

# Antler Regulations

PART 1 OF 3



## NAVIGATING THE TANGLED THICKET

BY BRONSON STRICKLAND AND STEVE DEMARAIS

**Antlers** They are a goal of most deer management programs, and they are the source of much frustration and controversy. How to harvest more larger-antlered bucks is a common question and an equally common source of frustration. But they are a thing of beauty! You have only to look in the pages of this and other leading hunting magazines to prove the attractiveness of antlers.

Mandatory antler-based restrictions are a common management approach used to protect younger bucks with the intent of harvesting them as older, larger-antlered bucks. Antler restrictions (ARs) are common throughout the Southeast, being found in part or all of 11 states, and are increasingly being applied outside this region in states like Missouri and Pennsylvania. Mississippi was the first southeastern state to institute a statewide mandatory AR, but western states experimented with ARs during the 1970s and 1980s.

This article is the first in a three-part series designed to discuss “the good, the bad and the ugly” of antler-based, selective harvest criteria. In this article we’ll review the benefits of an older buck age structure. Using examples from harvest data and research projects, we’ll describe how ARs work to increase age structure. In the August issue, we’ll discuss the expectations and

potential problems associated with antler-based regulations. We’ll also present the results from 10 years of a statewide AR on public hunting areas in Mississippi and discuss the experiences of similar programs throughout the United States. In the October issue, we’ll put together everything we know about antler-based regulations and recommend how to develop an effective management program designed to increase buck age structure as part of a QDM program on public and private lands.

### MANAGING AGE STRUCTURE

The QDM cornerstone “herd management” involves manipulating several deer population parameters, including density, sex ratio and buck age structure. Although all are important to an effective management program, age structure management is most often associated with the QDM mission due in part to the effectiveness of the association’s educational phrase, “Let them go so they can grow.” Shifting buck age structure from a preponderance of yearling bucks to a mix of all ages has significant biological benefits to the deer population and will improve the overall quality of the hunting experience.

The first step in improving buck age structure involves protection of young bucks from harvest. The benefits of this are

## The QDMA and Antler Regulations

two fold – there are more bucks alive within the population, and there is an increased prevalence of older bucks. Southeastern deer populations that have an unbalanced sex ratio and a preponderance of young bucks may suffer from an extended and late breeding season, resulting in late fawning and stunted yearling antler development. A protracted rut may increase the overall stress of the rut on bucks, resulting in reduced body weights and higher post-rut mortality. The effects of protracted rutting stress may reduce antler development in subsequent years.

Increasing the number of bucks and the prevalence of older bucks within a population can improve the timing and duration of the breeding season. Adequate numbers of bucks ensures that all does are bred during their first estrus. Inadequate buck numbers can lead to missed breeding and recycling of unbred does, which extends and delays the breeding season. Research by Dr. Karl Miller and others at The University of Georgia shows that increased prevalence of older bucks within a whitetail population may help bring does into an earlier and more synchronized breeding season. Louis Verme, John Ozoga and others in Michigan reported that does penned with bucks experienced estrus earlier than does without bucks in their pens. Similar influences of males on female breeding behavior have been shown for other members of the deer family, but limited controlled experimentation limits our understanding of this phenomenon.

The amazing process of antler growth is regulated by a number of complex physiological rela-

