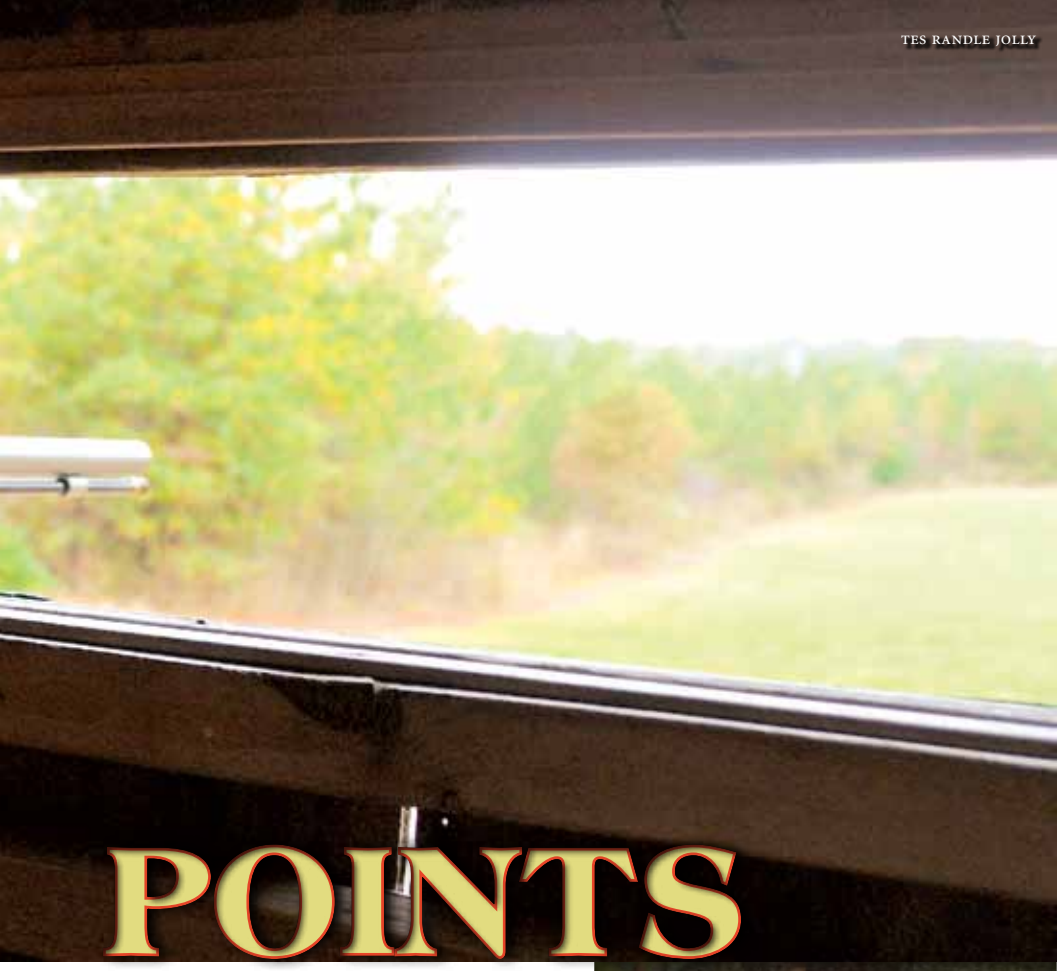
This is the third time I've sat this stand this year. How many times can I sit here before I start affecting deer movements? Have I overhunted this spot?

Do bucks really become wiser with age? Or, could it be that our perception is skewed because there are fewer of them running around out there, which inherently makes it harder to encounter them?

I was fortunate to be able to tackle some of these questions directly through scientific research. As a graduate student at Auburn University, I led an effort to better understand how bucks move across the landscape and the potential impacts that quality habitat, hunting pressure, and buck age have on their movements. Advances in GPS technology and mapping software are helping explain deer movements and behavior, revealing motives for why, when, and where deer travel.

