Solving The Riddle Of Deer Movement

Part 6

As every hunter knows, various weather conditions and levels of hunting pressure can have a major effect on whitetail activity. Here's what the latest research tells us about these modifiers of deer movement.

by Dr. James C. Kroll & Ben Koerth

Determining how deer activity varies in relation to environmental conditions has always been a real challenge. But thanks to modern technology, we biologists now know more than ever about how weather and hunting pressure affect the activity patterns of whitetails.

As noted earlier in this series, Robert Skinner (then a graduate student working with our Institute for White-tailed Deer Management and Research) conducted a detailed study of how such variables affected a wild herd at Loggy Bayou Plantation in Louisiana. This study, developed and funded by the Dickson Wildlife Museum of Louisiana Game Birds and Mammals, involved computerized monitoring of radio-collar transmitters that indicated whether a given deer was active (on its feet) or inactive (bedded). Robert was able to make some revealing observations of how weather variables impact deer patterns.

BUCKS & DOES DIFFER!

Part of what this study showed was that buck and doe patterns are seldom the same. We deer biologists have long understood that there are distinct behavioral differences between males and females of the species, and that lumping all deer together to make broad statements about their behaviors makes little sense. Unfortunately, mature bucks are much more difficult to catch than are does and thus are almost always under-represented in research studies involving captured animals. This explains why many research projects over the years have focused more on the behavior of does than of bucks.

Both sexes undergo major hormonal changes during the course of a year, and these translate into behavioral changes, especially during the rut. But the two sexes are not equally influenced. While buck involvement in the rut drags on for weeks on end, a doe typically comes into heat once, is bred and then soon reverts to her normal routine. Also, bucks and does have different nutritional demands, and that affects their feeding patterns and choice of habitats at various times of the year.

For these reasons, it is ludicrous to lump all observations of does, fawns, immature bucks and mature bucks together to make specific claims about deer. That is why we at the Institute have spent two decades sorting out the differences between the sexes and various age-classes.

The Loggy Bayou study was the first to show conclusively the subtle but real differences between buck and doe activity patterns. The graph on this page outlines the observed effects of weather on these patterns.

WEATHER & ACTIVITY

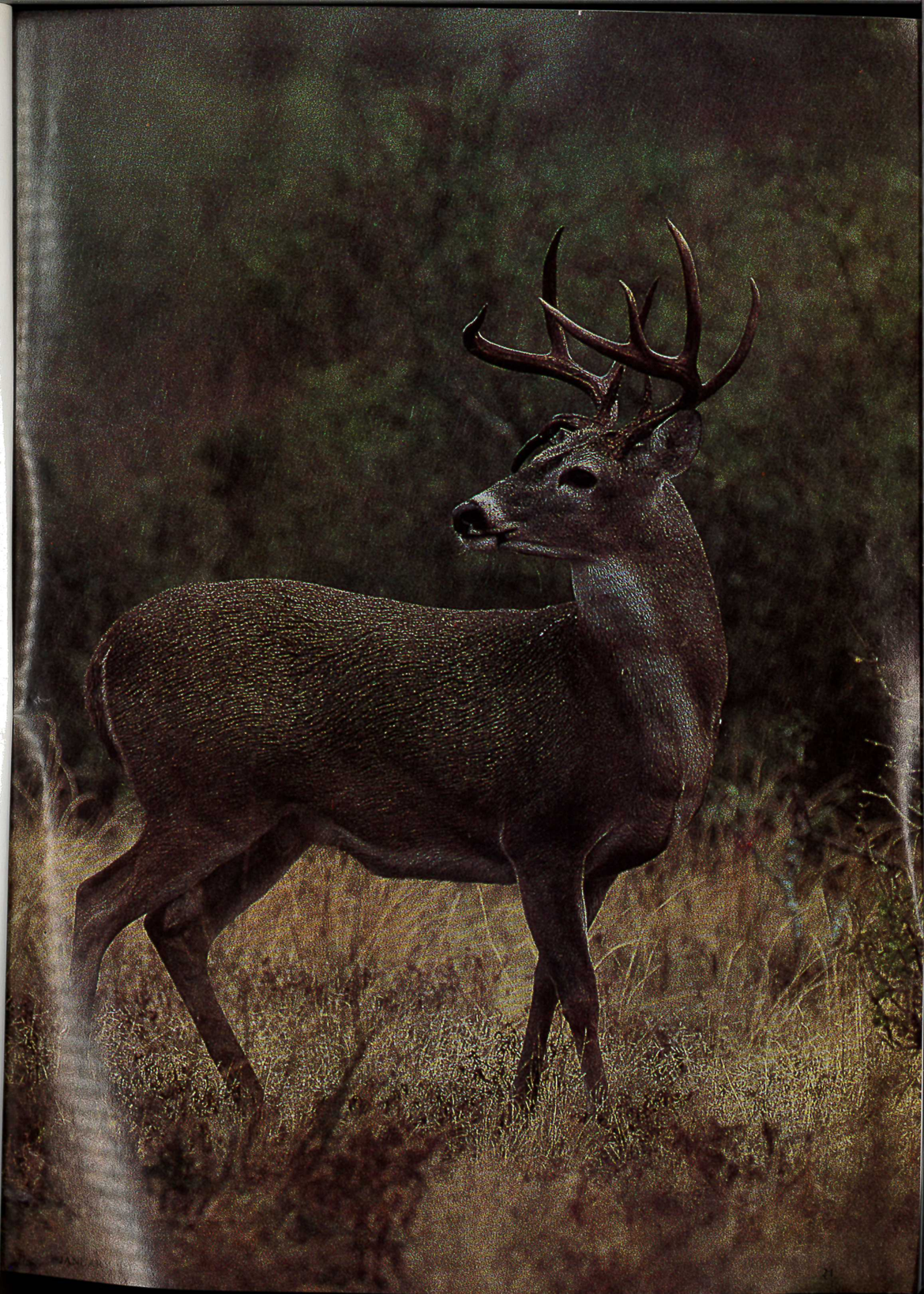
A question often asked of deer biologists is how weather impacts movement. While much has been