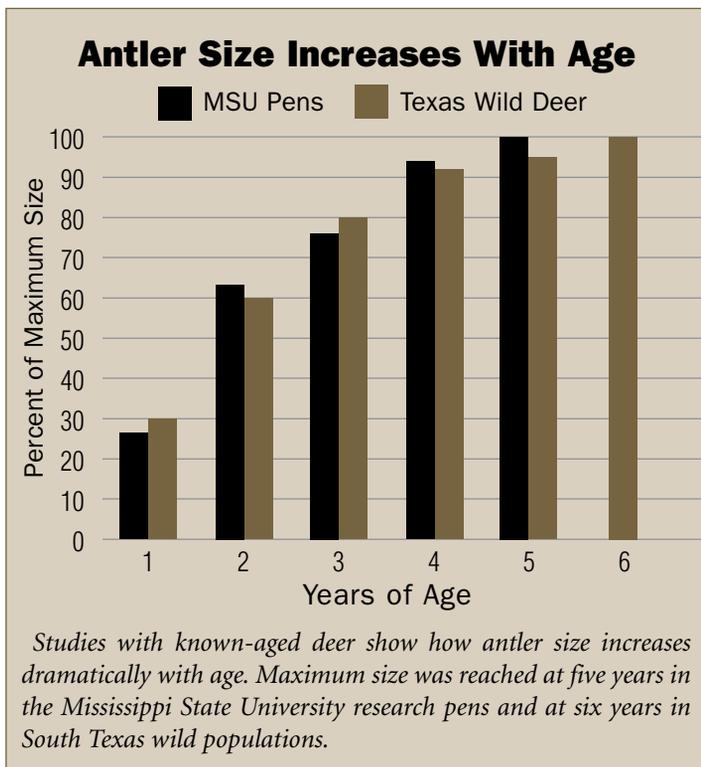
This feature article is the first in a series of three by Dr. Bronson Strickland and Dr. Steve Demarais of Mississippi State University that will discuss antler regulations in detail, including their pros and cons. After being published in *Quality Whitetails*, the articles will become a Cooperative Extension Service educational booklet available from Mississippi State.

Because of the obvious links between antler regulations (ARs) and efforts to improve the quality of deer populations, the QDMA is often viewed as the force behind the spread of ARs. Certainly, many members of QDMA have been involved in grassroots efforts to have ARs enacted at county, region or even state levels. QDMA members are no less entitled than non-members to ask their state wildlife agencies to consider changes in wildlife management regulations.

However, what is the QDMA's position as a national organization on ARs? First and foremost, the QDMA wants all hunters to understand that ARs and QDM are not the same thing. Comprehensive QDM programs involve active doe harvest, habitat management and record keeping. Protecting young bucks, whether using ARs or not, is only part of the equation.

Beyond that, the QDMA recognizes that, as you will learn through this series of articles, ARs must be site-specific and may not be appropriate for all habitats, deer herds and hunter groups. The QDMA's position was best summarized in executive director Brian Murphy's editorial in the June 2004 issue of *Quality Whitetails*. Brian wrote:

"The history of mandatory antler restrictions is still too brief for us to objectively determine which approach (or approaches) is most effective. In some areas we have supported mandatory antler restrictions, while in others we have not. In general, we would prefer QDM to be voluntarily adopted throughout the whitetail's range and ingrained as the modern deer-hunting ethic. Over the long run, we believe voluntary adoption has the best chance of being sustainable and successful because participants understand and actively support the approach."



tionships. Genetics ultimately controls the limits of antler growth, but nutrition and age have the most significant implications for most management programs. One of the simplest facts about antler growth is the direct relationship between age and antler size (seen in the chart on the left). A yearling buck will grow antlers that are only 25 to 30 percent of his maximum Boone & Crockett score. One of the surest ways to double the size of antlers is to let bucks grow from 1 to 2 years of age, since at 2 they will have reached about 60 percent of their ultimate score. Wouldn't it be great to be a financier who could guarantee a doubling of financial investment within one year? You'd have unlimited resources to use for Quality Deer Management! Three-year-old bucks are coming on strong with about 75 to 80 percent of their antler growth accomplished, but it takes a 4-year-old to reach 90 to 95 percent of his potential. The age at which a buck reaches his maximum antler size will vary among individuals and be affected by their nutritional resources. In the Mississippi State University deer pens, Dr. Harry Jacobson showed that bucks reached maximum antler development at 5 years. In a South Texas study on several deer populations, Dr. Mick Hellickson and others showed that most wild bucks maximized their antler size about a year later, at 6 years of age. Although the specific year may vary, it is clear that

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maximizing antler production within a population requires that bucks live until at least their fifth year to fulfill their potential for antler development.

The presence of adequate numbers of older-age bucks on a property will significantly improve the recreational hunting experience. Like many of you, we have hunted on properties with an unbalanced sex ratio and limited older bucks. And just like you, we've more thoroughly enjoyed the experience of hunting on properties operating under the principles of QDM. There is nothing that can compare to the sight of eight bucks following behind an estrus doe, led by a mature 8-pointer, and followed in descending order of age and antler size down to the lowly yearling spike. The memory is as vivid today as when it happened 10 years ago. Who can forget the first time they heard or saw two older bucks with antlers locked in dreadful battle, hooves pounding and backs arching, as they struggled for dominance? As fast as it started, it was over, the winner chasing the loser while vocalizing a snort-wheeze. The exhilaration of the hunters' first successful rattling experience is one that can be told and retold to friends over the campfire – but that experience is limited without an adequate number and age structure of bucks.

