

Implementing Quality Deer Management on Your Property

White-tailed deer (*Odocoileus virginianus*) are the most popular game species in Missouri, and the state's deer population is estimated to be about 1.4 million. The current success of Missouri's deer management program is a tribute to the science of wildlife management, the increase in suitable habitat and regulation of season length and bag limits.

Historically, deer managers concentrated on increasing deer populations by protecting antlerless deer from harvest. Recent research has demonstrated that the overall quality of a deer herd can be improved through management practices commonly referred to as quality deer management (QDM). Numerous landowners and hunting clubs across the United States have successfully adopted this approach to managing white-tailed deer populations. An increasing number of Missouri deer hunters and landowners are interested in the potential for implementing QDM strategies on property they hunt or own (Figure 1).

Quality deer management defined

Quality deer management promotes the philosophy of managing deer herds in a biologically and socially sound manner within the existing habitat conditions in an area. QDM is not trophy deer management, where the emphasis is placed on producing bucks with trophy-sized antlers, nor is QDM a program that promotes shooting only does. QDM simply encourages active participation of landowners and hunters in establishing and achieving defined deer management goals.

QDM strives to produce healthy deer herds in balance with existing habitat conditions by protecting young bucks from the harvest and ensuring an adequate number of antlerless deer are harvested. A recommended antlerless harvest is determined by the following criteria:



Figure 1. A cornerstone of quality deer management is achieving a balanced age structure in the deer herd, which involves allowing bucks to reach at least 3½ years of age before harvesting.

- Deer density (number of deer in an area)
- Sex ratio (number of bucks relative to the number of does in an area)
- Habitat condition
- Landowner objectives

Hunters who adopt and practice QDM become the managers of the deer herd by improving the age structure (allowing bucks to survive to maturity) and sex ratio, managing the habitat, and keeping detailed records on deer observed and harvested to ensure program success. In essence, QDM promotes sound deer management.

Every area or property has its limitations. Habitat quality, soil productivity and land-use practices influence management decisions on a property. QDM goals are not about putting a “monster buck” behind every tree but are about allowing the deer herd on a property to reach its full potential, with realistic expectations.

Managing a deer herd is complex and is influenced by many factors, some of which are poorly understood even by wildlife biologists. Although many deer management problems are complex, the solutions often involve the application of several simple biological principles. The most effective approach to any deer management problem begins with identifying the biological and social factors that may be limiting management goals. These limiting factors

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can be ranked in order of importance and addressed with appropriate management actions.

Factors that influence QDM

Successful deer management requires an understanding of the biology of white-tailed deer and the management flexibility to respond to changing conditions. Research has shown that three main factors greatly influence deer antler and body development: age, nutrition and genetics.

Age

An understanding of the age structure within the buck segment of the population is one of the most important factors in managing for a quality deer herd. The presence of mature deer in the herd creates normal social behavior during the breeding season, which is often exhibited by a greater number of scrapes and rubs.

A buck typically grows its first set of antlers at 1½ years of age. About 20 percent of buck fawns, however, may develop hardened antlers at about 8 months of age (and are often called “button” bucks). This phenomenon, which hunters do not usually see because it happens after the hunting season, indicates that nutrition is adequate to allow fawns to reach the critical body mass needed to initiate antler growth.

Bucks tend to achieve their maximum skeletal growth at 4½ years old, their peak weight at 5½ to 6½ years old and their maximum antler size at about 6½ years old. However, in some locations more than 80 percent of the bucks harvested each year are yearlings (1½ years old), which means few bucks are surviving to maturity. Reducing the harvest of younger bucks, through either regulation or voluntary restraint, will allow a greater number of bucks to reach older age classes.

A common response of hunters to QDM is: “I plan to shoot any buck I see. If I don’t take him, someone else will.” The attitudes and practices of hunters definitely affect the success of a QDM program.

