

USING

## TO MANAGE FOR OLDER-AGED BUCKS



*“navigating the tangled thicket”*

Interest in managing white-tailed deer has never been greater! A common goal of many deer hunters is maximizing antler development of the bucks they manage and hunt. Habitat management, food plots, adequate doe harvests, and increasing buck age structure are commonly prescribed in deer management programs to accomplish this goal.

Of these, managing for buck age structure may have the greatest impact. Because older bucks typically have larger antlers than younger bucks, a population of older bucks is needed to increase the antler size of harvested bucks. The term “age structure” is used to define the relative numbers of younger and older bucks in a population. If your goal is maximizing antler size of harvested bucks, you must have an older buck age structure.

Antler restrictions are commonly used to increase buck age structure by targeting only bucks with antlers that meet certain criteria. Antler restrictions are just a specialized type of selective-harvest criteria – tools to fulfill management objectives. They require hunters to harvest or not harvest the types of animals needed to fulfill management goals.



MSU Ag Comm

## MANAGING AGE STRUCTURE

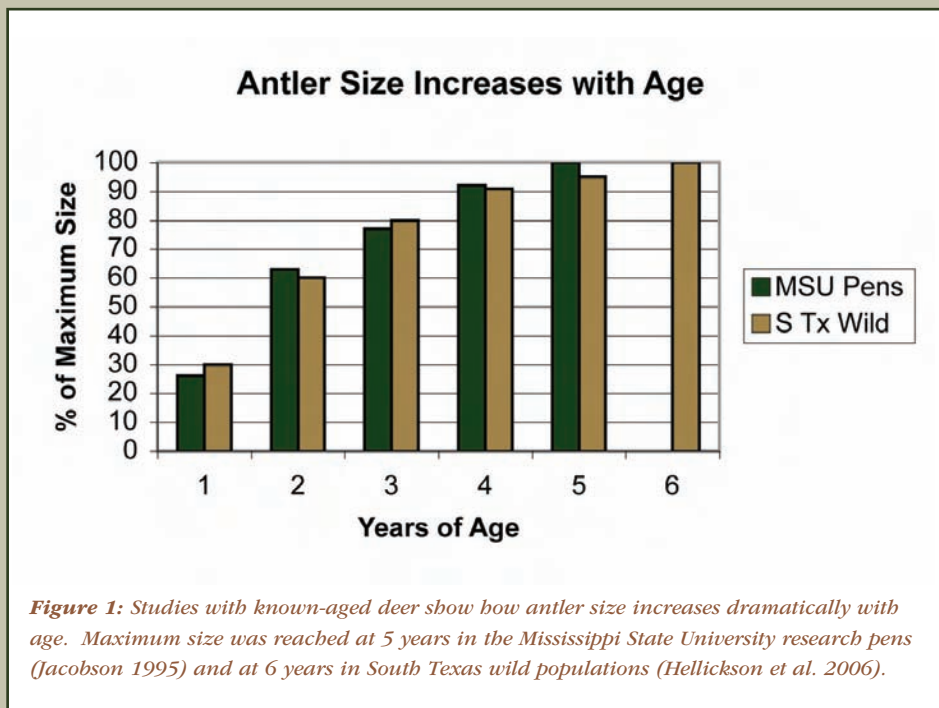
Deer management involves manipulating several deer population parameters, including density, sex ratio, and buck age structure. Although all are important to an effective management program, age structure management is often considered the most important. Shifting buck age structure from mostly yearling bucks to a mix of all ages has significant biological benefits to the deer population and improves the overall quality of the hunting experience. The first step in improving buck age structure involves protecting young bucks from harvest. The benefits of this are twofold – more bucks alive within the population, and there are more older bucks.

Southeastern deer populations that have an unbalanced sex ratio and only young bucks may suffer from a longer and later breeding season, resulting in late fawning and stunted yearling antler development. A lengthy rut may increase the overall stress of the rut on bucks, resulting in reduced body weights, higher post-rut mortality, and possibly reduced antler development in later 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 (breeding cycle); but inadequate buck numbers can lead to missed breeding and recycling of unbred does, which extends and delays the breeding season.

The amazing process of antler growth is regulated by a number of complex physiological relationships. Genetics ultimately controls the limits of antler growth, but nutrition and age have the greatest implications for most management programs.

One of the simplest facts about antler growth is the direct relationship between age and antler size (Figure 1). A yearling buck (yearling bucks are about 1½ years old during hunting season) grows antlers that are only 25 to 30 percent of his maximum Boone & Crockett score (the Boone & Crockett system is the most commonly used technique to measure antler size). One of the surest ways to double the size of antlers is to let bucks grow from one to two years of age, since at two they will have reached about 60 percent of their ultimate antler size. Three-year-old bucks develop about 75 to 80 percent of their ultimate antler growth, but it usually takes 4 years for a buck to reach 90 to 95 percent of his potential.

The age bucks reach maximum antler size varies, and nutritional resources influence that age, but it is typically around five or six years. Although the specific year may vary, it is clear that maximizing antler production within a population requires that bucks live until at least their fifth year to fulfill their potential for antler development.



# HOW ANTLER RESTRICTIONS WORK



Because antler size generally increases with age, deer managers can develop an antler restriction to protect a particular age class of bucks on their property. But antler restrictions are all site-specific. That is, an antler restriction that works on one property may not work on another. So, using historic harvest data from a property or working with a wildlife biologist who is familiar with the area of interest is essential for developing an effective antler restriction on your property.

To demonstrate the need for site-specific regulations, let's develop an antler restriction to protect the yearling age class, while allowing the harvest of 2½-year and older bucks on two areas in Mississippi. Based on harvest data from a higher-quality soil region, we see that about 60 percent of yearling bucks have only two to three antler points (see Figure 2-A). An antler restriction that protects from harvest all bucks with fewer than four total antler points protects about 60 percent of the yearling bucks and none of the 2½-year bucks in that population. Now, let's apply this same antler restriction to a population with lower soil quality. Notice in Figure 2-B that more than 95 percent of yearling bucks are protected with a 4-point antler restriction, but more than 50 percent of the 2½-year bucks and more than 10 percent of the 3½-year bucks are also protected! It's easy to see that no single antler restriction is right for all areas, and there must be clear objectives for the age class or classes targeted by the antler restrictions.

Mississippi implemented a statewide antler restriction in 1995 to protect younger bucks from harvest. The 4-point antler restriction (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 before the antler restriction, yearling bucks made up

Figure 2-A

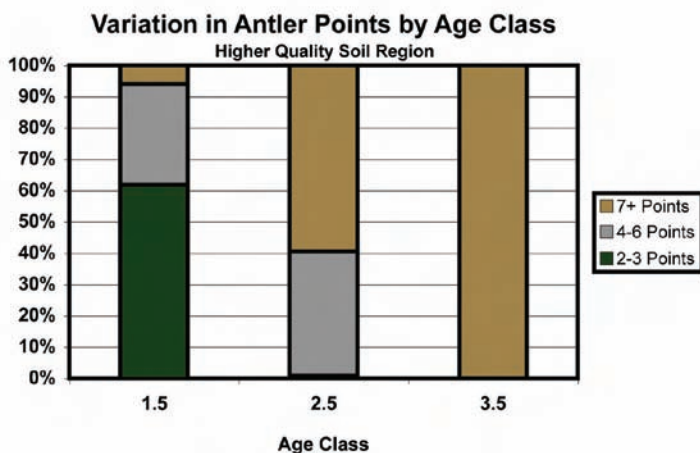


Figure 2-B

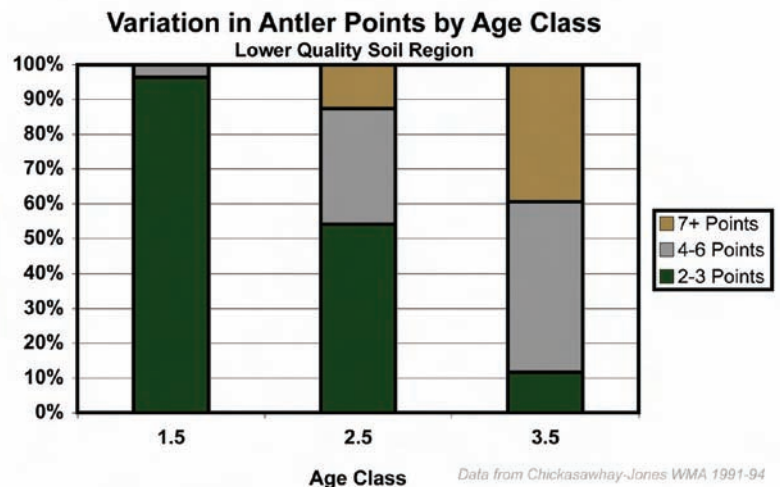


Figure 2 (A&B). The number of antler points varies for 1½-, 2½-, and 3½-year bucks in areas of higher and lower soil quality in Mississippi. Information on age-related antler development is critical when developing a site-specific antler restriction.

about 47 percent of the annual buck harvest; following the 4-point antler restriction, yearling bucks have comprised about 18 percent of the annual buck harvest.