The physical evidence of the pending breeding season can figuratively swell a hunter's neck as it literally contributes to the swelling necks of bucks. John Ozoga and Louis Verme reported that yearling bucks did not exhibit the courtship and marking behavior of older bucks. Mature bucks started making scrapes sooner and made six times as many as yearlings. Mature bucks made twice as many rubs as yearling bucks.

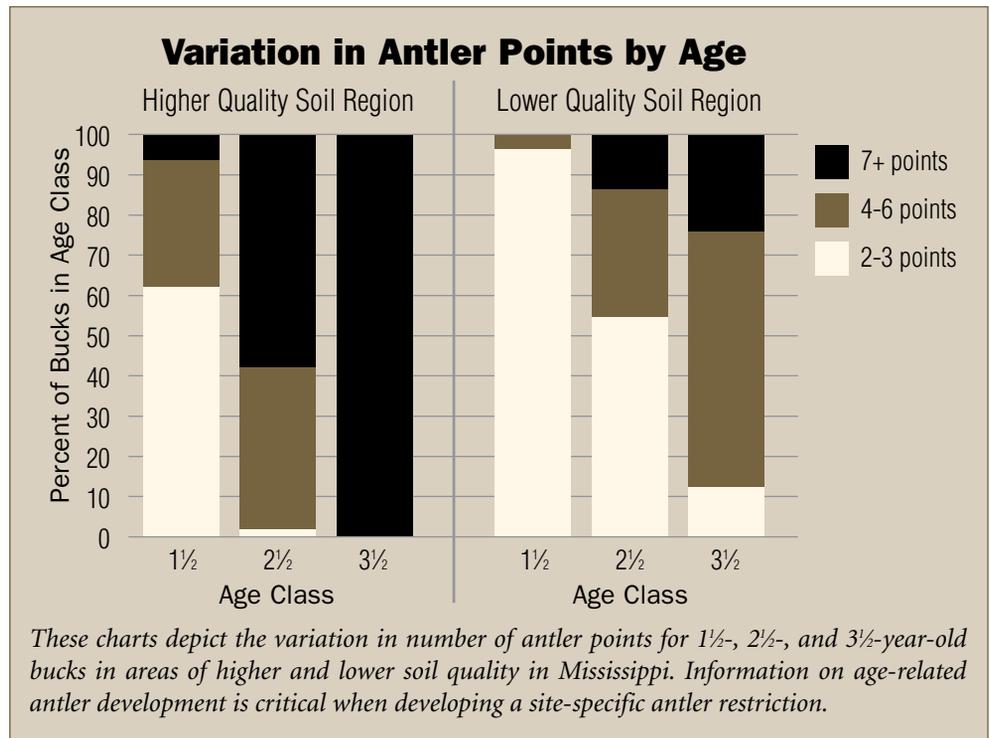
#### HOW ANTLER RESTRICTIONS WORK

Because antler size generally increases with age, deer managers can develop an AR to protect a particular age class of bucks on their property. However, ARs are all site-specific. That is, an AR that works on one property may not work on another. Therefore,

*Antler regulations must be site-specific, because antler development across age classes will vary by region. The 6-pointer on the right could represent a yearling buck in regions with high-quality soils. It could also represent a 2½- or 3½-year-old buck on lower-quality soils.*

using historic harvest data from a property, or working with a wildlife biologist who is familiar with the area of interest, is essential for development of an effective AR on your property.