Even though small properties may not be large enough to contain the home ranges of several bucks, a successful QDM program is possible, particularly if adjoining landowners have similar goals and objectives (Figure 2). Cooperation is the key. Take the time to talk with neighboring landowners and encourage them to work with you in developing a QDM program. The results will begin to show when hunters or landowners begin to harvest and observe older deer on the property.

Nutrition

The quantity and quality of available forage varies widely from area to area and directly influences body size, antler size, reproductive success, fawn survival and timing of the rut. Body growth, maintenance and survival of an individual deer take precedence over antler growth in a buck and over fawn production and lactation in a doe.

Antler development is greatly affected by the nutritional quality of the forage before and during antler growth.

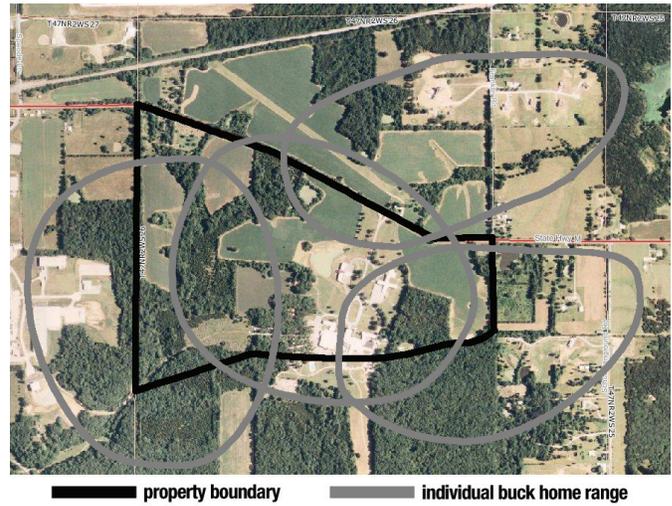


Figure 2. QDM success often depends on cooperation among landowners because home ranges of bucks often cross property lines and overlap.

Research shows that several nutritional components — most importantly protein, energy and minerals — interact to develop the bony matrix of antlers. Recent research additionally indicates the importance of a doe’s age and nutritional condition in determining the quality of her offspring’s first set of antlers.

The minimal level of protein in forage required for maximum antler development varies with age. Research has shown that a diet containing as little as 10 percent protein can meet the minimal requirements for adequate antler development for adult bucks. Younger animals that are actively growing, however, require much higher levels of protein. For example, weaned fawns require up to 20 percent protein in their diet for optimum growth. Typically, a diet averaging 16 percent protein will allow for maximum antler development. On many properties, protein content of prevalent forages declines below 16 percent during the late-summer and late-winter months. Actively managing the habitat to provide a diversity of food sources can ensure the availability of high-quality forages throughout the year.

Genetics

A buck’s potential for antler development is determined by genetic traits that are passed on by both sexes, not just males. All physical characteristics, including antler growth, are genetically based but can also be influenced by environmental factors, such as weather conditions and rainfall patterns. Thus, the genetic potential of a deer herd can never be expressed until adequate nutrition is available and the animals are able to reach maturity.

A topic hunters frequently discuss is whether spike yearling bucks are genetically inferior to fork-antlered yearlings. Research has addressed this question in many locations of the country, but results vary and researchers are still not in complete agreement. Some studies suggest that yearlings with larger racks (six to eight points) will produce antlers with a higher average gross Boone and Crockett score at maturity than yearlings with smaller sets of antlers (spikes and forked-antlered).

Other research indicates that the age and condition of the mother play an important role in the antlers expressed by 1½-year-old bucks. Young females and those in poor condition tend to have later fawning dates, which can result in 1½-year-old bucks with smaller antlers. Body growth and antler development during subsequent spring and summer months affect a young buck's ability to express genetic potential. Thus, genetics may not be the primary influence of antler size in 1½-year-old bucks. Whether small-antlered yearling bucks will catch up if they survive to maturity remains unclear.

