FEATURE

SUSTAINED YIELD HARVEST: A NEW WAY OF LOOKING AT MANAGING YOUR DEER

Part II—The Mustang Creek Ranch Story

By Dr. James C. Kroll

Last issue, I discussed the concepts related to producing large numbers of mature bucks on a sustained yield basis. Every deer herd, habitat and management situation has a population level from which you can maximize mature buck harvest. This is important, whether you are running a commercial operation or just want to harvest more quality bucks.

In order to do so, you have to pay close attention to the principles of what we call optimum sustained yield (OSY) management. These are: 1) good harvest records for bucks and does; 2) age structure of the harvest and herd; 3) a reliable estimate of recruitment; 4) habitat and nutrition management; and 5) proper culling.

Good harvest records should include the ages of deer harvested, antler quality and whether or not the does are lactating (in milk). Lactation rates give your first approximation of recruitment, the actual number of fawns reaching 1 year of age, but do not provide you enough information to make this final estimation.

Incidental sightings and infrared-triggered camera data, when collected properly, allow you to get a good idea of annual recruitment. If you are not recruiting at least 60 percent, you have a problem stemming from too many deer, poor quality habitat and nutrition or improper harvest. Habitat practices such as roller-chopping brush, burning, discing and timber harvest/thinning all significantly increase forage quantity and quality. In most cases, there are few operators ready for much attention to genetics, although I will discuss this topic briefly later.

So, this final installment will take the theoretical concepts I discussed in Part I and use a good example to show you how real these concepts are.

Mustang Creek Ranch

Mustang Creek Ranch is located near Salado, Texas. It is comprised of about 2,500 acres of high-fenced land, typical of the Hill Country region. There are numerous live oaks, clear streams and abundant forage. Soils are typical for the Hill Country—rocky and shallow. Annual rainfall is about 35 inches.

In the mid-1990s, the owners, Bill and Tere Grace, approached me about switching the operation from cattle and exotic venison production to white-tailed deer. Since I did not see much future for them with cattle or exotics, I agreed to help.

At that time, there were well over a 1,000 head of axis and fallow deer on the property. The first step was to develop a comprehensive, written management plan. Texas Parks and Wildlife biologist Mike Krueger provided significant help in developing the plan.

The next step was to eliminate as many exotics as we could. Bill did an excellent job of reducing the population of exotics on the ranch in short order.

Next, we conducted a census of the whitetail population, which was not easy considering the large number of exotics at that time. We used a replicated spotlight count to get an idea of the number of whitetails. I have no faith in such census techniques, even helicopters, but it allowed me a general idea of whitetail abundance. Th population, understandably, was belo what I thought it should be. We decide to let the herd grow under carefu control.

About that time, we were beginning t use infrared-triggered cameras more an more in deer management. Ou published studies clearly showed thes cameras could be used, not only to get good idea of deer numbers, but als provided an accurate estimate of buck doe and doe-fawn ratios.

Using randomly positioned ba stations, we conducted two-wee camera sessions across the ranch. Th photographs obtained allowed us t measure fawn crop and recruitment, a well as age structure and antler qualit of the buck herd. Believe it or not, yo can age deer from these photographs. A that time, the eight-point to 10-plus point ratio was not all that good since i represented a natural deer herd. It ha not been hunted seriously for som time.

From a genetics standpoint, this was very fragile time for the herd. If we ha succumbed to the temptation o harvesting the best bucks, the her would quickly have deteriorated to th typical eight-point herd seen throughou the Hill Country.

We had our raw material from whic to work, so we decided to push th native herd to its maximum befor dealing with releases of "geneticall superior" deer. The next step was t develop both a harvest strategy and nutrition program to support the herd.

Adequate doe harvest is critical to an

[CONTINUED ON PAGE 138

Sustained Yield Harvest: A New Way of Looking at Managing Your Deer

[CONTINUED FROM PAGE 136]

trophy management program. As I noted in Part I, you only need enough does to produce a maximum number of mature bucks. This is determined by the recruitment rate for yearlings and the age-related mortality rates. Oddly enough, we have found that once a buck gets into the second year, natural mortality under management is not that great, perhaps around five percent. Without nutrition management or at high doe-buck ratios, mature buck mortality can be quite high.

Now, we faced the first problem: How many deer did we have and how many does would we need to harvest to reach OSY? Since census is totally unreliable—other than to establish trends—we decided to let the deer themselves tell us how they were doing. We continued spotlight counts to satisfy Managed Lands Deer Permit requirements; however, we relied more on the herd than the counts to make decisions.