High-Quality Study Site

So that you can better apply the results of our research to the areas you hunt, it is important to provide an accurate depiction of the 6,400-acre portion of Brosnan Forest that served as our research site. This property is an intensively managed longleaf pine forest located in the flatlands of South Carolina's Lowcountry. Brosnan Forest is owned by Norfolk Southern Railway and has been maintained as a conference and recreation facility for the employees and customers of the company since the 1950s. The property is actively managed for wildlife and timber production, and most areas are burned on a 2- to 4-year rotation. Mature longleaf pines dominate the landscape, though an intermixing of various-aged loblolly pine plantings, hardwood drainages, and an array of food plots provide ideal habitat for many critters, including deer. Roughly 300 acres of food plots (about 5 percent of the property), a feeder per 100 acres, and the natural browse that is maintained by proper management techniques, provide the resources necessary to support a large and healthy deer herd. Spotlight and thermal imaging surveys conducted over the



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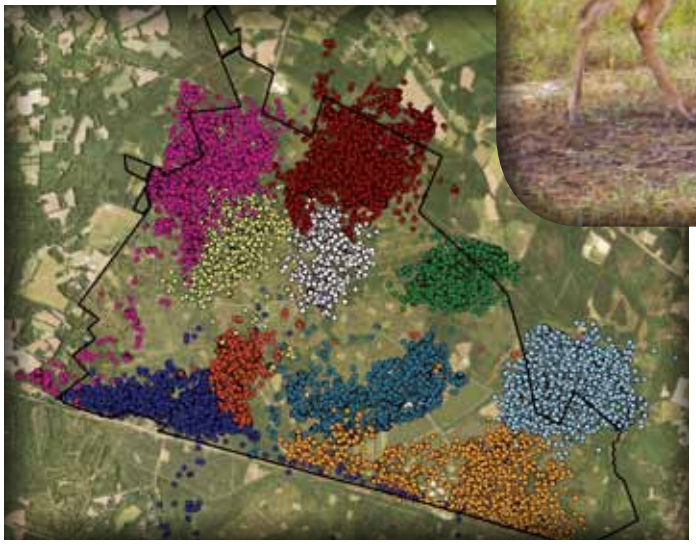
POINTS

course of our study revealed a relatively stable population and a buck:doe ratio of nearly 1:1.

Hunting on the property is restricted to invited guests of the Railway and has followed QDM guidelines for more than a decade. Hunters are encouraged to pass young bucks and shoot does, and, as a result, the antlerless harvest generally



In this example from the study, the colored dots are GPS locations, and each color set represents all the locations of one unique buck. Because habitat quality is high on the 6,400-acre study area, bucks have little reason to travel far. The average home range for a buck in the study was 350 acres.

constitutes about 65 percent of all deer harvested each year. The style of hunting at Brosnan Forest results in minimal intrusion or disturbance to the hunting area, as hunters are dropped off and picked up in close proximity to their stand. In most cases, hunters walk less than 20 yards before climbing into a box blind or ladder stand. Most of the nearly 100 deer stands on the research site are positioned looking over food plots and/or feeders (hunting over bait is legal in this area of South Carolina).

Capture and Collar

We captured bucks by "hunting" them with tranquilizer guns during the late winter and early spring of 2009, 2010, and 2011. We collected tissue and blood samples, examined toothwear to estimate age, and, most importantly, fastened a GPS collar around the buck's neck. The GPS collar was programmed to record a location once every 30 minutes from August 24 to November 22, which encompassed the unusually early timing of the Lowcountry rut (80 percent of breeding in this population occurs between September 20 and October 30).

After three years of collection efforts, over 40 different bucks were captured and fitted with a GPS collar. Rarely does everything work out perfectly when conducting research on free-ranging animals, especially when you attach a high-tech device to them. Having said that, we were fortunate to retrieve location information from 37 different bucks, totaling of over 116,000 locations! The collars were distributed evenly across age classes, where eight of our research animals were yearlings, 10 were 2½, nine were 3½, and 10 bucks were aged 4½ years old or older.

Home Range Size

"How big was his home range?"