Has Mississippi's antler restriction been effective at increasing the age structure of the buck harvest? Yes! The average age of harvested bucks before the 4-point antler restriction was 1.8 years old. The average age of harvested bucks after the antler restriction was 2½ years old. Because older bucks have larger antlers on average than younger bucks, the average buck harvested in Mississippi after the antler restriction was established had larger antlers. No large-scale effort has documented the effect of the 4-point antler restriction on age structure of live bucks, but plenty of anecdotal evidence shows 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 antler restriction. Let's start with a hypothetical population of 500 yearling bucks and follow them to 4½ years with and without an 8-point total antler restriction (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 nonharvest (such as accidents and disease) mortality rate. We used antler growth patterns from a higher quality soil region in Mississippi to simulate a real-world situation. In this region:

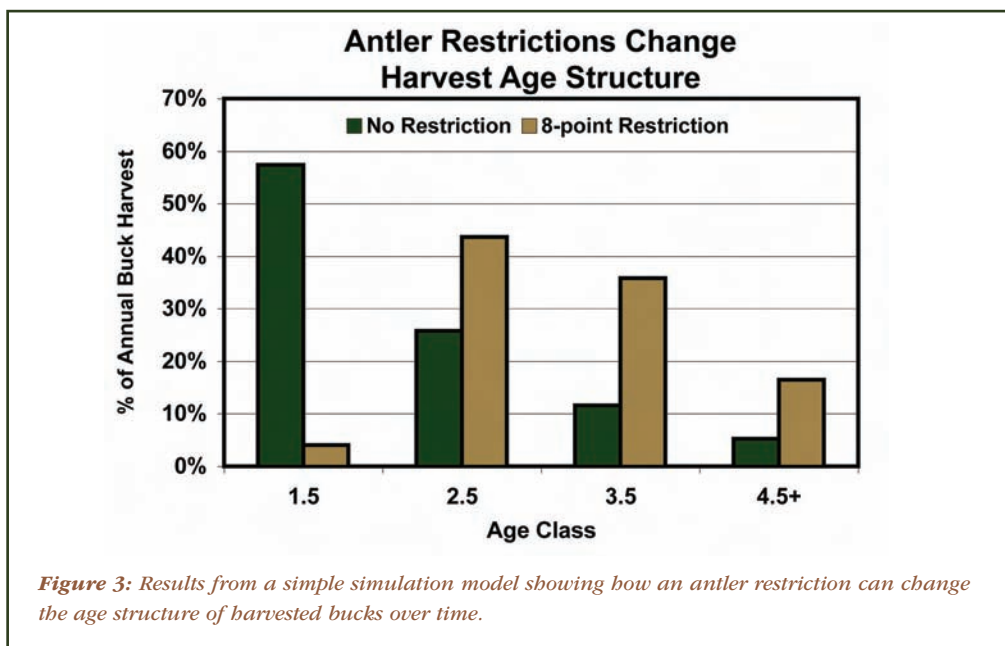
- 95 percent of the yearling bucks have fewer than eight total antler points;
- 38 percent of the 2½-year bucks have fewer than eight total antler points;
- 18 percent of the 3½-year bucks have fewer than eight total antler points, and
- 16 percent of the 4½-year and older bucks have fewer than eight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

First we'll look at how a random harvest without an antler restriction 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 non-harvest 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 non-harvest mortality.

Repeat the process for the third and fourth season, and you should see an age structure of harvested bucks similar to that in Figure 3 (green shading). For simplicity we assumed bucks had the same vulnerability to harvest as they grew older. Notice in Figure 3 more than 50 percent of the bucks harvested were yearlings when using no antler restriction. Also, about five percent of the harvest was composed of bucks 4½-years and older. Now let's compare these results with the age structure following an 8-point antler restriction 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 the first hunting season.
- 2) At the end of the season, remove an additional 10 percent to account for nonharvest 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.
- 4) At the end of the second season, remove an additional 10 percent to account for nonharvest mortality.



## 10 YEARS OF STATEWIDE ANTLER RESTRICTIONS IN MISSISSIPPI

Repeat the process for the third and fourth season, and you should see an age structure of harvested bucks similar to that in Figure 3 (brown shading). Notice that fewer than five percent of the bucks harvested with the 8-point antler restriction are yearlings, and the percentage of 2½-, 3½-, and 4½-year bucks has increased substantially. The biggest difference between the two simulations occurred in the 3½-year age class, which was 13 percent of the harvest without the 8-point antler restriction and 24 percent with the antler restriction. So, the 8-point antler restriction 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, increasing from 2.1 years for randomly harvested bucks to 3.1 years for the 8-point antler restriction simulation. These results are similar to the harvest ages in Mississippi before and after the statewide 4-point restriction. Our simulation results showed the average deer harvested will be older, so the average deer harvested will have larger antlers.

Remember that from two to three years of age, antlers improve from 60 percent of maximum up to about 80 percent of maximum.

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

So, antler restrictions protect smaller-antlered bucks from harvest. Because of the clear relationship between age and antler size, typically these smaller bucks are younger deer. The management goal for an antler restriction is to protect younger bucks, with the intent of harvesting them at older ages. Although the positive aspects of the antler restriction approach to protection of young bucks are many, they are not without their pitfalls.

The effectiveness of an antler restriction designed to protect smaller-antlered young bucks within an age class can be a source of problems. Are the protected bucks the ones you want growing older? The answer depends on your harvest goals. Remember that just about any sample of older bucks will have larger antlers, on average, than a similar sample of younger bucks. So if you are interested only in harvesting deer with larger antlers, a simple antler restriction protecting younger bucks, even if they are of lower antler quality, can be effective. But if your goal is to improve antler quality in older age classes, such an antler restriction may not be the best long-term approach.

Protecting smaller-antlered bucks and harvesting larger-antlered bucks within an age class reduces average antler size in older age classes – if antler development in younger bucks predicts future antler development. This is called “high grading” and is similar to removing better-quality timber and leaving lower-quality timber for later harvest (Photo 1).

High-grading effects can be documented by measuring antler size of surviving bucks at older ages. In contrast, population-level genetic effects take longer to develop and are more difficult to document because of a lack of reliable markers to gauge antler genetics within a population. We do know antler size and shape are heritable, so it does matter which bucks are breeding. Measuring the genetic effect at the population level, though, will be a limitation for the foreseeable future.

Mississippi's statewide 4-point antler restriction was established by legislative action in 1995. Although the Department of Wildlife, Fisheries, and Parks had experimented with antler point restrictions on some of its public wildlife management areas (WMAs), they did not recommend creating the statewide 4-point antler restriction.

