Camera Surveys 101

QDMA Articles

By: Jason Snavely

Few topics related to white-tailed deer are discussed by a more diverse segment of society than are population levels. Deer numbers, whether defined at the local, county or state level affect each of us in some way.

Increasingly, agricultural producers, gardeners, wildflower lovers, and motorists have an interest in deer populations. And, of course, deer managers and hunters want to learn more about their local deer population. Until recently, we relied solely on state game agencies for deer population information. Now, with the availability of infrared-triggered cameras, we have the ability to learn on our own.

In the last issue of Quality Whitetails (August 2004) I began a series of articles about infrared-triggered cameras by introducing you to the history of remote cameras along with some basic camera set-up tips. In this installment, I will describe a simple, yet practical technique to estimate the number of deer on your hunting property as well as important herd characteristics such as buck:doe ratio, age structure and fawn crop. By the time this article goes to press you may have missed the optimal window to conduct a fall or pre-season survey. No sweat, start making your preparations for a winter or post-season survey. Both surveys are valuable, and each provides insight into different aspects of your deer herd.

As a reader of nearly every outdoor publication available, I often see articles about deer censuses. A deer census is a complete count of every deer in a given area. As you can guess, this is simply not possible. Therefore, biologists estimate deer densities in defined areas and expand those numbers to derive population estimates of larger areas with similar habitat types.

The following infrared-triggered camera survey technique was developed and refined by Mississippi State University researchers Dr. Stephen Demarais, William McKinley and Dr. Harry Jacobson. This technique can provide a great deal of useful information on your deer herd, especially when used in conjunction with observation data, harvest data and habitat evaluations. Research has shown that a camera density of one per 100 acres provides sufficient reliability to make sound management decisions. Therefore, this is the camera density we will work with in this article. Researchers generally conduct pre- and post-hunting-season surveys. Pre-season surveys are generally conducted in September just prior to the hunting

season. Post-season surveys can be run as soon as the hunting season ends ? generally late January to early February.

Understand that all population estimation techniques involve a certain number of assumptions. For example, if your bait is not attractive due to the presence of a preferred native food source, you won't obtain sufficient pictures of your deer. In regard to camera surveys, Dr. Steve Demarais from Mississippi State University notes, "The results (i.e., percentage of the population that is surveyed) will vary among areas." Steve also points out the assumption that the bait is equally attractive to all deer. In other words, are bucks just as likely to hit the bait pile as does, and vice versa? He goes on to state that "bait attractiveness also can vary year to year, as forage and mast resources vary." A perfect example is the effect that a good acorn year can have on a poorly timed camera survey. If acorns are dropping in full force, deer will almost always pull away from your corn and hit the acorns.

To get started with the survey, you will first need to obtain an aerial or topographical (see mytopo.com) map of your property. Lay your map out and grid the property into approximately 100-acre blocks. Don't worry about being exact, just use your best judgment. Always place the camera in an area that is heavily utilized by deer. Don't create a camera station in the middle of a laurel thicket just because it is in the center of one of your 100-acre blocks. Logging roads, edges of food plots or agricultural fields, and heavily used trails make great camera locations. I prefer to record a GPS waypoint for each camera site for map-making purposes and to make it easier to find the same camera stations each year. Be sure to see last month's article for camera set-up tips.

Next, make sure your cameras are working properly. Set all of your cameras to record the date and time of each photo. Also, set all cameras on a 10-minute delay to avoid shooting up all of your film on a few deer. William McKinley, white-tailed deer program leader for the Mississippi Department of Wildlife, Fisheries and Parks, refers to deer that burn up your film as "corn junkies." William conservatively estimates he has gathered 40,000 pictures with infrared-triggered cameras. You probably won't catch up with this count any time soon, but you can learn from his considerable experience.

William recommends 200-speed, 36-exposure film to prevent from having to check your sites every day and to reduce human scent at your camera stations. If the camera has taken more than half (19 or more) of the roll, pull it and replace it with a new one. Of course, the new digital trail cameras by-pass these film limitations.

Once you've determined the proper number of camera stations, and located the camera sites, you will need to clear all vegetation from the detection zone to prevent false events. Make sure you face the camera North or South to avoid backlighting (see the article in the last issue). Once the site is prepped, you must pre-bait for at least five days. Be sure you are aware of the baiting laws in your state before beginning. If you see any problems, contact your local conservation officer and make him/her aware of what you are doing.

During this pre-baiting phase, do not operate the cameras. You are trying to establish usage of the site before beginning the survey.

William introduced me to a rather effective approach to pre-baiting. Pre-bait by placing approximately 15 pounds of corn 12 feet from the camera (the smaller amount is to avoid aflatoxin, which can result when corn gets wet and sits out long enough for mold to form). While in the pre-baiting phase, check the bait every other day for evidence of deer use. Be patient and wait until deer (not raccoons) clean up the corn before beginning your survey.

