

Estimating Deer Populations on Your Property

Camera Survey

Implementing a sound, quality deer management program depends on obtaining accurate survey data. Obtaining accurate data requires the ability to collect reliable estimates of deer density on your property. Many hunters use infrared-triggered digital trail cameras to scout and pattern deer on their property. This type of trail camera may be the best tool available to landowners for determining important demographic characteristics of the deer herd on their property. A camera survey can be used to monitor population demographic trends, including deer densities, age structure, sex ratio and fawn recruitment. This guide outlines how to conduct a camera survey on your property.

Conducting a camera survey

The two time periods during which camera surveys are typically conducted are preseason and postseason. Because attractants or bait such as corn are used during camera surveys, preseason surveys should be conducted in August so as not to be in conflict with baiting regulations. Scheduling a postseason survey in Missouri is much more of a challenge. Postseason surveys should be done before the casting, or shedding, of antlers but not at a time that would violate baiting regulations. For these reasons, we recommend conducting a preseason, late-August camera survey.

To lay out a camera survey, you will need a map or aerial photo of the property. Aerial photos are available through the following websites:

- MU Center for Applied Research and Environmental Systems (CARES), <http://ims.missouri.edu/moims2008>
- Missouri Department of Conservation GIS Mapping Service, <http://newmdcgis.mdc.mo.gov>
- Google Earth, <http://earth.google.com>

On the map or aerial photo, lay out a grid that divides the property into cells equal to the number of cameras



Figure 1. Identifying individual bucks is easier with high-resolution photographs that are date- and time-stamped.

you intend to use. Usually, one camera per 100 acres is sufficient. Locate each camera station near the center of a cell in an area with convenient access that is likely to be visited by deer.

Once you have identified the locations of the camera stations, bait each area with about 50 pounds of corn about one week before beginning the survey. Replenish corn as necessary to ensure bait is always present.

Set up the cameras when deer begin to visit the bait site on a regular basis.

- Set cameras to print the date and time on each photograph (Figure 1).
- Program cameras to take photos on a 1- to 10-minute delay. Although shorter delays may result in numerous pictures of the same deer and will increase the time required to analyze the photos, they may also result in photos of individual deer that appear only briefly at a bait site.
- Use the high-resolution settings on your cameras to aid in identifying bucks. Grainy or low-quality photos decrease the likelihood of differentiating individual bucks.
- At each station, place a camera about 12 feet from the bait pile. Face the camera north or south to avoid sunlight glare. Attach it to a tree or post about 30 inches above the ground, and aim it directly over the bait pile, not at it. Put a small sign with a unique number in the background to make identification of the camera station easier during data analysis.

This deer conservation guide is one in a series developed jointly by MU Extension and the Missouri Department of Conservation.

Written by
Robert A. Pierce II, Fisheries and Wildlife State Specialist, School of Natural Resources

Jason Sumners, Resource Scientist, Missouri Department of Conservation

Emily Flinn, Resource Scientist, Missouri Department of Conservation

- Allow cameras to run day and night.

Run the camera survey for 10 to 14 days. Check stations every four to five days to ensure bait remains and cameras are working properly and have sufficient battery life and memory card space. Replenish bait and replace camera batteries and memory cards as needed. Each camera will function differently, so rely on previous experience regarding battery life and memory card capacity.

Analyzing the data

When the survey period is complete, begin analyzing the photographs.

- Record the number of bucks, does and fawns in each photo.
- Separate buck photos from the others.
- Identify each individual buck using antler and body characteristics. Then, count the number of different bucks photographed.

Managing thousands of photos can be a challenge. To make it easier, develop a system for organizing all the photos taken during the survey. One good way to manage the photos is to create a folder for each camera station and put all the photos from each station in the station's folder. Then, copy all the buck photos into a "buck" folder for further analysis.

Use the time and date stamp, as well as location, to help differentiate bucks. Yearling bucks are especially difficult to identify as many of them look exactly the same. Opening

multiple pictures for viewing, or printing all buck pictures may allow for better differentiation of individuals. After all photographs have been analyzed, calculate population estimates as illustrated in Table 1.

Table 1. Example of calculating population estimates using a camera density of one camera per 100 acres for 10 nights on a 1,000-acre property.

Camera survey data analysis	
Acres sampled	1,000
Camera stations	10 (1 per 100 acres)
Census period	August 10–August 20
Different bucks	8
Total bucks	29
Total does	79
Total fawns	51
Doe:Buck	$79 \div 29 = 2.72$ does per buck <i>total does ÷ total bucks</i>
Fawn:Buck	$51 \div 29 = 1.76$ fawns per buck <i>total fawns ÷ total bucks</i>
Fawn:Doe	$51 \div 79 = 0.65$ fawns per doe; a 65% fawn crop <i>total fawns ÷ total does</i>
Does	$8 \times 2.72 = 21.76$, or 22 <i>different bucks x doe:buck ratio</i>
Fawns	$8 \times 1.76 = 14.08$, or 14 <i>different bucks x fawn:buck ratio</i>
Total population	$8 + 22 + 14 = 44$ <i>different bucks + does + fawns</i>
Deer density	$1,000 \div 44 = 22.73$ acres per deer <i>acres sampled ÷ total population</i>
Percentage of bucks	$8 \div 44 = 18\%$ <i>different bucks ÷ total population</i>
Percentage of does	$22 \div 44 = 50\%$ <i>does ÷ total population</i>
Percentage of fawns	$14 \div 44 = 32\%$ <i>fawns ÷ total population</i>

New restriction to limit the spread of chronic wasting disease

As of Sept. 30, 2012, grain, salt products, minerals and other consumable natural or manufactured products used to attract deer are prohibited in the chronic wasting disease (CWD) containment zone, which comprises Adair, Chariton, Linn, Macon, Sullivan and Randolph counties. Using such products to attract deer artificially concentrates deer within a small area, thus increasing the chance of CWD spreading from one deer to another or from the soil to deer. Because bait is required for camera surveys, population demographics on properties located in the CWD containment zone should be collected through another method, such as recording observational data (refer to MU Extension publication G9482, *Estimating Deer Populations on Your Property: Observational Data*).

Additional information

Jacobson, Harry A. et al. 1997. "Infrared-triggered cameras for censusing white-tailed deer." *Wildlife Society Bulletin* 25:547–56.

ALSO FROM MU EXTENSION PUBLICATIONS

For a complete list of MU Extension publications on the ecology of white-tailed deer, go to <http://extension.missouri.edu/deer>.

extension.missouri.edu | 800-292-0969