*Photo 1: Selective-harvest criteria that protect smaller-antlered young bucks (left) and allow the harvest of larger-antlered young bucks (right) could ultimately degrade average cohort antler size.*



Figure 4-A

### Change in Percent Harvest of Bucks

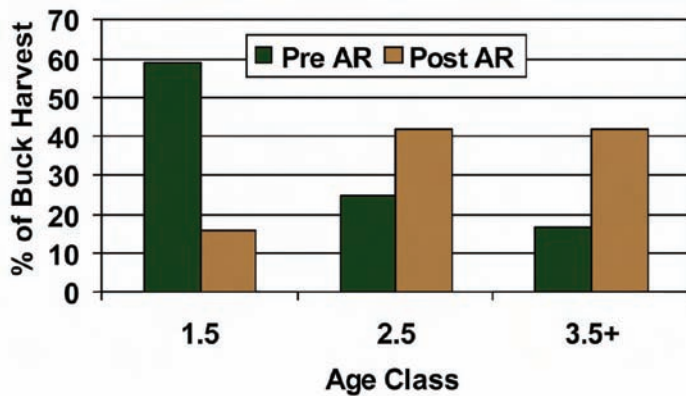


Figure 4-B:

### Change in Harvest Rate of Bucks

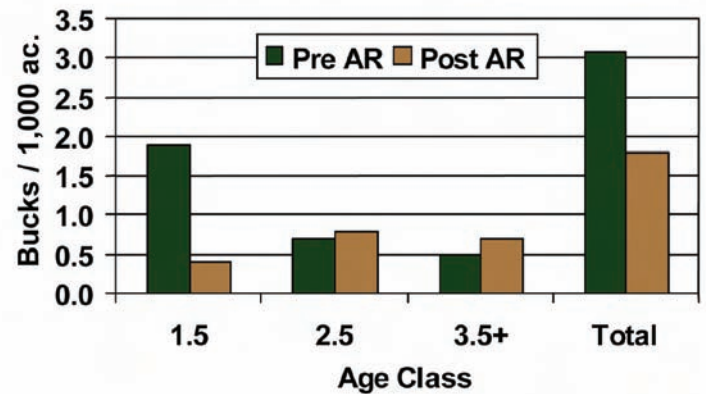


Figure 4 (A & B). Alternative interpretations of buck harvest data before (Pre AR) and after (Post AR) an antler restriction in Mississippi. In chart A, the proportion of bucks harvested in each age class is plotted, which shows a steep decline in the percentage of yearlings harvested and a big increase in the percentage of 2½- and 3½-year bucks harvested after the antler restriction. Now examine chart B, where harvest rate (bucks/1,000 acres) is plotted by age class. The same steep decline occurred in the yearling age class, but the harvest rate of older bucks is not that different from before the antler restriction. Protecting yearling bucks does not guarantee their harvest later.

The agency was promoting the harvest of females, to control population growth and reduce harvest pressure on bucks. The approved legislation expanded antlerless harvest opportunities but also created the 4-point antler restriction on both public and private lands statewide.

Having a statewide antler restriction allowed us to examine its effects across a broad range of environmental and management conditions. In cooperation with the Mississippi Department of Wildlife, Fisheries, and Parks and the U.S. Fish & Wildlife Service, we analyzed deer harvest data from 22 public hunting areas totaling about 525,000 acres across a range of soil regions. We compared data pre-antler restriction (1991 to 1994) to data post-antler restriction (1996 to 2001) to answer several important management questions. We compared the percentages of 1½-year, 2½-year, and 3½-year and older bucks in the harvest pre- and post-antler restriction. The harvest shifted from mostly 1½-year bucks pre-antler restriction (59 percent) to mostly older bucks (42 percent 2½-year bucks and 41 percent 3½ and older bucks) post-antler restriction (see Figure 4-A). Based on these numbers, you might conclude the antler restriction was successful. And it did change the age composition of the harvest. But these percentages don't tell the full story.

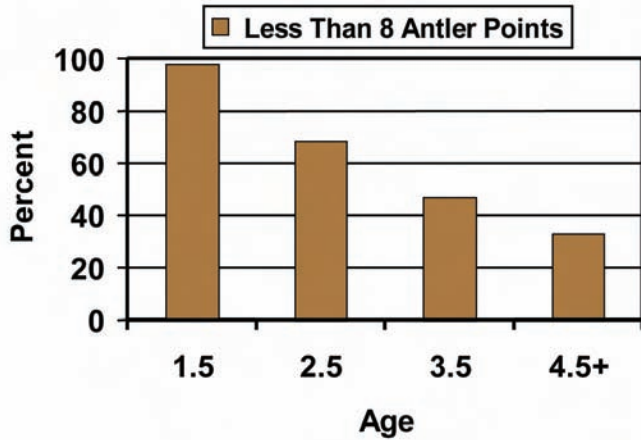
To determine if bucks protected at 1½ showed up later in the harvest as older bucks, we compared the number harvested per 1,000 acres on the 22 public areas. The number of 1½-year bucks harvested declined from 1.9 to 0.3 per 1,000 acres – which was the intent of the antler restriction. However, the harvest of 2½- and 3½-year bucks increased only slightly while total buck harvest decreased from 3.1 to 1.8 bucks per 1,000 acres (see Figure 4-B).

From these results we can draw two conclusions. First, the change in percentage composition of the harvest can be explained almost entirely by the removal of 1½-year bucks from the harvest. Judging the success of an antler restriction based solely on a shift in percentage of age classes in the harvest can lead to incorrect conclusions. Second, the regulation reduced overall buck harvest about one third. While this reduction was restricted to the yearling age class, the protected yearlings were not taken in significant numbers in later years on these public hunting areas.

We looked at several possible reasons many protected bucks did not show up in the harvest in later years. There was no change in overall hunting pressure after starting the antler restriction. The harvest rate of does remained steady, so there was no shift in harvest emphasis away from bucks. Based on pre-antler restriction harvest data, 18 percent of 2½- and 3½-year bucks and four percent of 4½-year and older bucks normally carried fewer than four antler points and would have remained ineligible for harvest. Also, nonharvest mortality could explain some of the reduced harvest at older age classes.

Unbalanced yearling-buck dispersal may have been another contributing factor. Finally, behavioral changes may occur in older bucks that decreased their susceptibility to harvest. The bottom line is that protecting 1½-year bucks with a 4-point antler restriction on public hunting areas did not substantially increase the harvest of older-aged bucks in later years on these areas.