To demonstrate the importance of developing a site-specific plan, let's try to develop an AR to protect as much of the yearling age class as possible, while allowing the harvest of 2½-year-old and older bucks on two management areas in Mississippi. Based on harvest data from a wildlife management area (WMA) in a higher-quality soil region, we see that about 60 percent of the yearling bucks have only two to three antler points (see the chart on this page). Therefore, applying an AR that protected from harvest all bucks with less than four total antler points would protect about 60 percent of the yearling bucks and none of the 2½-year-old bucks in that population. Now, let's apply this same AR to another population in Mississippi – this time in a region of



lower soil quality. Notice in the right side of the chart that more than 95 percent of the yearling bucks are protected with a 4-point-total AR; however, more than 50 percent of the 2½-year-old bucks and more than 10 percent of the 3½-year-old bucks are also protected! It's easy to see that no single AR is appropriate for all areas, and there must be clear objectives in terms of what age class or classes of bucks you are hoping to protect with antler restrictions. Typically, a biologist develops an AR that will maximize the protection of younger bucks (1½- and 2½-year-olds) and allow the harvest of older bucks (3½ years old and older).

Mississippi implemented a statewide AR in 1995 to protect younger bucks, primarily yearlings, from harvest. A 4-point AR (a buck must have at least four *total* antler points for legal harvest) was selected because it protected almost all of the yearling bucks in regions with lower soil quality and more than half the yearling bucks in regions with higher soil quality. Most people would view the regulation as a success because prior to the AR yearling bucks composed about 47 percent of the annual buck harvest; whereas, following the 4-point AR, yearling bucks have comprised about 18 percent of the annual buck harvest.

Has Mississippi's AR been effective at increasing the age structure of the buck harvest? Yes! The average age of harvested bucks prior to the 4-point AR was 1.8 years old. The average age of harvested bucks following the AR was 2.5 years old. Because older bucks have larger antlers on average than younger bucks, the average buck harvested in Mississippi after the AR was established had larger antlers. There has been no large-scale effort to document the effect of the 4-point AR on age structure of live bucks, but there's plenty of anecdotal evidence that more older bucks are alive and roaming the Mississippi deer woods.

Here's a quick example to demonstrate how buck age structure and the average age of harvested bucks changes with implementation of an AR. Let's start with a hypothetical population of 500 yearling bucks and follow them to 4½ years with and without an 8-point *total* AR (eight total antler points required to be eligible for harvest) and see how age structure of the harvest changes. In both cases, we'll harvest 50 percent of the eligible bucks and assume a 10 percent natural mortality rate, which is in addition to the harvest rate. Natural mortality includes things like accidents, disease, predation and deer-car collisions. We used antler growth patterns from a higher-quality soil region in Mississippi to simulate a real-world situation. In this region:

- 95 percent of the yearling bucks have less than eight total antler points;
- 38 percent of the 2½-year-old bucks have less than eight total antler points;
- 18 percent of the 3½-year-old bucks have less than eight total antler points, and
- 16 percent of the 4½-year-old and older bucks have less than eight total antler points.

First we'll look at how a random

harvest without an AR will influence age structure of the population. Here's how it works:

- 1) Start with 500 yearling bucks and randomly harvest 50 percent of them during the first hunting season.
- 2) At the end of the season, remove an additional 10 percent to account for natural mortality.
- 3) Move the surviving bucks to the second hunting season and randomly harvest 50 percent of them.
- 4) At the end of the second season, remove an additional 10 percent to account for natural mortality.

Repeat the process for the third and fourth season, and you should see an age structure of harvested bucks similar to that depicted in the chart at right. For this simulation we assumed that bucks had the same susceptibility to harvest as they grew older – a yearling buck was just as likely to be harvested as a 3½- or 4½-year-old buck. This assumption is not entirely accurate, but we wanted to keep the simulation simple. Notice in the chart below that more than 50 percent of the bucks harvested were yearlings when using no AR. Additionally, about 5 percent of the harvest was composed of bucks 4½ years old and older. Now, let's compare these results with the age structure following an 8-point AR simulation. Here's how this model works:

- 1) Start with 500 yearling bucks and randomly harvest 50 percent of the bucks that have eight or more antler points during the first hunting season.
- 2) At the end of the season, remove an additional 10 percent to account for natural mortality.
- 3) Move the surviving bucks to the second hunting season and randomly harvest 50 percent of the bucks that have eight or more antler points.