Research suggests that yearling bucks with small antlers (two- or three-pointers) are able to produce quality racks if given the opportunity to mature, assuming nutrition is not a limiting factor. Even if a local deer herd has poor habitat conditions, buck size can be increased by allowing bucks to reach older age classes (4½ to 5½ years old). This will eventually lead to more mature bucks in a given area. Remember this simple fact: Let him go, and he will grow.

QDM, as a management philosophy, is not trophy management. It is a program designed to promote healthy deer herds with a sound social structure in a given area. The genetic influences on a deer herd are complicated by several factors, most of which cannot be manipulated by landowners or hunters. Landowners and hunters participating in a QDM program should focus on providing adequate nutrition through habitat management and improving the herd's age structure by allowing younger bucks to reach maturity.

Impact of QDM on the rut

Research has shown that the rut is influenced by many factors, including photoperiod (the amount of daylight in a 24-hour period), sex ratio, age structure, nutrition, genetics and weather. The factors hunters can influence are sex ratio, age structure and availability of quality nutrition.

A doe entering estrus (heat) is receptive to breeding for at least 24 hours, and perhaps longer if not bred during the first cycle. While in estrus, a doe may be tended by one or more bucks for a day or more. If a doe is not bred during her first estrous period, she may recycle in about 28 days. Over time, traditional hunting practices (that is, bucks only or limited doe harvest) result in overpopulated deer herds skewed heavily in favor of does, many of which are not bred during this first estrous cycle. This overabundance of does coupled with nutritional limitations can lead to prolonged breeding and fawning seasons.

A prolonged breeding season is when the rut is spread out over a long period. There may be no noticeable "peak" rut where hunters observe an intense period of bucks chasing does. A prolonged fawning season typically results in a higher percentage of late-born fawns, which are handicapped by poor-quality nutrition during the late summer and a shorter period for growth before winter begins. Because of these setbacks, late-born fawns tend to have a higher mortality rate, and late-born buck fawns, those born in late June or early July, tend to produce smaller

antlers the next fall when compared with buck fawns born earlier in the season (late May to early June).

Adequate doe harvests can create a more even sex ratio and result in a greater percentage of does being bred during their first estrous cycle. This can bring about a shortened, more intense rut. When bucks are allowed to survive to maturity, a dominance hierarchy is established and real competition occurs between mature bucks for breeding rights. With a balanced sex ratio and improved age structure, rutting activity is pronounced, with increased signpost rubs and scrapes, and hunters experience a noticeable and exciting rut.

Determining deer management goals

Implementing a QDM program takes time and commitment. Changing the quality of the deer herd and improving the quality of available habitat may take quite a few years to accomplish. The ability to communicate goals and objectives and work with others is essential. The first step is to set realistic goals and collect appropriate data to help guide management decisions. Every group should strive to attain the following goals:

- Collect and record data, including the age and weights of harvested deer
- Maintain the deer population within the carrying capacity of available habitat
- Improve the buck-to-doe sex ratio
- Improve the age structure

Involving the entire group of neighboring landowners and hunters in these management decisions can increase the chance of success.

Developing sound harvest recommendations

Early deer management programs in the state regulated the antlered buck harvest through bag limits because harvesting bucks has little influence on the total population of the deer herd. As a result, deer populations increased dramatically but few bucks survived to older age classes. More recent statewide management efforts have attempted to define optimal population levels and design hunting regulations to achieve them.

In an effort to balance populations, improve sex ratios and increase the numbers of older bucks, the Missouri Department of Conservation (MDC) has developed regulations that promote more liberal antlerless deer bag limits and impose antler point restrictions in select counties, primarily in northern and central Missouri (Figure 3). The point restrictions prohibit the harvest of bucks with antlers that do not have at least four points on one side and attempt to shift harvest pressure from younger bucks to does. These QDM strategies are designed to increase the proportion of older bucks in the population and, depending on the specific goals and objectives, can improve the quality of a deer herd.