Although some research has shown that shorter survey periods (five to 10 days) can be just as accurate for sex-ratio and age-structure information, I prefer 10- to 14-day survey periods to maximize density estimates and to provide more time for shy deer to loosen up to the cameras. Research conducted by Dr. Harry Jacobson and his associates sought to determine the accuracy of three camera densities by surveying a deer population with color-coded collars for individual identification. These researchers conducted the survey for 14 days. During the first year of their two-year study, they "recaptured" 30 of 30 deer (100 percent!) on photographs using a camera density of one for every 160 acres. During this first field season, 29 of 30 deer were bucks. Researchers photographed 97 percent of marked bucks and 73 percent of marked does during the second year of the study.

In a similar Mississippi study, William McKinley photographed 92 percent of the bucks and 89 percent of the does. Although new bucks were still showing up on days 13 and 14, William states that "a 10-day survey would get over 90 percent of what you would have gotten with a 14-day survey." William was only picking up one or two bucks after day 10. He goes on to mention that a 10-day survey is more cost effective when you consider the additional cost of "two new deer for the cost of two more rolls of film and processing, multiplied by the number of cameras." The bottom line is that infrared-triggered camera surveys are a valuable tool that can be effectively applied to your farm, lease or hunting club. Compared to alternative methods for estimating deer numbers, camera surveys have the perfect mix of cost efficiency, accuracy and simplicity. Traditional methods used by state agencies and

biologists are usually complex and involve confusing statistics and formulas.

Be sure to keep bait piles, camera batteries, detector batteries and film fresh throughout the survey. Once your survey period is over, compile all of your photographs and carefully count the number of bucks, does and fawns. With does and fawns, don't worry if you suspect that you are counting the same deer more than once. Count the total number of does and fawns including known repeats. With bucks, you need to tally two numbers: the total number of bucks in the photos including repeats, and the actual of number of unique bucks. For example, your survey photos may include 60 photographs of bucks, from which you can identify 17 recognizable individuals. When counting the number of unique bucks, simply identify antler characteristics such as number of points, abnormal points, tine length, spread and any other distinguishable antler or body characteristics.

If you end up with a few deer that are unidentifiable (you almost always do) simply throw those deer out of the survey. Do not make guesses on deer just beyond the range of the flash. If you have a significant number of photographs that are difficult to identify, it is advisable to ask a biologist or hire a reputable private consultant.

We can rather easily determine the number of unique bucks in our photographs, but most does and fawns do not have distinguishable characteristics that allow us to count them individually. To separate the number of individual does and fawns from the repeats, we must compute what the researchers call a population factor. I know, I said no complex formulas and statistics. This one is easy. Simply take the number of unique bucks (17 in our example) and divide this by the total number of bucks photographed (60). The resulting population factor (17 divided by 60 equals 0.28) is then multiplied by the number of does and fawns counted in the photographs. If you have a total of 100 does in your photographs, multiplying by your population factor of 0.28 gives you an estimate of 28 individual does.

This population factor filters out those "corn junkies" that like to visit the camera sites multiple times. In other words, by using the known number of bucks that revisit the camera site we can determine how many of the does and fawns are repeats. Obviously, this assumes that bucks and does are equally likely to visit the camera sites. In William's study, uniquely tagged does were used to determine if bucks and does visited the camera sites at the same rate. He found no significant difference in usage rates.

Once you have estimated the total population you can calculate a buck:doe ratio and a fawn:doe ratio. If you have developed a skill for aging the bucks where you hunt, sort them by age class and examine your age structure. As you repeat your

survey over multiple seasons, you can compare trends in your estimates. In fact, season-to-season trends in this kind of data are more valuable than actual population estimates in any given year.

Research conducted in Mississippi (where late fawning commonly occurs) showed that the most accurate fawn crop estimates are derived from a winter or post-season survey, because young fawns don't move as much during the fall survey. It is possible that older, northern fawns might be more active than their late-born southern cousins. In northern climates, fawns must reach a critical body weight of approximately 60 pounds before harsh weather sets in. More research is needed in the North to determine if this is the case in colder climates with more harsh and prolonged winters. That's the great thing about infrared-triggered camera technology being available to the general public ? you can be the scientist. Conduct your own study comparing fawn crop results from the fall and winter surveys. If you are collecting observation data on the number of fawns observed per doe, you have another piece of the puzzle to throw into your analysis.

Researchers agree: these surveys may not answer every question, but they are fun to conduct and will add greatly to your knowledge and deer-management experience.

About the Author: Jason R. Snavely owns and operates Drop-Tine Wildlife Consulting (DWC) in Millville, Pa. He received his wildlife science degree?from Mississippi State University.

This article was taken directly from a previous issue of Quality Whitetails, the bi-monthly journal of the QDMA. The $30 annual membership to QDMA includes a subscription to this acclaimed publication. For information on joining QDMA, click here.