WEATHER VARIABLES AND DEER ACTIVITY

	Wind Speed	Sunlight	Temp.	Humidity	Bar. Pressure	Rain/ Day	Rain Rate
PRE-RUT							
Bucks	↓	ne	↑	ne	↓	ne	ne
Does	↓	↓	ne	ne	ne	ne	ne
RUT							
Bucks	ne	↓	↑	ne	↓	ne	ne
Does	↓	ne	↓	↑	↑	ne	ne
POST-RUT							
Bucks	ne	↑	ne	ne	↑	ne	ne
Does	↓	↓	↓	↑	ne	ne	ne

This table shows how deer activity at Loggy Bayou Plantation in Louisiana was affected by environmental variables during a recent study. Arrows indicate an increase (↑) or decrease (↓) in activity as the value of the variable increased; "ne" indicates "no effect." Chart by Allen Hansen.

The Loggy Bayou Plantation study in Louisiana was the first to show, via computerized monitoring of radio-collared deer, the effects of weather variables on buck and doe activity. Chart by Allen Hansen.



The authors' research indicates that even heavy rain has no negative effect on buck movement during daylight hours. At night it's a different story, however. Photo by Mike Biggs.

written on this topic in both the scientific and popular literature, most authors have focused on describing severe winter weather's negative effects on the activity patterns of Northern whitetails; little else has been examined in detail.

One significant problem in the analysis of weather variables is that the variables tend to interact. For instance, air temperature affects relative humidity, while wind speed and direction affect perceived air temperature. It's hard to isolate one variable, and trying to base anything on such analyses can lead to false conclusions. This is why we analyzed the Louisiana data with what is called a *multivariate* approach, in which the most sophisticated statistics and computer programs were used to test the combined effects of many variables.

Please note that while the results are presented here as individual variables, they actually represent a multivariate analysis of *more than 175,000 lines of data containing more than 2.275 million individual data entries.* The sampling period was from Sept. 21, 1993, to Jan. 21, 1994, covering the entire rut and overall hunting period.

Wind Velocity

Over the years, several researchers have commented on how wind velocity affects whitetails. One author in South Texas asserted that high winds increase deer movement, while most others have suggested that high winds have a suppression effect. *In our study, as wind speed increased, doe activity decreased. Bucks, conversely, did not appear to be much affected by wind speed; in fact, the only time we found high winds to have a negative impact on buck activity was during the pre-rut period.* It appears that bucks "throw caution to the wind" when the rut kicks in.