This is one of the first questions hunters ask about deer movement studies. If you look back at the description of the study area, you realize a deer residing on Brosnan Forest does not have reason to travel very far. All of the major resources a buck needs to survive and reproduce – food, cover, and does – are plentiful across the property. So, we predicted these bucks would have comparatively small home ranges, and that is exactly what we found. When it is not necessary for bucks to travel great distances, our study suggests they seldom stray far from home. The average home range for a buck in our study was only 350 acres. Often the question is asked: "How does the age of a buck factor into the size of their home range? Do older bucks cover a larger area than younger

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ones?" Our two smallest home ranges were yearling bucks at 60 and 90 acres. Our two largest home ranges of 754 and 640 acres were also yearling bucks! Age apparently did not play a role in determining the size of a buck's home range in our study, and as previous studies have documented, buck movements are largely driven by their own "personalities" – some tend to cover large areas while others are content to stay close to home. To further illustrate that point, take two of our 4½ year old bucks – one had a home range of 521 acres, the other only 108 acres!

"How far did he travel?" is another common question from hunters.

Again, we detected no major differences between age classes, but during the pre-rut, a buck averaged about 2.5 miles a day. During the rut and post-rut, they ramped it up to an average of about 3.5 miles a day. So, even though they had small home ranges, bucks were still moving a considerable distance within that range on a daily basis. Our shortest recorded movement was a 2½-year-old buck on August 27, where he only moved 0.4 miles (about 700 yards) in a 24-hour period. On the other end of the spectrum, a 1½-year-old buck traveled just over 10 miles in one day during the peak of the rut.

Hunting Pressure & Buck Movements

Arguably the most fascinating aspect of our research focused on the impact of hunting pressure on buck movements. Brosnan Forest employees recorded the date, time, and location of each hunter as they were dropped off at their hunting stand, giving us the unique ability to examine how bucks may alter their movement in response to increasing pressure. The effects of hunting pressure on deer behavior have been documented by previous research that found increasing use of refuges and dense cover as hunting pressure increased, as well as home range shifts and altered movement rates. However, few of these previous studies included adult bucks, and none have been able to determine how or if the deer's age plays a role in how they respond to hunting pressure. Campfire tales of wise, old, mature bucks outwitting an unfortunate hunter are as common as sweet tea in the South. But, are mature bucks really the Einsteins that we give them credit for? Or, is that the perception that we have simply because we don't encounter them as often as their younger

Clint's study of GPS-collar data included 10 bucks aged 4½ or older. They occupied home ranges of 108 to 521 acres in size.

counterparts? It's no secret that mature bucks are less abundant than yearlings and 2½-year-olds, so our perception of them being "smarter" could simply be a consequence of the inherently lower probability of encountering them while afield.

To try and answer some of these difficult questions, we first determined the distance from each GPS deer location to the nearest hunting stand and assessed how it changed over the course of the hunting season for different age classes. On average, the locations of adult bucks on November 22 were 55 yards further away from hunting stands than they were on August 24. Conversely, yearling buck locations averaged 16 yards *closer* to hunting stands (statistically unchanged) at the end of the study as compared to the beginning. At first glance it appears we have our first shred of evidence that adult bucks are indeed "smarter" than yearlings. However,

Researchers identified "harvest zones" around every stand site that included effective sight and shooting distances. Bucks were four times as likely to enter any harvest zone at the beginning of hunting season compared to the end.

our estimate for adult bucks is slightly biased as a result of some of them being harvested by hunters during the season. The adult bucks that naturally occurred closer to hunting stands were those most likely to be shot by a hunter. Once these deer were removed from the dataset, the average distance to the nearest stand for the remaining adult bucks increased accordingly. Meanwhile, yearlings and most 2½-year-olds were being passed.