### Some older bucks may never be eligible for harvest with some antler restrictions

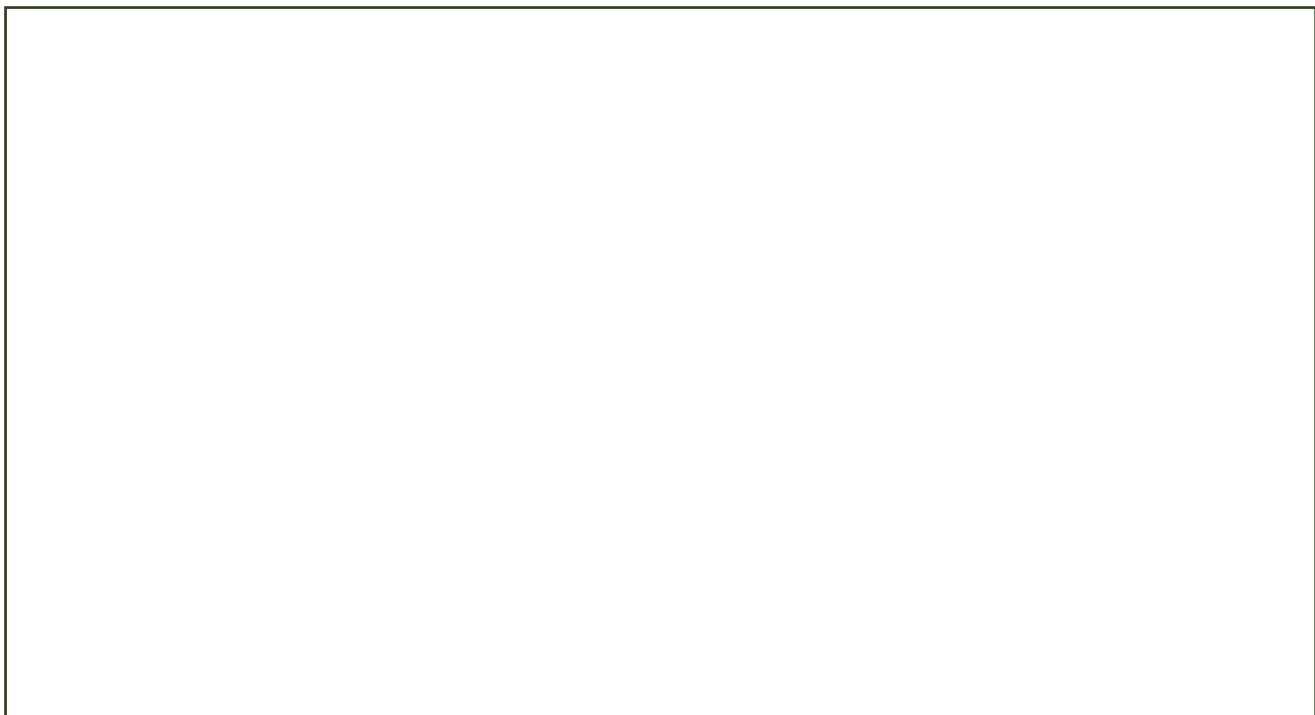


**Figure 5:** It is critical to work with a biologist to design an appropriate antler restriction for your property. The graph shows the percentage of bucks in each age class with fewer than eight total antler points from a region with moderate soil quality in Mississippi. Using an eight-total point antler restriction in this area almost totally protects yearling bucks, but it will also protect more 30 percent of 4½-year and older bucks.

The perpetual protection of bucks with small antlers could be a problem with any antler restriction, but it is especially a problem when using more restrictive antler restrictions designed to extend protection to 2½-year bucks. For example, if an 8-point antler restriction were applied to moderate quality habitats in Mississippi, it would protect almost all yearling bucks and 70 percent of 2½-year bucks. But it would also

protect 34 percent of bucks 4½-years and older (see Figure 5). In other words, it would create a class of always protected, small-antlered, mature bucks that would eat valuable forage and breed while better-quality bucks were being harvested.

The example in Figure 3 showed the problem of perpetual protection of inferior-antlered mature bucks can be without proper antler restriction. In our example we started with 500 yearling bucks and followed them to 4½ years of age with an 8-point total antler restriction to approximate its potential effects on buck age structure. We used antler-growth patterns from a high-quality soil region in Mississippi, applied a 50 percent harvest rate, and added a 10 percent nonharvest mortality rate each year. To determine how many of these “perpetually protected” older bucks could result under these conditions, we boosted the nonharvest mortality rate to 15 percent for mature bucks and calculated the number of 4½-year and older bucks with less than eight total points would still be alive after five years. Under these conditions about 70 of these bucks could be roaming the woods after five years! Again, these bucks would never be eligible for harvest but would be eating and breeding – a management problem that should be addressed. To evaluate the effect of the 4-point antler restriction on antler size of older bucks, we used six WMAs with adequate sample sizes from 3½-year bucks. Antler size within age classes generally declined after the antler restriction (see Figure 6). The decline was evident in at least one of the two age classes evaluated across the range of soil regions in Mississippi. On these public management areas, gross Boone & Crockett scores decreased 5 to 9 inches for 2½-year bucks and 10 to 17 inches for 3½-year bucks.



Antler restrictions should be designed to allow the harvest of smaller-antlered old bucks such as the one pictured on the right.

Figure 6-A

### Higher Quality Soil Region A 58,000-acre Management Area

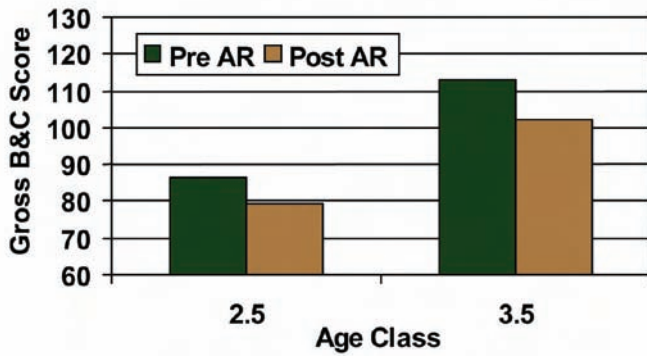


Figure 6-B

### Moderate Quality Soil Region A 28,000-acre Management Area

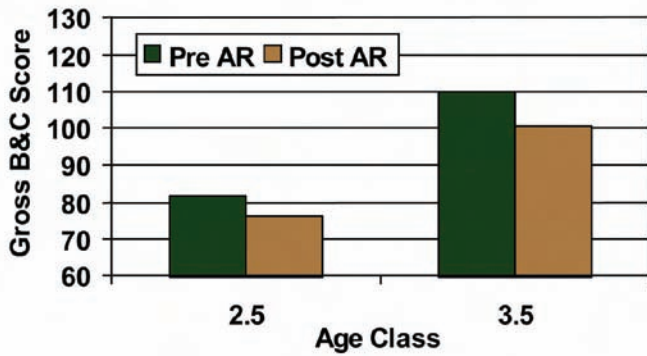


Figure 6-C

### Lower Quality Soil Region 15,500-acre Management Area

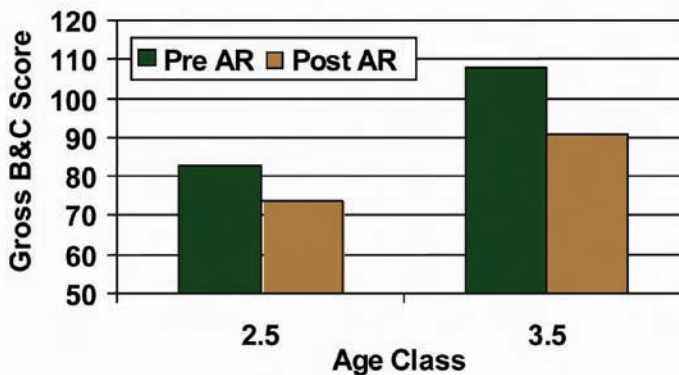


Figure 6 (A, B & C). The data presented below are from three management areas in Mississippi with varying soil quality that represent what we call a "high-grading" effect, where younger-aged bucks with fewer than four total antler points are protected, while those younger bucks with four or more total antler points are harvested. With enough hunting pressure, this type of regulation can decrease average antler size of older-aged bucks in later years. Pre AR represents average antler size before the four-point antler restriction, and Post AR represents average antler size after the four-point antler restriction.

The availability of sub-4-point ("any buck") tags to all hunters during the 2003 season on one management area in a moderate-quality soil region allowed the first valid sampling of all antler sizes since initiation of the antler restriction in 1995. For this property, distribution of antler points changed for 3½-year bucks between the pre-antler restriction period and the 2003 hunting season (see Figure 7). All three antler-point categories that would indicate "inferior" antler production at 3½ years (that is, two or three, four or five, and six or seven points) increased. Bucks 3½ years old with two or three points had not been recorded before the antler restriction period but made up six percent of the harvest in 2003. Bucks with four or five and six or seven points increased from 4 to 17 percent and 15 to 31 percent, respectively.

At the same time, bucks with eight or more points decreased from 81 to 47 percent. The big shift in prevalence of antler points within the 3½-year age class on this public property shows how the 4-point antler restriction can decrease average antler size. Protecting two- and three-point yearling bucks results in smaller-antlered 3½-year bucks only if there is a link between antler size at 1½ and 3½ years.

In better-quality Mississippi habitats, antler size of 1½-year bucks is, on average, a good predictor of antler size in older age classes. But in areas of inadequate nutrition and/or late fawning, antler potential may be delayed one or two years, something we see in southeastern Mississippi. In this region, average antler size of bucks at 2½ or 3½ years is a more accurate predictor of future antler size.