Sunlight

As we have noted in previous parts of this series, whitetails are basically low-light animals. But in the Loggy Bayou study, the rut appeared to affect this general rule, at least regarding does. *Female deer activity was not suppressed on sunny days during the rut, but buck activity was.* Of course, sunlight was not a factor in nocturnal activity.

Temperature & Humidity

One of the most striking regional differences in whitetails is in the way Northern and Southern deer react to changes in air temperature. *Northern deer react positively to lower temperatures, moving freely, while Southern deer tend to spend a greater percentage of the time bedded (inactive) at temperatures far below normal. However, as the air temperature increases, Northern deer become progressively less active, Southern deer progressively more active.*

But if the temperature gets too high, even Southern deer activity dwindles. *Does appear especially sensitive to high temperatures during the fall and winter.* In the Louisiana study, daytime doe activity tended to decrease during the rut and post-rut as the temperature increased. Nocturnal doe activity, on the other hand, was not significantly affected by high temperatures.

Bucks did not show similar responses to warming air; in fact, *during the pre-rut and rut, buck activity increased as the temperature rose.* From this, we can conclude that bucks and does appear to respond differently to changes in air temperature.

During the rut, Robert's computer monitoring showed that *doe activity increased significantly as the relative humidity rose; however, bucks showed no such response.*

Barometric Pressure

During both the pre- and post-rut periods, doe activity was unaffected by barometric pressure, but during the rut there *was* a significant effect; as barometric pressure increased, so did doe activity. Once more, though, bucks showed a different reaction. *During the pre-rut and rut, increasing barometric pressure tended to suppress buck activity, though activity increased with rising pressure during the post-rut.*

At this time, we still are analyzing the data to determine whether any change (increase or decrease) in barometric pressure promotes an increase in activity by whitetails. For some time, we have believed that it should, but we cannot yet say that this idea bears out conclusively.

Rainfall

The rate at which rain fell during this study appeared to have no effect on the daytime activity levels of either bucks or does. This finding frankly did not surprise us, because in one of our Institute's videos on whitetail management, we used footage of a huge mature buck feeding casually in a driving rain.

But in Robert's study, *heavy nighttime rains were another story, as they suppressed both buck and doe activity.* Again, this makes sense, as a deer that gets soaked on a fall or winter night has no warming sun to reduce heat loss. Maintaining a comfortable thermal balance is just as necessary for deer as it is for humans.

Summarizing Weather Variables

In summary, weather variables did have effects on whitetail activity at Loggy Bayou, but those effects were not the same for bucks and does in many cases. *During the pre-rut and rut, bucks tended to favor warmer days with lower barometric pressure, with wind speed having little effect on daytime activity. Does, on the other hand, were reluctant to move on windy, sunny days or during periods of high temperatures. All deer were basically unaffected by rainfall during daylight hours, but buck activity was reduced by higher barometric pressure.*



A cold front that dropped the temperature from 32 degrees Fahrenheit to zero in only six hours helped Peter Keblish (left) and Kellan Moen get these two trophy Montana bucks on Nov. 18, 1994. Peter said the storm front "really got the bucks moving," and the results prove it. Photo courtesy of Peter Keblish.

Note that in many cases, the impact of weather variables appears to depend on the stage of the rut. Therefore, to get the most out of these variables as predictors of whitetail activity at a given time, you clearly must know where your deer are in the overall breeding cycle.

NOCTURNALITY

In case you have not yet noticed this fact, our analyses of various data reflect an animal that is largely nocturnal. Naturally, one question arises: Is this the "normal" pattern for whitetails, or is it simply a result of hunting pressure?

The general activity pattern of whitetails everywhere we have studied them shows a four- to six-hour cycle of feeding/movement, modified by both internal and external factors. We already have discussed several modifiers that appear to reduce daytime activity, but on top of this, *we have reason to believe that, at least for whitetails living in the latter part of the 20th century, there is a genetic predisposition to nocturnality.*

Let us offer the following example from Georgia's Fort Perry Plantation, a 2,000-acre high-fenced area developed by ***WHITETAIL*** publisher Steve Vaughn as an educational center and trophy-management demonstration area. As part of this operation, all native deer were removed from the main part of the property in the late '80s and replaced with genetically larger animals from several sources. The resulting herd has never been hunted. Yet these deer are still largely nocturnal.