That is where sound record keeping comes in. The key data were those discussed above: recruitment estimates, age structure of the harvest, age structure for live deer from the photographs and antler quality data.

We used census estimates only to gauge the overall population trend. The real fine-tuning came from the deer themselves. Starting with harvest, the average number of does taken annually over the last six years has been 68 does and 43 bucks (Fig. 3). That translates to an average harvest of one doe per 37 acres, one buck per 58 acres and a deer per 22.5 acres. The range of bucks harvested has been reasonably tight, 37-47 total, while doe harvest has fluctuated broadly to meet herd control goals (28-122).

At the same time, average age (one of the most reliable diagnostics) of bucks and does harvested has remained incredibly stable, with the average age of bucks being 4.8 years and does 3.4 years. This is almost perfect in regard to OSY where we strive for an average buck age of 4.5 years and 3.5 years for does.

The most interesting point is, if we believe census data, we only are harvesting about 13 percent of the herd annually (Fig. 5), which may explain the need to fluctuate doe harvest over a wide range. The truth is, the ranch is "leaving bucks on the table" and not taking full advantage of them.

Since the goal was to establish an OSY instead of a maximum sustained yield (MSY) program, the herd may be close to OSY. One thing is sure, if about 15 percent of the estimated herd is OSY, then MSY, which occurs at one half of carrying capacity, must be much greater, supporting a much higher recruitment rate.

The only way to determine if we have reached OSY is to increase buck harvest, beginning next season, to see if average age is lowered. If so, then we know the current harvest is OSY. If not, we can continue tweaking the harvest until we do. My calculations indicate we need to average about 100 does (1/25 acres) and 50 bucks (1/50 acres) annually to dampen population fluctuations.

This begs the question, "How many deer do we really have?" If the census is suggesting, on average, an adult deer to as much as 2.5 acres, what is the true population? We probably never will know, but as I noted, the herd is telling us most of what we need to know: We have a sustained yield of at least bucks. Now, let's look at the reproductive side of this analysis to see if the story is consistent.

Remember, at the same time we were practicing what I refer to as rifle-based habitat management (meaning we reduce the herd to improve habitat), Bill and Tere were also implementing both habitat and nutrition management.

The habitat management included fire, discing and brush management. Nutrition management included the above, plus supplemental free-choice feed stations and food plots. Since rainfall is not very reliable in Central Texas, food plots pretty much have been limited to cool season crops of cold hardy oats and clover. More recently, we have added chicory to the fall planting since this variety grows for up to five years and is very drought hardy.

So, taking into account proper harvest management, coupled with nutritional management, we also should be seeing changes in reproduction, as well. Again,

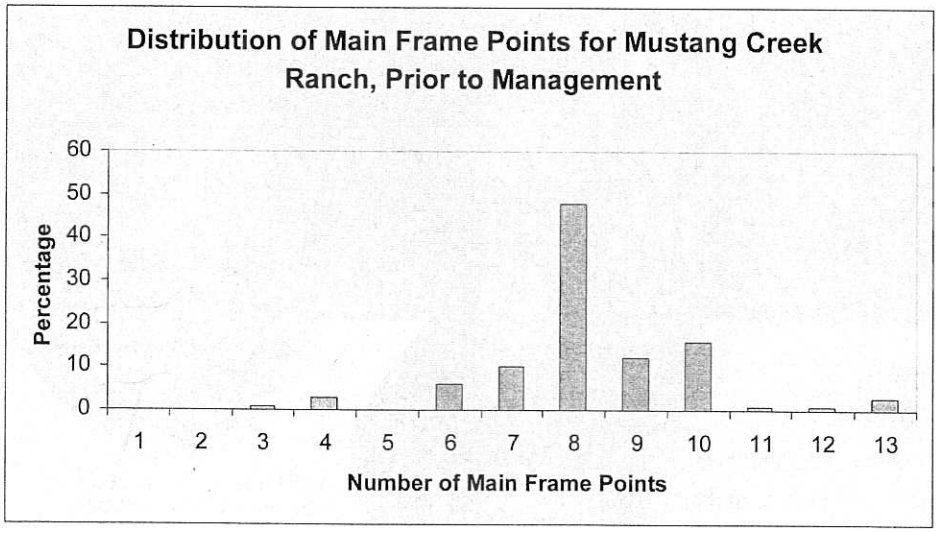


Figure 1. Prior to beginning a management program at Mustang Creek Ranch, the author conducted an infrared-triggered camera study of main frame points distribution for mature bucks. Note the majority of bucks had eight points, with several bucks having 10 or more points. This was a fragile time for the program because harvesting these better bucks could have seriously changed the genetics of the herd.

we return to our harvest data for the answers, specifically looking at lactation data for both adults and yearlings, and fetal counts and measurements.