Since our first attempt at discerning age differences in hunter avoidance was about as clear as mud, we used a little more sophisticated approach by creating "harvest zones" around each of the hunting stands on the property. Each hunting stand was encircled by a buffer representing the area around the stand in which a hunter could see and harvest a deer. In the example shown above, a deer hanging out in the thick planted pines northwest of the stand would be considered "safe," while any of the locations within the red "harvest zone" would be at risk of harvest. Since we can't hunt deer at night, a deer was only considered to be at risk of harvest if he was within the "harvest zone" during daylight hours. Not surprisingly, bucks responded negatively to increased hunting pressure, but by using this more informative approach, we failed to detect any differences between yearling and adult bucks. All deer, yearlings and mature bucks alike, responded similarly to hunting pressure. Specifically, the odds of a buck wandering into the "harvest zone" during daylight at the end of the study were only a quarter of what they were at the beginning. Or, to put it another way, on August 24 a buck was four times as likely to put himself at risk as compared to November 22.

To gain a better understanding of how bucks respond to hunting pressure, we examined how their use of food plots and bait sites changed over the course of the hunting season. Again, the age of the buck did not have any measurable effect on their patterns of use. An average of 8 percent of deer locations occurred in a food plot during the first week of the study. By the end of the season, food plot use increased to over 12 percent. How can bucks be avoiding the hunting stands that are positioned over food plots, while at the same time be increasing their use of food plots? You probably guessed it: They just wait until after dark. Though bucks increased

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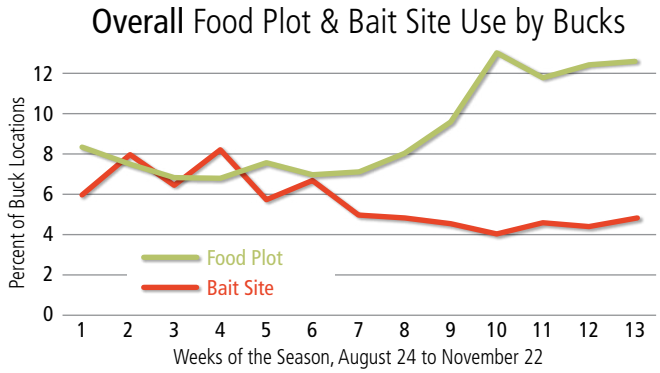
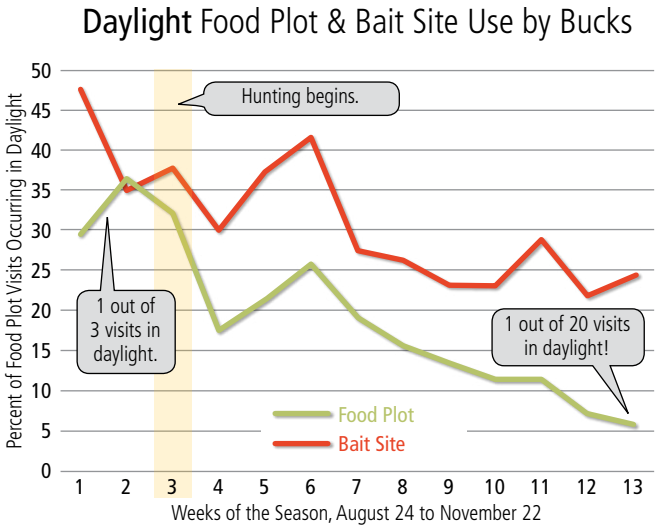
their use of food plots over the course of the season, the percentage of those food plot visits occurring during daylight hours plummeted. During the first three weeks of the monitoring period, before hunting on Brosnan Forest commenced, bucks averaged about one of every three food plot visits during daylight. By the 13th week of the study, 19 out of 20 food plot visits were under cover of darkness! Hunting deer over bait sites resulted in a double whammy. Not only did overall use of bait sites decline over time, but the odds of those bait-site visits occurring during daylight declined as well.





Stand-Site Effects

Up until this point I have discussed hunting pressure in terms of how it generally accumulates over the course of a hunting season. But, as mentioned before, we had access to information that specified when, where, and how long hunters were in stands. We used these data to get a more detailed look at the immediate, or short-term, effects of hunting pressure on deer behavior. Specifically, we wanted to know if the number of hours spent hunting a stand over the previous week had any effect on the likelihood that a deer would enter the "harvest zone" during daylight hours. Again, we looked for differences among age classes and found none. However, we did find an immediate effect of hunting pressure, where the amount of time spent in a particular stand over the course of a week did impact deer behavior. The odds of a buck entering the "harvest zone" during daylight hours were reduced by half after 12 hours of hunting pressure. In other words, a buck was twice as likely to avoid putting himself at risk if the stand had been hunted for 12 hours over the course of the previous week.