And as you probably are all too well aware, hunting pressure only adds to this nocturnal nature. At Fort Perry, the original "stocked" herd on this property has been maintained in a 1,000-acre tract since '87, but an additional 1,000-acre tract adjacent to it was also enclosed in a high fence several years ago. As was done

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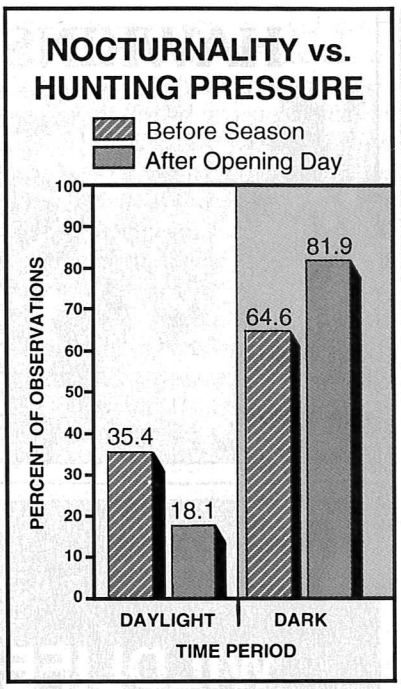
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in the original tract, we set out to remove all native deer from the newly fenced area. This was done by applying heavy hunting pressure (in accordance with all Georgia hunting laws) for two seasons.

While this was going on, we used infrared-triggered cameras to monitor feeding patterns on both tracts — one hunted, the other not hunted. What we learned from studying the resulting photos was that while the unhunted deer were largely nocturnal, they did exhibit that typical pattern of becoming somewhat more active every four to six hours during daylight hours. Bucks and does showed just about the same pattern in this regard. The hunted population, meanwhile, shifted activity almost exclusively to times at which it was not legal to hunt. Does became totally nocturnal, while bucks moved some at midday and just at the onset of night.

How long does it take a herd to become almost entirely nocturnal? Not long at all. In a 1995 study on Que Pasa Ranch near Navasota, Texas, we saw (again, through use of infrared-triggered cameras) that prior to opening day, approximately one-third of all feeding activity was during legal hunting hours. Once the shooting started, though, this diurnal feeding activity quickly fell to less than 20 percent of the total.



In the authors' study, one day of hunting cut daytime activity sharply! Graphic by Allen Hansen.

(To give you an idea of what type of pressure we are talking about on these properties, think of the hunted portion of Fort Perry as experiencing pressure similar to that of some Northeastern states with extremely high hunter densities, while pressure at Que Pasa Ranch was far lighter.)

We believe the whitetail is now naturally nocturnal to a great extent, but would add that this probably was not always the case. Consider the situation on the King Ranch on the Texas coast, a huge landholding with one of the last truly pristine whitetail herds and habitats in North America.

Only very recently has this ranch received significant hunting pressure from modern man, and as you might guess, deer there are still more diurnal in their activity patterns than are those on ranches that have been hunted for years. In addition, King Ranch deer have a remarkably short "flight distance" (the minimum range they will allow a person to get within before fleeing). That flight distance is just about equal to the maximum effective range of Native Americans' primitive bows and arrows, which suggests that these deer have not yet adapted to the increased efficiency of modern hunting weapons.

This, in conjunction with other evidence, leads us to believe that whitetails are becoming more nocturnal as a result of inadvertent genetic selection by modern hunters, and possibly as a result of interacting with a growing human population in general.

Now that we have examined the various factors that can affect deer activity, we come to the bottom line: how you can benefit from this knowledge. Next month, in our series finale, we will help you put it all together to become a more effective hunter than ever before.

FOR YOUR INFORMATION

This series has been adapted from the authors' new book on predicting deer activity. To order this or their other publications on management and hunting, contact: Institute for White-tailed Deer Management and Research, Box 6109, Dept. WT, SFA Station, Nacogdoches, TX 75961; (409) 468-2004.

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