Lactation rates generally increased over time, indicating an increase in fawn crop. If we conservatively assume a lactating doe harvested in the fall successfully has produced at least one fawn, then the fawn crop during all of the last seven years has exceeded 60 percent.

If we also look at the average number of fetuses in the does at the time of harvest (our first "cut" at reproductive success), we find the average fetal count also has increased over time. If we assume the long-term average fetal count (1.7 fetuses per doe) as an estimate of reproductive potential, and average lactation (72 percent) as a conservative estimate of fawn survival, then the ranch is losing 42 percent of fawns from birth to fall.

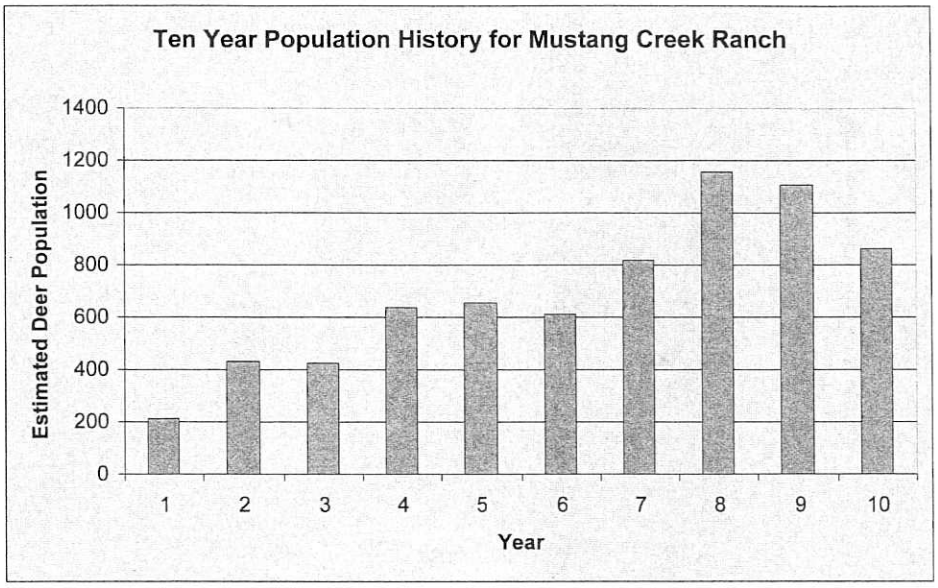


Figure 2. In 1995, the author became involved in a management program at Mustang Creek Ranch, Salado, Texas. This chart shows the estimated deer population from spotlight counts for each of the last 10 years of management. Spotlight counts are highly inaccurate and tend to under-estimate the true population, but they are useful for trends. The Mustang herd continued to increase, peaking in the eighth (2002) year. The population estimate shows the herd is coming under control. The goal is to have 700-800 adult animals on the 2,500 acres.