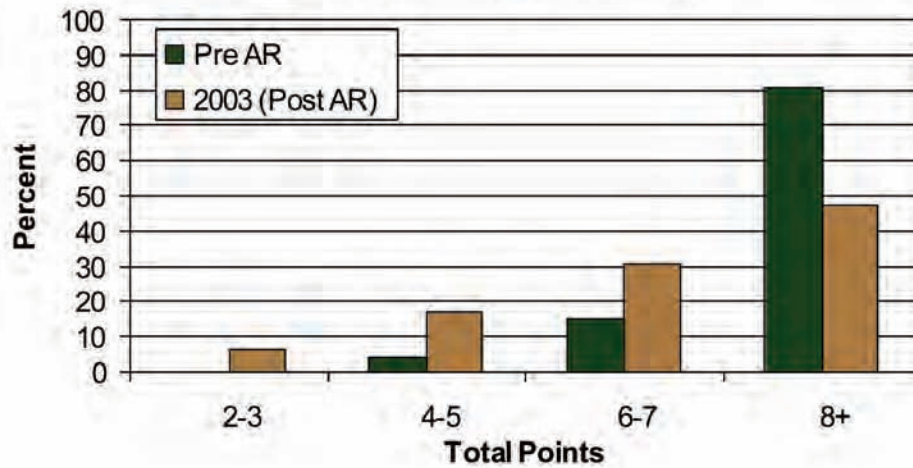
We can't prove that the 4-point antler restriction caused the decline in antler size within age classes because this study did not include scientific controls. But we can eliminate several other possible causes. The most obvious explanation is that antler size decreased because of declines in habitat quality and thus nutrition. If antler size decreased in response to lowered nutrition, we would expect other indicators to reflect similar decreases. But kidney-fat measurements and fetal rates of adult females on the study areas remained stable between pre-antler restriction and post-antler restriction periods. It appears unlikely a nutritional decline contributed to the reduction in average antler size of older bucks.

We conclude the 4-point antler restriction has reduced average antler size of older bucks on numerous public hunting areas in Mississippi. We emphasize these results were from public hunting areas, and that's where the conclusions are most applicable, but these problems could develop on private lands under similar management conditions.

At this point, you may be wondering about the impacts of the 4-point antler restriction on private lands in Mississippi. Harvest data from about 2 million acres enrolled in Mississippi's Deer Management Assistance Program (DMAP) allow a similar comparison of antler development before and after establishment of the statewide antler restriction. On these private properties,



**Moderate Quality Soil Region  
48,000-Acre Management Unit  
Antler Points of 3 1/2-Year Bucks**



*Figure 7: Antler characteristics of 3½-year bucks have changed greatly after 7 years of a 4-total point antler restriction on a large management unit in Mississippi. The frequency of 3½-year bucks with fewer than eight points has increased, while the frequency of 3½-year bucks with eight or more points has declined. Pre AR = before the antler restriction, and Post AR = after the antler restriction.*

average antler size of bucks in all age classes remained constant or improved slightly after antler restriction.

How can we explain the differences in results between public and private lands? We believe the differences between public and private lands are partially because of selection factors. First, the greater harvest rate of higher-quality, young bucks on public areas is more likely to result in high-grading. Second, hunter selectivity differs between property types.

On public areas, most hunters shoot the first available legal buck, and the harvest sample is more representative of available legal bucks. On private areas, hunters are generally more selective and often pass legal but smaller-antlered bucks. As a result, the “high-

graded bucks” are not as likely to be harvested, making the harvest sample less representative of the 2½- and 3½-year bucks in the population. A 2004 survey by Kevin Hunt at Mississippi State University showed that 94 percent of DMAP cooperators have hunters who chose not to harvest legal bucks.

A final difference between public and private hunting areas in Mississippi deals with the type of antler restriction. Most managed private properties have antler restrictions or other harvest criteria that are more restrictive than the statewide 4-point antler restriction. A more severe antler restriction applies the potential high-grading effect at an older age class, which makes antler degradation harder to document.



Thomas Kirkland

## TECHNIQUES TO IMPROVE BUCK AGE STRUCTURE

Simple antler restrictions have generally increased the age structure of deer populations, but hunters and managers must understand some of the biological realities when using these strategies.

Changing the buck age structure of a population takes much acreage and many years. Realistically, you must have several thousand acres under a common management approach if you hope to alter the buck age structure much, but this large area does not have to be a single property. Adjacent properties that share similar management goals can form a cooperative and work together to manage the buck age structure in the population they hunt.

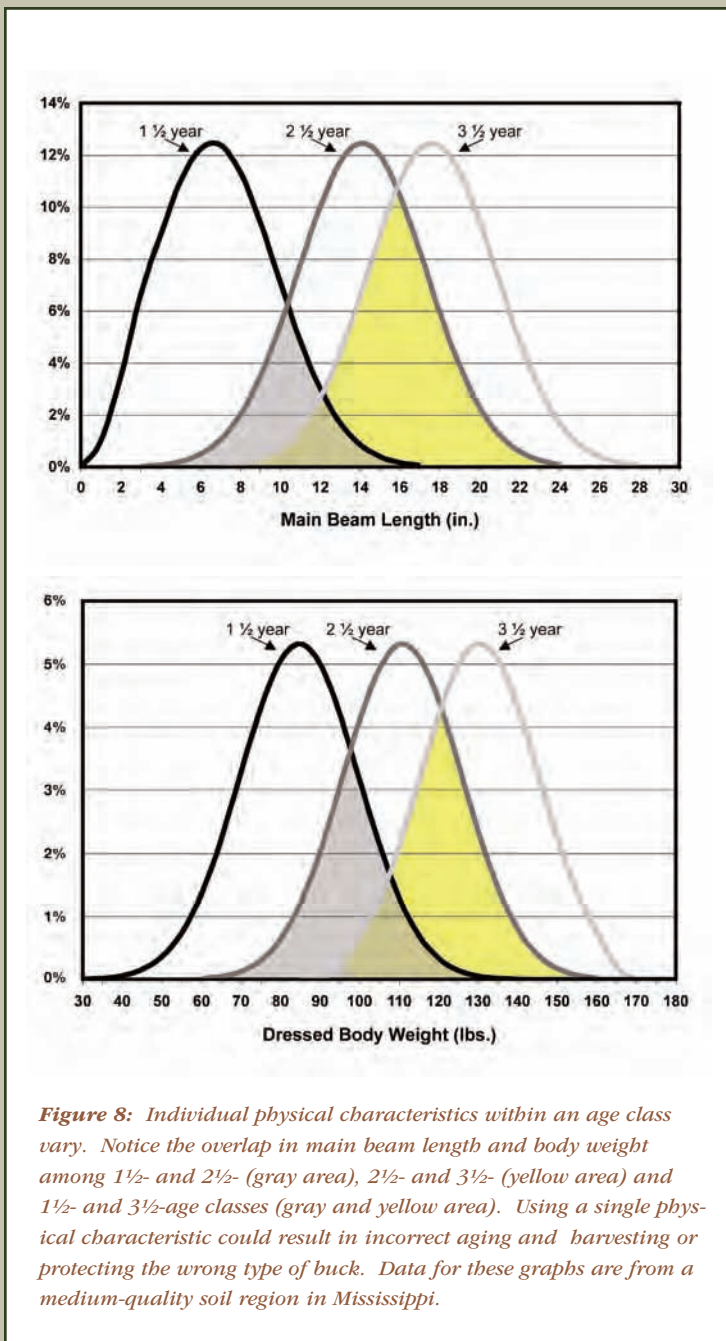
Also, at least four to five years are needed to see big improvements in buck age structure. This time is needed to let bucks that were protected as yearlings grow into mature bucks.

When managing buck populations, you want to protect some bucks while allowing the harvest of other bucks. Generally, you want young bucks to grow older, so age is the most basic grouping factor. We must be able to place bucks into age groups before harvest. The problem is that aging bucks based on a single physical feature leaves much room for error. Figure 8 shows the high degree of overlap among age classes using either beam length or body weight as a single criterion. Longer beam lengths in the 1½ year class overlap the shorter beam lengths in the 2½ year class. Longer beam lengths in the 2½ year class overlap the shorter beam lengths in the 3½ year class. The pattern is identical when using body weight as the physical criterion – inaccurate aging

will be high when using any one physical feature to age (and selectively harvest) a buck.

To compound the problem with inaccurate aging, harvest based on a single criterion could result in high grading of the younger age class, as discussed earlier. Aging deer before harvest is difficult, but it's critical to the success of advanced deer management programs. It should not be based on a single antler-based harvest criterion.