Likewise, individual landowners can self-impose harvest restrictions to effectively manage deer numbers and increase the number of mature bucks on a property.

Recommendations for buck harvest

One goal of a QDM program is to manage the age structure of the herd by restricting the harvest of younger bucks. Several restrictions can be used to limit the harvest of bucks:

- Antler point
- Antler spread
- Minimum antler score
- Minimum age regardless of antler size

The goal of imposing antler restrictions is to increase the proportion of older bucks in the population. Unfortunately, no single set of harvest restrictions will work in every circumstance. Landowners can use a combination of these techniques to impose harvest restrictions on their property but should have clear goals and data that support those restrictions.

The best policy is to use the appropriate combination of restrictions that helps you meet your management goals and objectives. When implementing a QDM program, remember that one of the goals is to have fun. Although penalties may be required to keep hunters from killing “nonlegal” bucks, these penalties can cause some hunters to become disenchanted and lose interest in the overall goals of the program.

Antler restrictions imposed in a specific area should be based on the deer population and the antler characteristics of bucks in the area. This information is available only if data has been gathered for several years. Ask the MDC or other hunting clubs for data on bucks harvested in the surrounding area, if it is available.

Antler point restrictions

The most popular restrictions used to protect yearling (1½-year-old bucks) and some 2½-year-old bucks include point restrictions, whereby a buck has to have a certain number of total points or points to a side before it can be taken. A review of the data gathered by the MDC or other hunting clubs in the area can help you determine an appropriate point restriction. For example, an eight-point limit (four points to a side) may effectively protect 80 percent of the yearling bucks and 25 percent of the 2½-year-old bucks in one area.

Antler spread restrictions

Spread restrictions limit the bucks taken to those whose antler inside-spread is a specific width or greater. The inside spread is measured as the greatest distance between the main beams. In general, a spread restriction of 15 inches, which is the typical distance from ear tip to ear tip for adult bucks, has been effective in protecting about 95 percent of yearling bucks and, in some cases, up to 40 percent of the 2½-year-old bucks (Figure 4). Again, the percentage of the 2½-year-old bucks to protect depends on your goals.

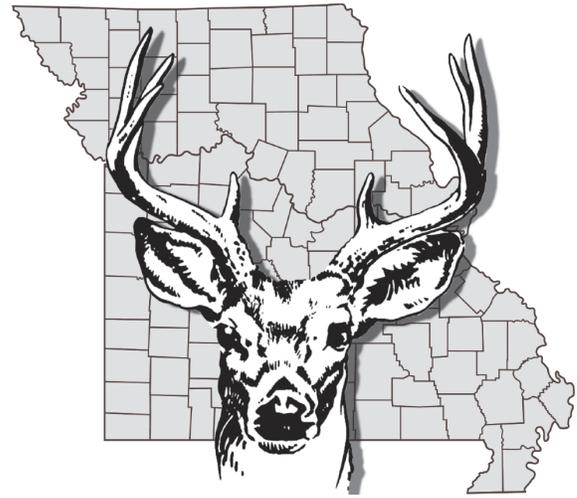


Figure 3. Several Missouri counties have antler point restrictions. To find them online, go to <http://mdc.mo.gov> and search for “antler restrictions.”

Antler score restrictions

Antler score restrictions can also be used to restrict the bucks eligible for harvest. For example, in an area where 2½-year-old bucks grow antlers with seven or more points, a point restriction may not be effective. Thus, the antler spread of the 2½-year-olds would need to be evaluated. If the average spread of 2½-year-old bucks was 15 inches, then a 15-inch spread restriction would not be an effective method for protecting them from harvest. The next option is to set an antler score restriction to protect 2½-year-olds. An antler score is calculated from spread, beam, circumference and point measurements. (Download a scoring sheet from http://mdc4.mdc.mo.gov/tv/bints/rack_meas.pdf for more information.)