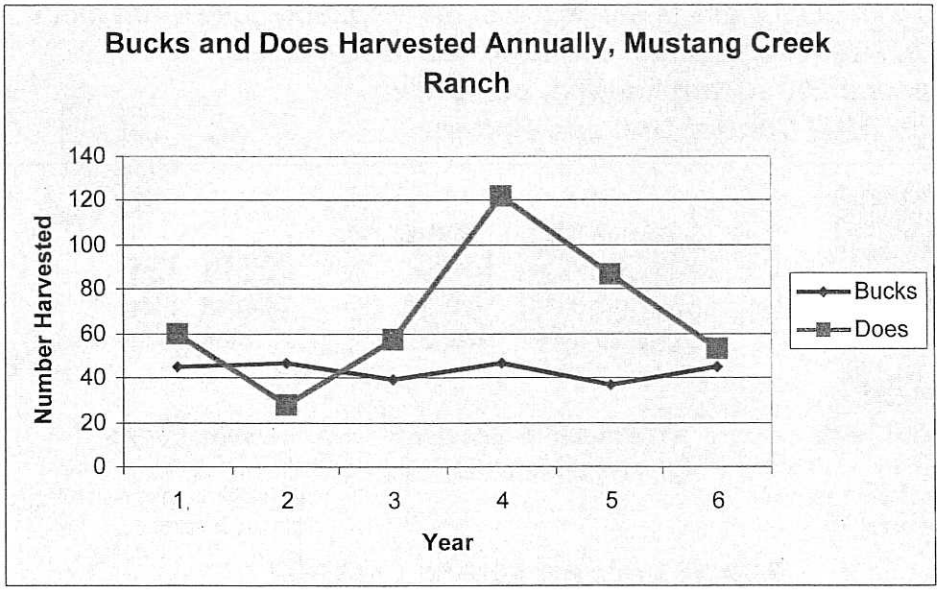


Figure 3. Although the doe harvest intensity has fluctuated over the last six years, due primarily to efforts to control herd growth, buck harvest has fluctuated little during this period. This clearly suggests the ranch has achieved an optimum sustained yield of mature bucks.

We recently implemented a late winter camera count to estimate recruitment so that we will have an estimate of the true picture for the Mustang Ranch herd—number conceived, number surviving until fall and the number recruited. That will get us about as close to knowing the real population and harvest rate as we can come. My "gut" feeling is it will be much higher than our current 13 percent average harvest.

One thing that may be working to increase recruitment is the timing of breeding. In general, the earlier a fawn is born, the more likely it will survive to weaning. As a matter of course, we measure and count all fetuses found in harvested does.

Research in South Carolina has shown a significant (95 percent) relationship between crown-rump length of a fetus and its age in days. So, we can measure this length for each fetus and derive a 95 percent accurate age for it. The average fetal length for does taken during the same time each year has continued to increase, meaning the does are getting bred earlier each year.

Now, that's a significant finding since, as noted above, additional research has shown the earlier a fawn is born, the better its chances of survival.

Finally, one of my best diagnostics on herd health is the yearling doe lactation rate. If a yearling doe is lactating when she is harvested in the fall, it means she was bred as a doe fawn! The higher the percentage of yearling does lactating, the better the herd's health is.

I usually establish a 40 percent lactation rate as my goal. You cannot expect there to be fawn breeding every year since density-independent factors such as rainfall often affect fawn growth. Once again, the herd is "telling us" it is

[CONTINUED ON PAGE 142]

[CONTINUED FROM PAGE 139]

in good condition.

An exciting aspect of doe fawns breeding is our research that has shown a high proportion of the fawns born to doe fawns are bucks. That means your healthiest deer are giving birth to bucks, which in turn probably represent your best genetics.

What about their habitat? A healthy deer herd also means good habitat. All you have to do is drive to the Mustang Creek fence and look at the surrounding Bell County landscape. On the Mustang side is a healthy ecosystem, with knee-high vegetation, while many ranches in the county are grazed to the ground!

The most staggering observation about the Mustang Creek Ranch experiment is, since 1999, the ranch has harvested some 667 deer! This translates to one deer harvested during a six-year period to 3.7 acres.

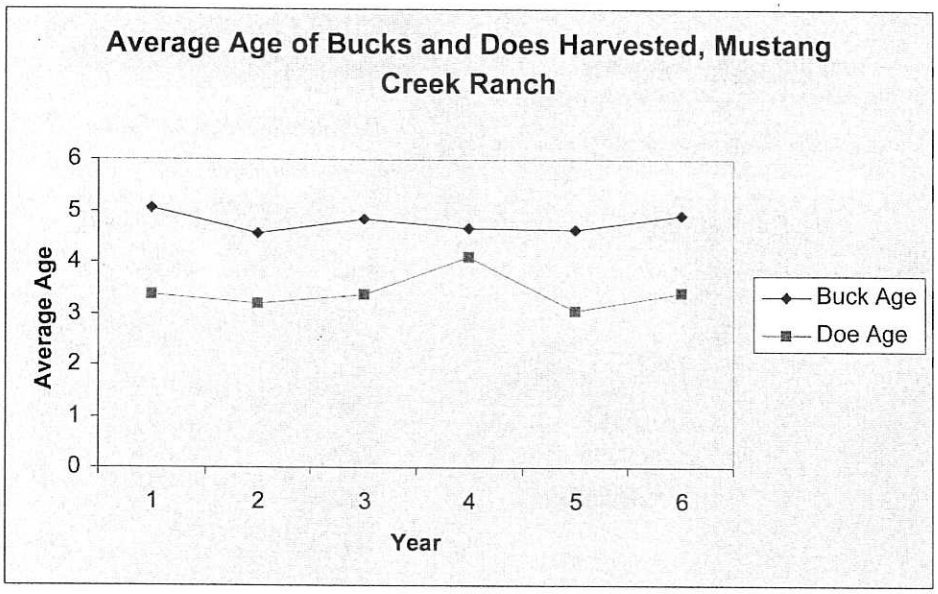


Figure 4. Over the last six years, the average age of does and bucks harvested from Mustang Creek Ranch has remarkably stable. The upswing in age at year 4 (2002) reflects the need to remove more does (see Fig. 3).