Aging bucks before harvest should use a combination of physical features and requires a commitment to learning these identifying features. Publications 2206 (A Hunter's Guide to Aging and Judging Live White-tailed Deer in the Southeast) and 2205 (A Pocket Guide to Aging and Judging Live White-tailed Deer in the



**Figure 8:** Individual physical characteristics within an age class vary. Notice the overlap in main beam length and body weight among 1½- and 2½- (gray area), 2½- and 3½- (yellow area) and 1½- and 3½-age classes (gray and yellow area). Using a single physical characteristic could result in incorrect aging and harvesting or protecting the wrong type of buck. Data for these graphs are from a medium-quality soil region in Mississippi.

Southeast) are available through the Mississippi State University Extension Service to assist you with this task. Using a combination of features does not guarantee total accuracy, but it certainly improves your odds.

The simplest approach to age-structure management is to avoid harvesting any 1½- and 2½-year bucks. This solves many management problems. But because of the problems with antler restrictions, you can do this only by aging on-the-hoof using a variety of physical features.

Many hunters are satisfied with the size of antlers on older bucks, so all they need to do is protect all younger bucks. We like to tell hunters the best way to double the average antler size of harvested bucks is to let them age from 1½ to 2½. Once you estimate an age, you can effectively apply antler-based harvest criteria within an age class with little potential for highgrading. In fact, properly designed antler restrictions applied within age classes can increase average antler size in older age classes.

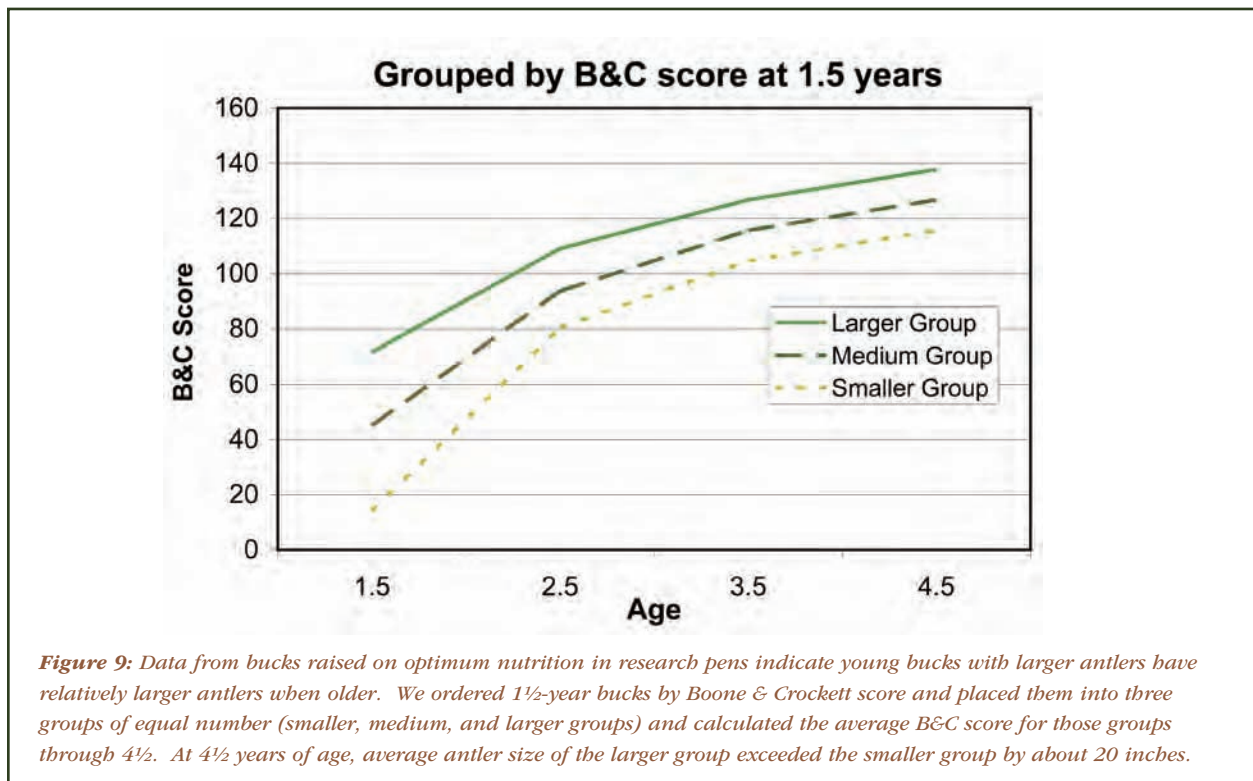
Relative antler size within an age class generally predicts future antler size, so preferential removal of smaller-antlered bucks within an age class and protecting larger-antler bucks within an age class could increase average antler size at older ages.

Figure 9 shows that in research pens under optimum nutrition, bucks with larger antlers at 1½ years continue to have larger antlers through 4½ years. If you are going to remove young bucks from your population, it makes sense to remove ones that have relatively smaller antlers within an age class.

It's very important to note that you should try to target smaller-antlered young bucks for removal only when larger-antlered young bucks are in adequate supply and excess bucks need to be harvested. For example, removing all spike bucks in lower-quality habitats in Mississippi could eliminate most of the yearling age class, thus dooming your buck age structure improvement program.

Antler restrictions designed to differentially remove smaller-antlered young bucks must be developed with careful consideration of their potential impacts. We have made that case for any differential removal of bucks using antler-based criteria, but it is especially true for these circumstances. All antler-based harvest criteria should be developed with extensive, specific knowledge of landowner goals, habitat quality, population characteristics, and factors affecting expression of genetic potential for antler development – in other words, they are site specific. We emphasize that no one approach to antler-based harvest criteria can be universally applied. Examples in this publication are presented to clarify the variety of approaches available and are not necessarily appropriate to your specific management context. If you decide to use antler restrictions as part of your management program, be sure to develop an appropriate antler restriction. Having no antler restriction is better than having a poorly designed one.

The general goal of an antler restriction is to protect young bucks from harvest. In more specific cases they are designed to protect the higher-quality,



younger-aged bucks and allow the harvest of lower-quality bucks at any age and the harvest of higher-quality, older-aged bucks. The limitations of an antler restriction such as the 4-point regulation in Mississippi were described earlier, but it's worth a quick review. The 4-point antler restriction protects most of the yearling age class throughout most of the state, but it allows the harvest of the very best 1½-year bucks, and perpetually protects older-aged bucks with less than 4 points.

A “slot-limit” approach can alleviate some of these problems. Slot limits are harvest restrictions commonly used by fisheries biologists to protect medium-sized fish. The slot-limit approach to antler restrictions lets managers be more specific when protecting or targeting certain types of bucks for removal. A slot-limit antler restriction can allow the removal of lower-quality bucks, both young and old, and protect higher-quality, younger bucks from harvest.

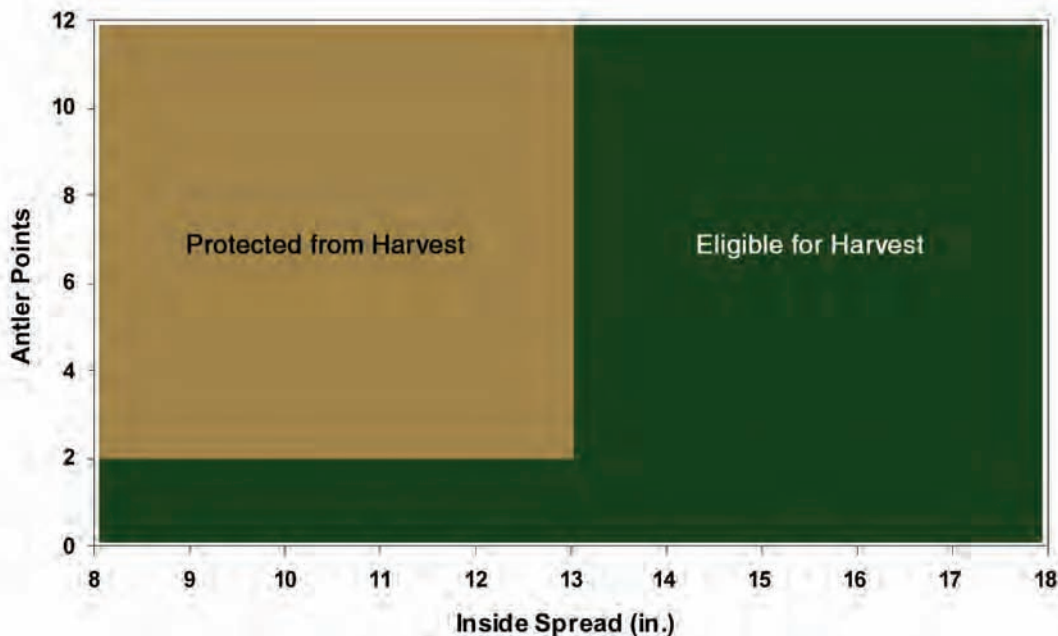
Figure 10 represents a slot-limit that could be used under certain circumstances. It allows the harvest of bucks with only two antler points (spikes) and bucks with an inside spread of 13 inches or greater. This antler restriction lets you remove low-quality yearlings while protecting the best yearlings. Also, you can harvest older-aged bucks that have 13 or greater inches of inside spread, regardless of how many points the buck has.

