

Deer Census Techniques

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Why Count Deer?

The white-tailed deer is the No. 1 big game animal in Texas. In fact, Texas has more whitetails than any other state. We harvest more deer annually than most states have in their entire herds. This resource provides tremendous hunting recreation for Texans, as well as more than 16 million pounds of boneless venison each year.

Most of these animals live on privately owned farms and ranches. More than 95 percent of our state is composed of privately owned lands. The harvestable surpluses of deer and other game animals provide landowners with opportunities for increasing their agricultural income through hunting leases. Continued high quality hunting recreation and increased ranch income are dependent on how well deer herds are managed.

Good deer management doesn't just happen. It requires a basic understanding of how deer live and how they fit into the range management programs on ranches devoted to livestock-wildlife production. The nutritional requirements of the deer must be understood and applied to the types of vegetation on the range. For this reason, the number of deer present must be accurately estimated so that populations can be balanced with food supply and livestock which compete for the food supply.

The ideal situation would be to have a complete count or census of all deer on a particular ranch or in a particular pasture. Unfortunately, complete counts of deer are nearly impossible to obtain, even where animals are confined within a high fence. Unlike domestic livestock, which can be rounded up and counted, deer do not confine their activities to large herd groups and cannot be rounded up successfully. For this reason, sample census methods must be used.

Wildlife biologists have had to rely on various sample census techniques to estimate wild populations. The basic principle involved is that if wildlife numbers can be estimated in a known area which is representative of a larger area, those estimates can be applied to the larger area. The key is to sample the study area as thoroughly as possible and make sure it is representative of the larger

habitat for which the estimates will be used. For example, if a sample census is made only in heavy juniper stands, the population estimates could not be accurately used in an open oak savannah.

It must be recognized that censuses are estimates and, therefore, subject to some error. Wildlife managers have done a good job if their estimate is within 10 percent of the actual population. Since deer are capable of responding to slightly decreased numbers with increased survival of young, a 10 percent error is quite tolerable for management purposes for determining harvest levels. In fact, where population estimates are carefully made each year under as nearly comparable conditions as possible, the trends are as important, if not more important, than the actual numbers in any one year.

In some parts of the country, "sign" can be used to estimate deer herd densities. For example, where mule deer migrate from summer to winter ranges, track counts can be made along migration routes. Or, where deer are the main large herbivores, the condition of major food plants gives an indicator of population density. When highly palatable plants are being heavily used as well as some plants of secondary importance, deer numbers should be reduced to prevent range depletion. In our area, however, the most widely used census techniques are "strip census" ones, which entail counting deer along a known route and estimating the acreage observed.

Before discussing these techniques in detail, however, it is important to note that herd composition is as important as total numbers. Buck:doe ratios tell us how much of the harvest should be composed of females and how much of males. Some ranchers, biologists and hunters believe an ideal situation would be a 1:1 ratio, as this reflects the approximate way the animals are replaced by births; however, to maintain a deer population at this ratio requires intensive management. In practice, a ratio of one buck to two does is not bad. As these ratios get higher, however, the number of harvestable bucks is decreased. In a herd at carrying capacity, a 1:10 buck:doe ratio tells us we have too many females and fewer bucks to harvest. If meat production was the only goal, this would not

necessarily be bad. However, the consumer (hunter) is primarily interested in hunting bucks. Thus, the rule of thumb is to harvest bucks and does based on the ratios that the census indicates.

Another important ratio we can get from a census is the number of fawns per doe. This gives us an indication of herd health, since reproduction will be low when females are stressed (as by poor nutrition on depleted ranges). In good deer habitat, adult females tend to have twins, with triplets not uncommon. In marginal to poor habitat, single births are the rule and fawn survival is decreased. The number of fawns produced and their survival is important to future hunting seasons.

Deer Census Methods

Three types of census that can be used by private landowners are the Hahn, Spotlight and Mobile Line techniques. All are designed to be used just prior to the hunting season (usually October) and do not require the use of special equipment.

These three methods determine deer populations by observing animals on a calculated number of acres. In other words, a census line is established by determining the number of acres which can be seen along a given route. Dividing the number of acres by the number of deer seen gives an estimate of the population, expressed as acres per deer. This number, when based on a representative sample, can be expanded to estimate the number of deer on a given ranch.

To determine the number of acres observed along the route, the distances which deer can be seen to the right and left of the line are measured at regular intervals. When these distances are totaled and divided by the number of stops (observation points), an average width of the census strip is calculated. The average width (usually in yards) is then multiplied by the length of the line (in yards). This will give the square yards in the sample. The square yards in the sample divided by 4,840 (square yards per acre) will give the acres seen.

Example:

A line 2 miles long is walked, and, based on the visibility to the right and left at 100-yard intervals, the average width is 150 yards.