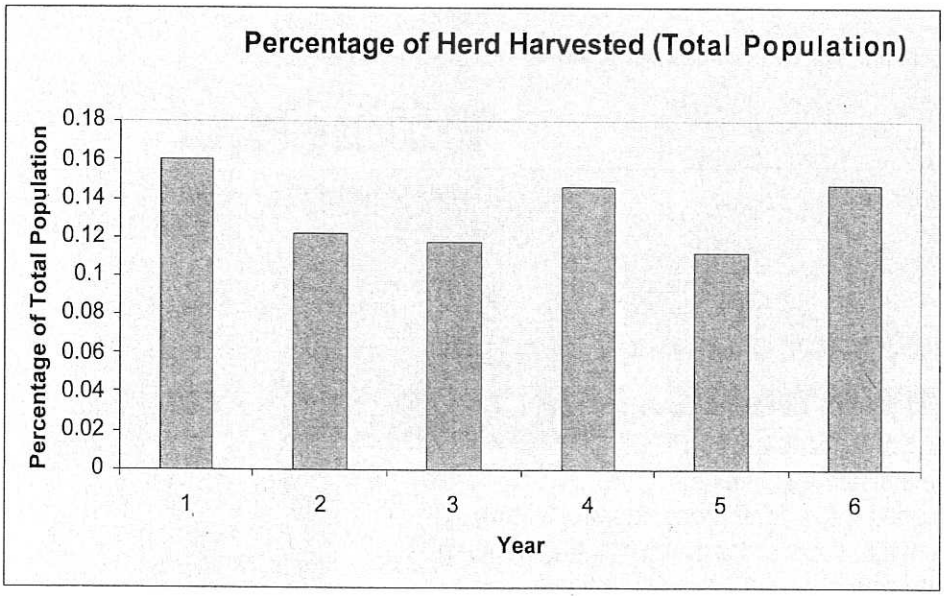


Figure 5. The annual estimated harvest rate. The long-term average harvest rate supports a sustained yield harvest rate of 13 percent for deer at Mustang Creek Ranch. Whether or not this is OSY remains to be seen, after responses to future increases in harvest are monitored.

From an economic standpoint, placing an average value across all bucks of $2,500 (conservative) and all does of $400 (again, conservative), the total estimated gross value of these deer would be $650,000 for bucks and $162,800 for does, a combined total of $812,800!

Since the value given for bucks is way below the state's restitution values, this is very conservative. That's a potential return of $325.12 per acre for the six-year period ($54.19/acre/year). Compare that to a cattle operation.

It would not be fair to Bill and Tere to divulge the actual amount they have earned, but needless to say they feel the enterprise is well worth the effort. Of course, there are many expenses since they are managing their habitat and herd, not mining it.

Where Does Mustang Creek Go Next?

I often hear biologists tell a landowner, "You don't need to stock deer. You can get trophy bucks from the deer you already have." It is my experience that seldom is this the case, particularly for fenced herds. When you fence a property, you essentially are reaching into a pool of deer and randomly selecting "X" number. The luck of the draw more often than not is against you.

Further, after years of shooting the best deer, many of our herds have deteriorated (see Fig. 1, Part I) in antler quality. Hence, although you can substantially improve weights and measurements of deer on your property using the above strategies, you may reach a plateau of quality that cannot be exceeded with native genetics.

Although the ranch is producing some mighty fine bucks, we cannot rest on our laurels. I feel we have "pushed" the

Mustang Creek herd as far genetically as we can.

About the same time we began this program, Bill and Tere also began a scientific breeder program involving one of the first efforts at artificial insemination with the nation's top bucks. They now have several 200-class Boone and Crockett bucks in their program.

In the near future, they will begin a release program designed to take them to the next step. Combined with adequate harvest of native animals, this should take them to the next step. I hope to report on their progress in the future.

In this two-part series, as promised, I hope you have come to a totally new way of thinking about your deer herd. Sustained yield harvest and production management is the key to producing large numbers of healthy, trophy-class bucks, either for your personal enjoyment or to generate agricultural income from your land. In my mind, it is a "win-win" for everyone, including the white-tailed deer. You end up protecting undeveloped land and healthier deer and ecosystems. What more could you want?