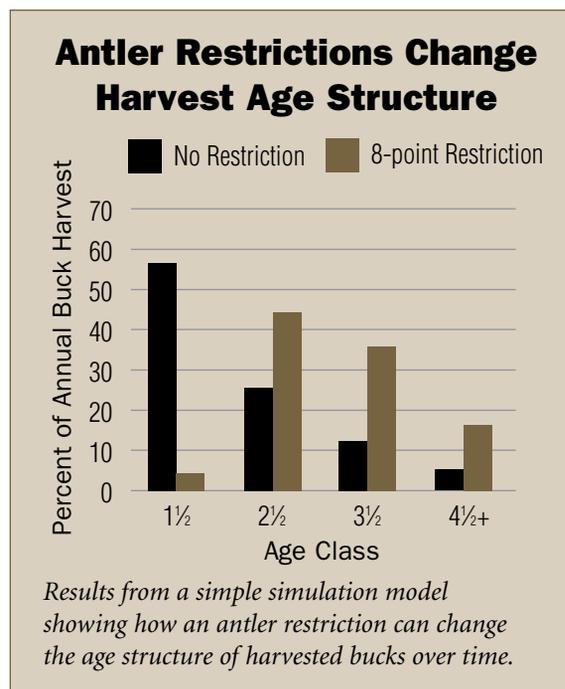
Repeat the process for the third and fourth season, and you should see an age structure of harvested bucks similar to that depicted in the chart. Notice that less than 5 percent of the bucks harvested with the 8-point AR are yearlings and the percentage of 2½-, 3½-, and 4½-year-old bucks has increased substantially. The biggest difference between the two simulations occurred in the 3½-year-old age class, which was 13 percent of the harvest *without*

the 8-point AR and 24 percent *with* the AR. So, the 8-point AR used in our simulation worked as intended by protecting a large proportion of yearling bucks and allowing them to reach an older age class before being harvested.

The average age of harvested bucks also differed between the simulations. The average age of harvested bucks varied from 2.1 years for randomly harvested bucks to 3.1 years for the 8-point AR simulation. These results are similar to the harvest ages in Mississippi prior to and after the statewide 4-point regulation. Our simulation results showed that the average deer harvested will be older, therefore the average deer harvested will have larger antlers.

Remember that from 2 to 3 years of

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age, antlers improve from 60 percent of maximum up to 75 to 80 percent of maximum. Therefore, you would expect that the average 3.1-year-old buck harvested during the 8-point AR simulation would have antlers about 25 percent larger than the 2.1-year-old buck harvested during the random simulation.

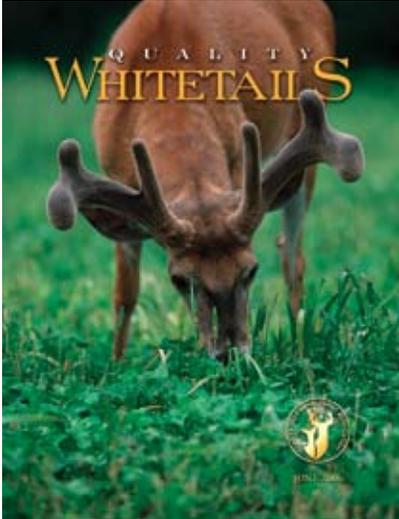
There's no doubt that using an AR can be a very effective management strategy to alter the age structure of the buck harvest and population. In many cases an AR can be used to accomplish the first step in many deer management programs – decrease the harvest of younger bucks. The challenge is developing an AR that will protect younger bucks while allowing the harvest of older bucks in your particular area.

This was a very simple simulation model that clearly demonstrates how an AR works and how it affects age structure of harvested bucks. We made several assumptions when developing this simulation model to keep it from getting too complicated. Interestingly, the changes in age structure of the buck harvest in our simulation were very similar to changes that occurred in Mississippi following implementation of a 4-point AR. We feel confident that we have developed a simplified but realistic example.

So, what's the bottom line for antler-based harvest regulations? They protect smaller-antlered bucks from harvest. Because of the clear linear relationship between age and antler size, typically these smaller bucks are younger deer. The management goal for an AR is to protect younger bucks, with the intent of harvesting them at older ages. The numerous biological benefits of an older buck age structure are exceeded only by the improvements in the recreational experience of the hunters. The "good" aspects of the AR approach to protection of young bucks are many, but antler-based regulations are not without their pitfalls. Our August article will expand our discussion from the "good" to the "bad and the ugly."



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