Even a slot-limit antler restriction has flaws. In some areas of Mississippi, about 60 percent of 1½-year bucks have only 2 points. Under intense harvest pressure, removing this portion of this age class would greatly limit recruitment of bucks into older age classes.

Another potential pitfall is not being able to harvest some older-aged bucks with a very narrow antler spread (for example, a 3½-year buck with a 10-inch spread). To address this, you can add a criterion, such as an inside spread of at least 13 inches OR a main beam length of at least 15 inches. Any further exceptions would be rare and should not have much impact on your deer herd. On private lands, managers can design a very specific and complex antler restriction appropriate for their unique management situations. But greater complexity requires more work and education of hunters.

The complexity of an antler restriction may be limited on public lands by hunters' lack of ability or unwillingness to make informed harvest decisions. Attempts to apply “one size fits all” antler restrictions at the regional or statewide level have been based on this hunter-based limitation. The truth is the most biologically valid antler restrictions succeed only if the hunter properly applies them.

A simple alternative to antler restrictions when managing for buck age structure is to limit the number of bucks harvested on a property. South Texas developed a reputation for production of trophy whitetails during the 1970s. What special antler-based harvest criterion was used to establish this reputation? The answer is absolutely none. Older buck age structure was due to one aspect of harvest – restraint! A typical buck harvest regulation was “hunter’s choice,” but only one trophy buck harvested per 1,000 acres. A hunter might pass up dozens of bucks before finding his target. An important point to remember is management goals vary, and harvest recommendations need to reflect these differences.



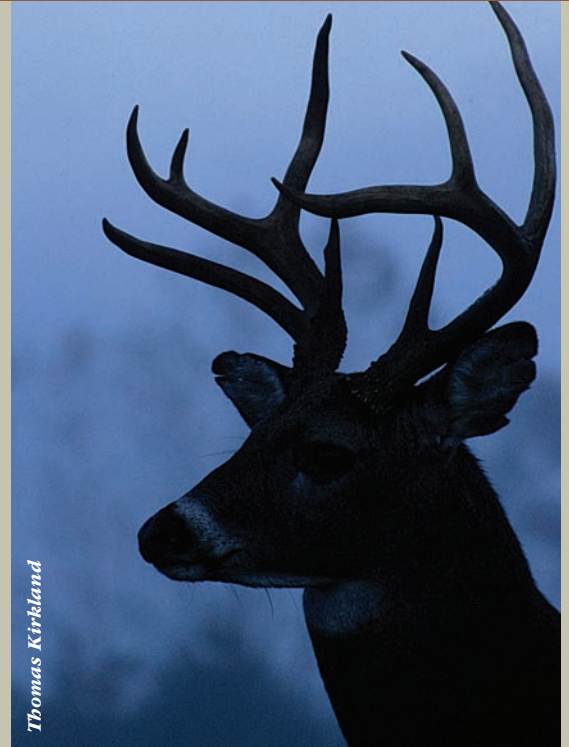
**Figure 10:** A slot-limit, or two-criteria antler restriction provides more flexibility to target specific animals for harvest. In this example, the antler restriction allows the harvest of spikes in any age class but protects bucks with an inside spread of less than 13 inches. These younger bucks would have the best potential to grow larger antlers at older ages. Hunters could cull “from the bottom up” by removing spikes, but this approach is appropriate only if a small percentage of the 1½-year bucks are spikes. In areas where most of the 1½-year class is spikes, this type of antler restriction eliminates too many young bucks and limits the number available for harvest in subsequent years. All antler restrictions must be site-specific to minimize potential problems.

## SUMMARY

The many benefits from an older buck age structure justify the effort in a quality deer management program. But using a single-feature, one-size-fits-all antler restriction can create some biological problems. A properly-developed antler restriction must fit an area's unique biological and social circumstances, and hunters must be able to apply the criteria to their harvest decisions. The hunter-manager must be committed to continuing education and self restraint. The ideal approach is to age bucks on-the-hoof and apply appropriate harvest-selection criteria within age classes. You must understand that selection criteria and harvest recommendations typically change over time in response to new circumstances.

## ACKNOWLEDGEMENTS

We thank the following wildlife biologists from the Mississippi Department of Wildlife, Fisheries and Parks for their assistance with this research project: Larry Castle, Jim Lipe, Bill Lunceford, Chad Dacus, William McKinley, Chris McDonald, and Lann Wilf. We thank Dr. Harry Jacobson, professor emeritus – Mississippi State University, for providing data and critical reviews of our research. We appreciate Lindsay Thomas of the Quality Deer Management Association for allowing us to present some content in this publication that was previously published in *Quality Whitetails* magazine. Thanks to Don Frels of the Texas Parks and Wildlife Department and Dr. Karl Miller of the University of Georgia for contributing data for our analyses. Finally, we wish to acknowledge the Federal Aid in Wildlife Restoration Program (project W-48-48) for funding.



Thomas Kirkland



Thomas Kirkland



Thomas Kirkland



Paul Brödn

*“navigating the tangled thicket”*

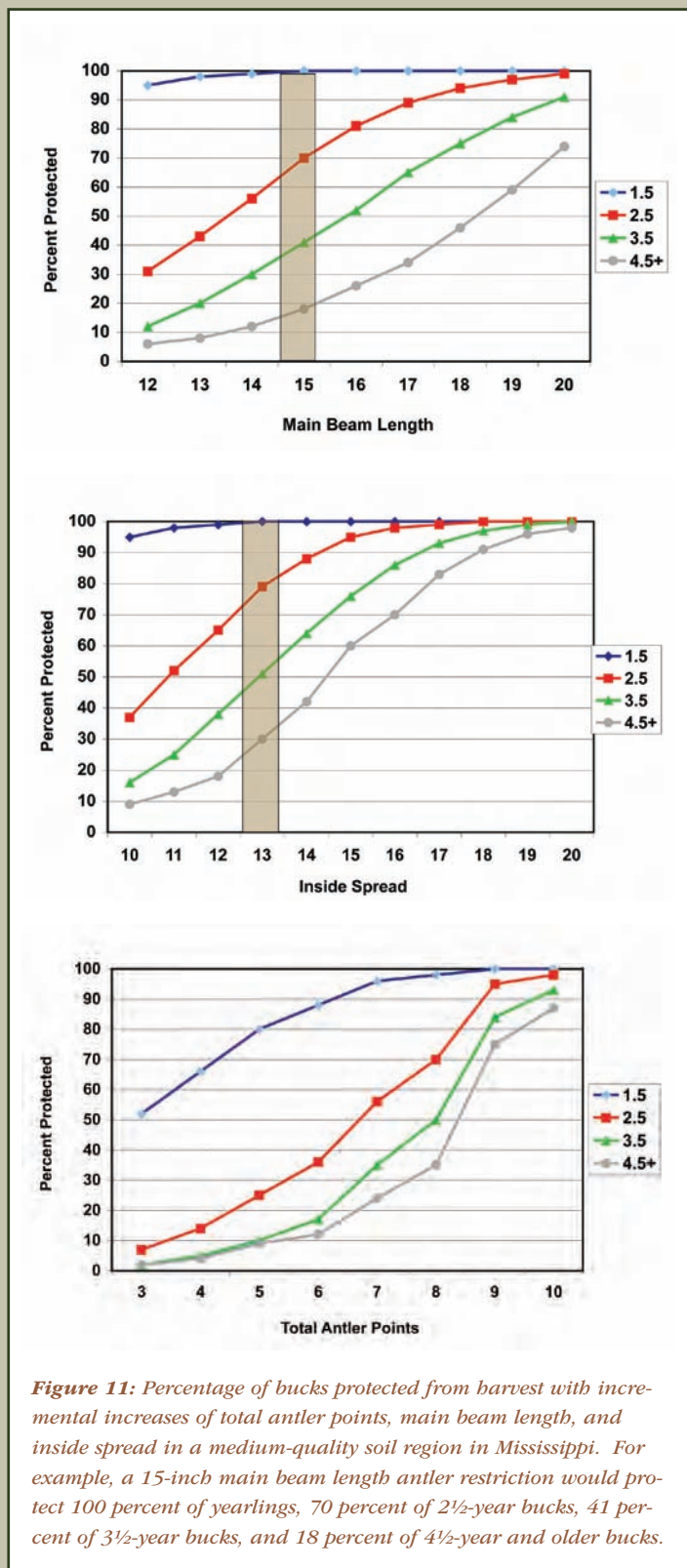
# CUSTOMIZING AN ANTLER RESTRICTION FOR YOUR PROPERTY