Knowing that hunting pressure does indeed affect deer behavior, we set out to answer one final question: Once a stand is hunted, how long does it take for a buck to recover from the intrusion? We once again examined the probability of a buck entering a "harvest zone" under six different circumstances: the stand hadn't been hunted within the past five days, it was hunted the previous day, and it was hunted two, three, four and five days ago. The graph on the next page shows how deer, on average, responded to each of these scenarios. If the stand had not been hunted in the previous five days, deer seemed to be attracted to the stand site. This is not surprising given the fact that most stands are set over food plots and feeders that would naturally attract deer. However, if the stand was hunted the previous day, bucks appeared to respond immediately and displayed avoidance behavior. This avoidance lasted on average for three days. By the fourth and fifth days following a hunting event, the response was no longer significantly different from neutral, and thus deer were no longer considered to be avoiding the hunted stand – though they still were not attracted to the site as they were before the stand was hunted.

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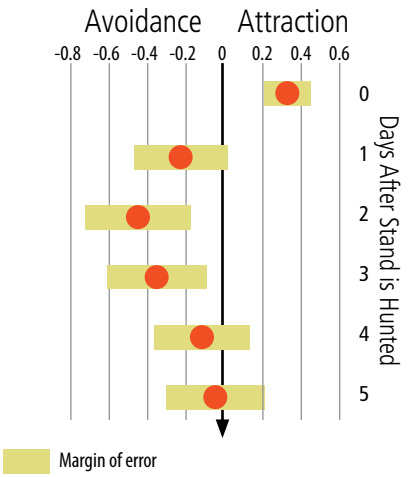

Researchers examined the probability of a buck entering a given "harvest zone" before and after a hunt at that stand. If the stand had not been hunted in the previous five days, deer seemed to be attracted to the stand site (most stands were set over food plots and feeders that would naturally attract deer). Once a stand was hunted, avoidance began immediately and lasted on average for three days. By the fourth and fifth days, avoidance was no longer statistically significant, but attraction had not returned to previous levels.

Final Thoughts

Technological advancements have given us more insight into deer movements and behavior than ever before, but we have yet to, and may never, unravel all the mysteries of the whitetail. One thing we've learned about deer movements is they are difficult to generalize. Some patterns emerge, but on the whole, deer just seem to have unique "personalities" that dictate their movements and home-range size. However, one thing that isn't as hard to pin down is the ability of deer, regardless of how old or how unique their "personalities" may be, to become aware of our presence in the woods. The negative responses to hunting pressure documented in this study are undeniable. It's easy to get in a routine and sit the same stand time after time, especially if it has produced in the past or if you have trail-camera photos of a big buck in the area. It's easy to think, "If I keep hunting this stand, I'm bound to cross paths with that buck at some point." The results of our research suggest just the opposite – the more that stand is hunted, the less likely deer are to pass within range of it. There are always exceptions to the rule, and big bucks get killed every year in heavily hunted areas. But, our findings suggest that to improve your chances of encountering deer, avoid making yourself predictable. By hunting one of your favorite spots too often, you may be unintentionally affecting deer movement and behavior patterns in the area, leading to reduced chances of success. Though I have long thought about the effects that too much hunting pressure can have on deer movement, the findings from our study have convinced me to pay more attention to the potential impact of every hunt.

The question of "how much is too much?" when it comes to hunting pressure is now a little clearer, so make a conscious effort to try and mix things up a little bit the next time you head to the deer woods. It just might make all the difference!

About the Author: Clint McCoy is a deer biologist with the Ohio Division of Wildlife. He earned a master's degree in wildlife science at Auburn University, and he conducted the research featured in this article while working on his Ph.D., also at Auburn. He earned his bachelor's degree in biology at Davidson College. Clint is a QDMA member and was a featured speaker at the recent QDMA National Convention.