Let's say that a minimum score of 120 inches was set to protect the 2½-year-old bucks, but the deer population includes some 3½- and possibly 4½-year-old bucks that do not score 120 inches. Should they be eligible for harvest even though they don't meet the score restriction? If the QDM goal is to allow bucks to reach at least 3½ years of age before harvest, the answer is yes. According to such deer management objectives, nothing is wrong with harvesting mature bucks, regardless of antler size or characteristics.

Age restrictions

Antler characteristics are only one clue to identifying a buck's age on the hoof. Body characteristics more accurately identify age, so learning the body characteristics of various age classes is important to achieve a balanced age structure. Refer to MU Extension publication G9485, *Techniques for Aging Live Deer*, for additional information on aging live white-tailed deer. General descriptions of body characteristics by age class can also be found in *Observing and Evaluating Whitetails* (Richards and Brothers 2004) and in Mississippi State Extension Service's publication on aging live white-tailed deer (Demarais, Stewart and Griffen 1999), both of which are listed in the *Additional information* section.



Figure 4. This buck could be harvested with a 15-inch spread restriction.

Recommendations for doe harvest

A major objective of a sound deer management program is to establish and maintain a deer herd that is in balance with its habitat. This can be achieved by **harvesting an appropriate number of does** because doe harvest affects deer density, sex ratio and habitat quality. Properties that have a history of significant buck harvest and limited doe harvest can have a sex ratio that is skewed heavily towards females. Conversely, properties that have protected the majority of bucks from harvest and harvested effective numbers of does can have a balanced adult sex ratio, which is close to one buck per one or two does. Harvesting equal numbers of bucks and does is appropriate when the sex ratio is even.

In general, the numbers of bucks and does harvested effects a deer population in specific ways:

- Harvesting equal numbers of bucks and does tends to stabilize a deer population.
- Harvesting more does than bucks tends to decrease the population.
- Harvesting more bucks than does tends to increase the population.

Does and fawns

The correct number of does to harvest depends on whether your goal is to increase, decrease or stabilize the deer population. In most situations, harvesting 25 percent of the adult does will result in stable deer numbers.

Some people believe that if they shoot a doe with a fawn, the fawn will die of starvation. Research shows, however, that being orphaned does not affect the survival rate of fawns once they become functional ruminants. They become functional ruminants when they are 2 months old and are essentially weaned by 10 weeks of age, about the same time they lose their spots. Although uncommon in Missouri, fawns with spots may be observed as late as September or October in areas with overabundant deer populations and skewed sex ratios.

Correct timing of the doe harvest is important. Many hunters will not shoot a doe until they are finished buck hunting, but for biological and management reasons, the appropriate number of does should be taken when opportunities are presented.

Fawns typically suffer the highest annual mortality rate of any age class. About 60 percent of the fawns born in the

spring are recruited into the fall population, and many die in the winter, when food sources are limiting in poorer habitats.

About 40 percent of the antlerless harvest is comprised of fawns each year. When this occurs, the age structure of the doe segment of the population can increase while keeping the population stable and the benefits of having an older age-class of does can be realized. However, a certain percentage of the fawns taken will be buck fawns, or “button bucks,” which may hinder buck recruitment. In some situations, hunters should be careful about harvesting fawns.

Collecting data and census information

A successful deer management program relies on the collection of appropriate data, which is used to evaluate the success of your efforts. Some measure of deer density, sex ratio, age structure and habitat quality is needed to set harvest recommendations for a particular area. Data collection begins with recording deer sightings and evaluating the habitat on your property.

Recording deer sightings

All deer sightings should be recorded on an observation form. (See MU Extension publication G9482, *Estimating Deer Populations on Your Property: Observational Data*, for information on collecting observational data.) Most hunters are willing to record this information after each hunt; however, emphasize the need to record deer sightings year-round. Over a few years, population trends will become apparent, indicating whether the deer herd is increasing, decreasing or remaining stable. For best results, collect observational data the same way each year, and make comparisons by season or month.