When developing an antler restriction for a specific area, keep in mind the “big picture.” Harvest guidelines must protect and allow harvest of the correct types of animal based on your management situation. Generally, an antler restriction should maximize protection of young bucks and minimize potential for high-grading young bucks and protecting smaller-antlered, older bucks. Your specific circumstances will determine how liberal or restrictive to make the antler restriction.

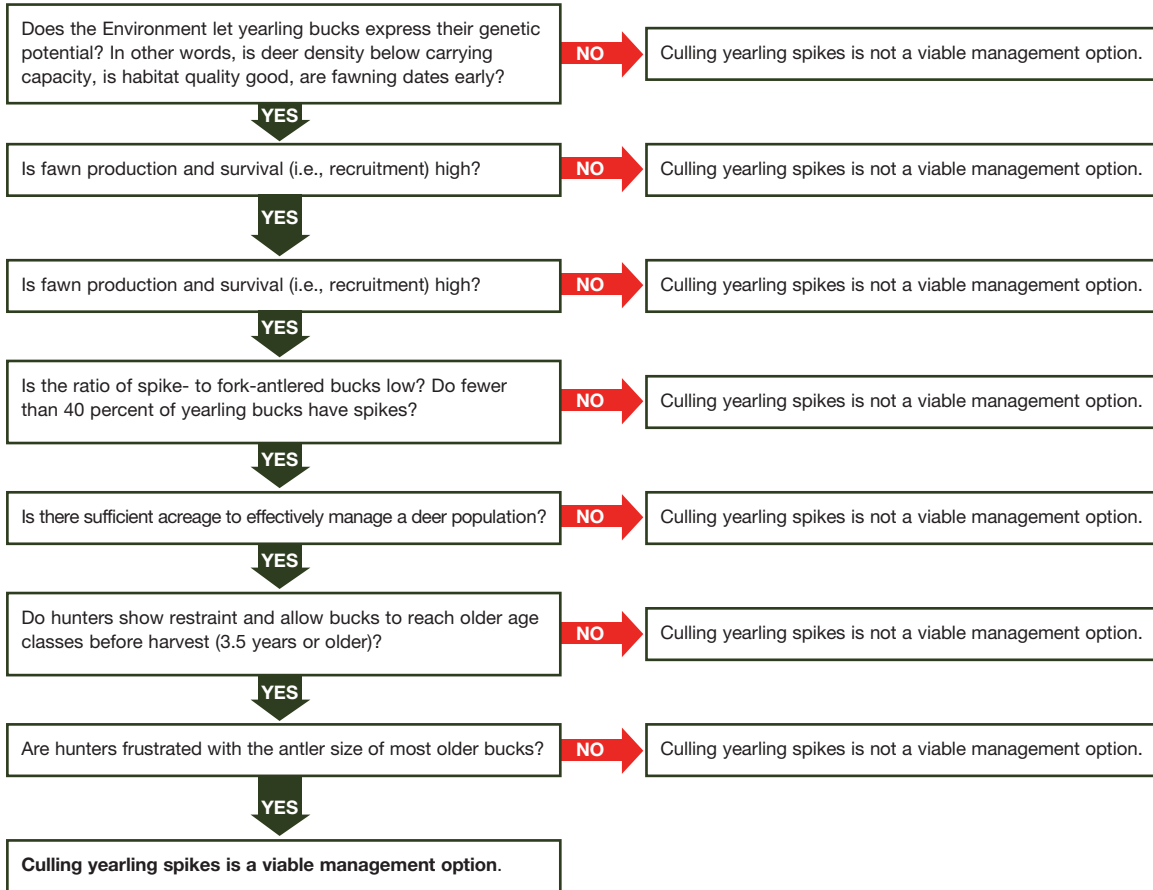
You should start by determining the age-specific antler growth patterns for your area, using long-term, unbiased harvest data (Figure 11). A wildlife biologist from the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) can help you with this. If your goal is to protect all yearling bucks, you could use a 13-inch inside spread OR a 15-inch main beam length antler restriction to protect 100 percent of the yearling age class. This combination antler restriction also protects about 75 percent of 2½-year bucks and 45 percent of 3½-year bucks.

There are two reasons for using a main beam OR inside spread antler restriction. First, two antler criteria give the hunter greater flexibility when making a harvest decision (the hunter may not be able see one or the other criterion). Second, it allows the removal of older bucks protected by one criterion. For example, only rarely would you find an older buck with a narrow spread that does not have 15-inch beams.

Even with a more complex antler restriction there is still opportunity to high grade. The 13/15 combination antler restriction still allows harvest of larger-antlered 2½-year bucks. Harvesting the 25 percent of 2½-year bucks and 55 percent of 3½-year bucks with the largest antlers would high grade these age classes! This is where aging on-the-hoof is so valuable. You don’t have to harvest every eligible buck. If a buck meets the minimum requirements of the antler restriction but appears to be young, DON’T SHOOT! This is the buck you want to protect!



## General Guidelines for Selective Harvest (Culling) of Yearling Bucks.



You can remove smaller-antlered bucks with limited potential to control overall deer density. You could apply a criterion to yearling bucks to remove them before they get older with a slot limit or address the problem at older ages.

Removing some lower-quality yearling bucks with two points (spikes), may be appropriate. Be careful when allowing removal of spikes because spikes make up about 50 percent of the yearling age class in this population, and removing too many would deplete recruitment of bucks into older age classes. The actual number of spikes to harvest should be based on specific factors, such as local deer density, acreage of

your property, and antler potential within age classes. If spikes make up a small percentage of the yearling age class, say about 20 percent, it may be appropriate to allow a liberal harvest of spikes (a special permit is required by MDWFP to harvest any buck below the current state antler restriction). A more conservative approach is to remove smaller-antlered bucks at older ages. Allowing the removal of bucks more than the 13/15-inch minimum that ALSO have fewer than 8 points is one possible solution. But the best solution to this problem is aging on-the-hoof and removing older bucks with smaller antlers.





[msucares.com](http://msucares.com)



By Dr. Bronson K. Strickland, Assistant Extension Professor, Wildlife and Fisheries; and Dr. Stephen Demarais, Professor, Wildlife and Fisheries

Front page photo by Thomas Kirkland.

*Discrimination based upon race, color, religion, sex, national origin, age, disability, or veteran's status is a violation of federal and state law and MSU policy and will not be tolerated. Discrimination based upon sexual orientation or group affiliation is a violation of MSU policy and will not be tolerated.*

Publication 2427

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. VANCE H. WATSON, Interim Director

(1M-06-07)