$2 \text{ miles} \times 1,760 \text{ yards/mile} = 3,520 \text{ yards of strip length}$

$3,520 \text{ yards (strip length)} \times 150 \text{ yards (average width)} = 528,000 \text{ square yards observed}$

$528,000 \text{ square yards} / 4,840 \text{ square yards/ acre} = 109 \text{ acres observed}$

If 11 deer were observed, the density would be 109 acres to 11 deer = 9.9 acres per deer.

The visibility also can be determined from an aerial photo, although most people prefer ground estimates. One general rule to follow in measuring acreage is that distances are not measured across an open draw or gully and deer are not counted across the draw or gully. Also, distances are not to exceed 250 yards to the right or left of the line and deer are not counted past these distances. All lines should be well marked to ensure that the same route is followed in future years. This is normally not a problem with driving lines on roads, but walking (Hahn) lines should be clearly marked with fence posts, trees or piles of rocks spot-painted with brightly colored paint.

Hahn Line

A Hahn line (named for Henry Hahn who devised the technique) is a strip census in which numbers of deer are counted along a 2-mile strip by one man walking. The general directions for establishing and using a Hahn line are as follows:

1. The line should be laid out on an east-west axis and always walked from west to east in the evening (sun at observer's back). It may be 1 to 3 miles long with 2 miles being optimum.
2. Visibility should be measured at 100-yard intervals along the line. In establishing the line, two men are used. One stays on the line and the other walks out at right angles. When the walker disappears from view in the brush, the line man signals him to stop and the distance walked is the visibility.
3. One line per 1,000 acres should be established if possible.
4. The line should be walked at least twice and the results averaged. The more times it is walked, the more precise the count will be.
5. The line should be walked in late September or October. Start the census 30 minutes prior to official sunset for a 2-mile line.
6. All deer observed should be recorded. When possible they should be identified as bucks, does or fawns.
7. The weather conditions are important. Ideal weather would be a southerly wind less than 15 miles per hour, a cloud cover of less than 50 percent and a relative humidity of less than 70 percent.
8. The Hahn method is accurate on ranges with high deer densities such as the Edwards Plateau. The reliability decreases with low deer populations.

Spotlight Census

The spotlight technique involves counting deer at night using a vehicle (preferably a pickup). One person drives the vehicle and two people, if possible, count deer and make visibility estimates from the bed

of the truck. Aircraft or high intensity spotlights are used. This is considered the most consistent method of deer census. However, while it provides valuable density data and is easy to do, it does not work as well for composition (buck:doe, doe:fawn) data. For this reason, a daylight mobile line should be run to obtain this information.

The criteria for a spotlight line are as follows:

1. The count should be started 45 minutes to 1 hour after official sunset.
2. The driver should not exceed 10 miles per hour. On ranch roads, 5 to 7 miles per hour is preferable.
3. The Texas Parks and Wildlife Department uses lines at least 15 miles long. Shorter ones may be used on a ranch, but should be run frequently.
4. Visibility is taken at 1/10-mile intervals along the route.
5. Winds should be less than 20 miles per hour and cloud cover less than 50 percent. Relative humidity should be less than 70 percent.
6. Record all deer observed within the sample area. Identify their sex and age when possible.
7. The local game warden should always be notified prior to the count and told the time of spotlighting and the exact location of the activity. No weapons should be carried in the vehicle.

Mobile Line

This technique involves one person driving a vehicle over a marked route to count deer on a measured acreage. It can also be used to count deer without estimating acreage for buck:doe and doe:fawn ratios. It is the least accurate of the three techniques for estimating density figures.

The criteria are as follows:

1. The line should run west to east and should be approximately 7 miles long if possible.

2. The census should be started 30 minutes before official sundown for a 7-mile line.
3. Weather conditions should include a southerly wind less than 15 miles per hour, cloud cover less than 50 percent and relative humidity less than 70 percent.
4. Visibility should be taken to the right and left at 2/10-mile intervals if a density estimate is desired.

Other Information

Certain other observations can be made which will increase the reliability of census methods. Some of these are:

1. **Casual observations:** Keep records of all deer seen from August until the opening of hunting season. Use binoculars to classify deer as bucks, does, fawns and undetermined. This will help verify buck:doe and doe:fawn ratios.
2. **Watch vegetation:** Deer feed primarily on forbs (broadleaved plants sometimes classified as weeds) and browse. Watch these indicator plants to determine if deer use is too heavy or if there is heavy competition from livestock.
3. **Harvest records:** The quality of deer in the harvest can say a lot about what is happening in a deer herd. Recording antler sizes, body weights and body conditions is important. However, these statistics must be related to age. Each deer should be aged to see if it is a young deer doing well or an older deer doing poorly. The Texas Parks and Wildlife Department or your county Extension agent can provide materials to help you learn how to age deer. These records from harvested animals will be useful in years to come as you evaluate the progress of your management program.

Remember, all census information is trend data. Annual records should be retained to compare population trends and to help determine the impact of management practices.