Measuring adult sex ratio

Determining the adult sex ratio of deer on your property is not difficult. An infrared triggered camera survey will provide estimates of the numbers of adult does and bucks. (MU Extension publication G9481, *Estimating Deer Populations on Your Property: Camera Survey*, describes how to conduct a camera survey.) Survey estimates are best used as trend data. By charting consecutive years of data, you can begin to monitor the success of your deer management program and determine if it is influencing the adult sex ratio.

Collecting harvest data

Keeping accurate records on each deer harvested each year is extremely important, as is consulting a wildlife biologist knowledgeable about deer population dynamics to help interpret data and provide specific harvest recommendations each year. Collect the following data on each deer killed:

- Date of harvest
- Sex
- Age
- Weight
- Antler measurements

(Refer to MU Extension publication G9483, *Estimating Deer Populations on Your Property: Harvest Data*, for additional details on collecting age, weight and antler measurements. For an explanation of how to age a deer, refer to MU Extension publication G9484, *Aging a Deer by Examining Its Jawbone*.)

Conclusion

Sound deer management promotes a well-balanced, healthy deer herd and also helps ensure a quality hunting experience. Landowners are beginning to realize that QDM strategies can also be used to combat increasing deer-crop depredation problems. When landowners and hunters take the steps to implement QDM guidelines, properties experiencing crop depredation have the potential for a larger doe harvest. These strategies can benefit both hunters and landowners: Hunters are allowed to take home more deer (and put more meat in the freezer) while promoting sound deer management, and landowners lose less crop.

QDM is achievable for many landowners, even those with small acreages. The QDM philosophy promotes landowners working together to achieve deer management goals and objectives. Hunting a deer herd with a well-balanced sex ratio and a good number of mature bucks is an exciting experience, one that is being realized by an increasing number of Missouri deer hunters and landowners. QDM may not be for everyone, as some hunters are more interested in deer quantity than deer quality. But for those that want to actively participate in managing a deer herd and desire the opportunity to hunt mature bucks, QDM is the only sound strategy.

Additional information

- Beringer, J. and L. P. Hansen. 1997. *Missouri whitetails: A management guide for landowners and deer enthusiasts*. Missouri Department of Conservation. <http://www.mdc.mo.gov>.
- Brothers, A. and M.E. Ray Jr. 1998. *Producing quality whitetails* (revised edition). San Antonio, TX: Texas Wildlife Association.
- Demarais, S., D. Stewart, and R.N. Griffen. 1999. *A hunter's guide to aging and judging live white-tailed deer in the Southeast* (Publication 2206). Mississippi State University Extension Service. <http://msucare.com/pubs/publications/p2206.pdf>.
- Harper, Craig. 2003. *Quality deer management: Guidelines for implementation* (PB1643). The University of Tennessee Agricultural Extension Service. http://trace.tennessee.edu/utk_agexfish/8.
- Missouri Department of Conservation. *Hunting and management of white-tailed deer in Missouri*. <http://www.mdc.mo.gov/789>.
- Quality Deer Management Association. *A basic guide to quality deer management and Quality Whitetails Journal*. <http://qdma.com>.
- Richards, D. and A. Brothers. 2003. *Observing and evaluating whitetails*. Quality Deer Management Association. <http://qdma.com>.
- Strickland, B.K. 2007. *Using antler restrictions to manage for older-aged bucks* (Publication 2427). Mississippi State University Extension Service <http://msucare.com/pubs/publications/p2427.pdf>.

ALSO FROM MU EXTENSION PUBLICATIONS

- G9479 *Ecology and Management of White-tailed Deer in Missouri*
G9481 *Estimating Deer Populations on Your Property: Camera Survey*
G9482 *Estimating Deer Populations on Your Property: Observational Data*
G9483 *Estimating Deer Populations on Your Property: Harvest Data*
G9484 *Aging a Deer by Examining Its Jawbone*
G9485 *Techniques for Aging Live Deer*

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