

## Appendix L

### CONDUCTING WHITE-TAILED DEER SPOTLIGHT SURVEYS IN CENTRAL TEXAS

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This brief overview of the **deer spotlight survey** is designed to answer some of the most commonly asked questions about this method for censusing white-tailed deer and its application in central. A deer spotlight survey is only one part of a comprehensive deer management program that must also include proper habitat management, harvest management, and record keeping. Why a deer census is needed, what it will and will not tell you, the type of equipment necessary for conducting spotlight surveys, and how to interpret data collected will be discussed.

There are some limitations to using spotlight census for estimating densities of white-tailed deer in central Texas. Spotlight surveys have limited application on small tracts of land or where dense vegetation such as juniper or oaks greatly reduces visibility. Land holdings of 1,000 acres or greater offer better potential for application of this sampling technique. Spotlight surveys are not designed to observe a total deer population, rather to sample a representative portion of habitat and the number of deer found there.

**What is a deer spotlight survey?** A deer spotlight survey is a method of sampling a given area of land and the density of deer found there. Area is expressed as the number of **visible acres** which is determined by taking a series of visibility readings along the designated route at 10th mile intervals. Data collected on a deer spotlight survey is expressed as the number of **acres per deer**. Multiple counts are required on the repeatable route for reliable information on deer density.

**Why do I need to know about estimated deer density and herd composition?** Estimates of deer density and habitat surveys can help determine whether your deer herd is at, above or below carrying capacity of the habitat. Deer **carrying capacity** is the density of healthy and productive deer the land can support without causing habitat damage. A knowledge of the deer density and herd composition is necessary to regulate annual deer harvest (how many bucks or does to harvest). Daylight herd composition counts may be used in conjunction with spotlight census data to more accurately estimate percentages of bucks, does, and fawns in the deer herd. The spotlight census also enables landowners to monitor progress of habitat and harvest strategies in reaching specific deer management goals and objectives.

**Where do I set up my deer census line?** Select all-weather roads that go through a variety of habitat types. Avoid roads that frequently wash out or become impassable following heavy rain. The transect should sample different habitat types in proportion to number of acres they represent on the property. Avoid roads by feeders or food plots where deer may be concentrated. Spotlight surveys conducted during August and September are less likely to be influenced by seasonal environmental factors, food

distribution, acorn-drop, or other biological events affecting deer. On large tracts, more than one route may be required to adequately sample a ranch. **Make a map of the route(s) for future reference.**

**How do I set up my line and determine visible acres?** Once a route has been selected, an estimate of the number of visible acres along the route must be determined. During the summer months and prior to the first official count, drive the route at night with two observers on the back of the vehicle. Using the same type of spotlight you will use to count deer, have the driver stop every **1/10 mile**. The observers estimate how far they can see a deer (or where the brush becomes too thick to see deer) in a straight line perpendicular to the truck (**left 150 yards and right 50 yards, etc.**) up to maximum of 250 yards from the road. A visibility estimate is also needed at the start point of the line. Visibility estimates made on census routes 12 miles long or greater can be taken ever **2/10 mile**. Visibility readings may be recorded on a form or tape recorded for later tabulation. This process is repeated for the length of the route. On dead-end roads, record visibilities only going down the road and resume taking visibilities when a new portion of the route is begun. When conducting additional counts on the same census route, it is **not** necessary to retake visibilities. Visibility estimates may be used for several years unless significant changes in vegetation have occurred along the route. The following formula is used to convert 1/10 mile visibility estimates into **acres of visibility**:

**Total yards of visibilities / number of 1/10mile stops +1 X Number of miles X 1,760 / 4,840 = Visible Acres**

For a 7.7 mile line with 4,744 total yards of visibility the formula would be:

**4,744 / 77 + 1 X 7.7 X 1,760 / 4,840 = 170.29 ac.**

**When do I conduct deer spotlight counts?** In central Texas, spotlight surveys should be conducted during the months of August, September and early October. Deer are generally well distributed in their home ranges during this period of the year and are more easily identified by sex and age-class (fawns). Each route should be counted 3-4 times to improve reliability of the data. Do not conduct surveys during rain, high wind or following significant disturbance along the route during the day of the count (working cattle, construction, seismograph work, etc.) Begin all counts one hour after official sunset. Contact the local Texas Parks and Wildlife Department game warden prior to conducting spotlight surveys. Also, notify neighbors or adjoining landowners who might see the lights to alert them about your activity.

**What equipment do I need to make a deer survey?** Pickup trucks (4-wheel drive may be required) are preferred over sport utility vehicles or cars. Use a 25 ft. piece of 12 gauge insulated woven wire with two "alligator" clips on one end and a two-plug outdoor type outlet box on the other. Replace the cigarette lighter plug on the spotlight cords with a standard male plug. Attach the alligator clips to the positive and negative poles of the vehicle battery and plug the light into the outlet box. Other wiring systems

can also be used. Use 100,000 candlepower tractor or utility bulbs and avoid using Q-beam-type lights which are heavy, produce excessive glare and can quickly drain a battery. Other necessary equipment includes clipboard or tape recorder, **binoculars**, and a pencil.

**How do I conduct the survey?** Drive the route 5 to 8 mph. In open terrain where visibility permits, speed may be increased to 10-12 mph. Stop only to identify deer or determine the number of deer in a group. Unless all deer observed in a group can be identified by sex and age-class, record ALL these deer as unidentified. Recording only bucks from a group will bias data and reflect a better buck to doe ratio than may be present. Record deer as **bucks, does, fawns, or unidentified**. Deer are usually first spotted by their reflective eyes. Deer eye reflection is greenish-white. Other wildlife, birds, fence posts, and livestock are often mistaken for deer. It is **imperative** that binoculars be used to identify **all** deer observed. Keep the lights moving as the truck moves, checking both ahead of and behind the vehicle. The observer on each side of the vehicle shines only his/her side to prevent blinding the other observer. Deer observed over 250 yds. from the vehicle should **not** be recorded.

**How do I interpret the spotlight census data?** Divide the **total number of deer** into the **total number of visible acres** observed to determine the number of **acres per deer** on the route. For example: **1,260 acres** (one spotlight survey route counted 3 times with 420 acres of visibility) divided by 90 (total number of deer observed on one spotlight survey route counted 3 times) = **one deer per 14.00 acres**. The estimated deer population for the ranch can then be estimated by dividing the total acres of the ranch by the estimated acres per deer figure. For example, the deer **population estimate** for a **5,000 acres** ranch with a deer density of one deer per **14.00 acres** is **357 total deer**. An **estimate** of the number of bucks, does, and fawns in the population may then be determined by multiplying the **total number of deer** by the **percent** of all deer identified that were bucks, does, and fawns. For example:

$$\begin{aligned} 357 \text{ Deer} \times 0.20 \text{ (\% identified as bucks)} &= 71 \text{ bucks} \\ 357 \text{ Deer} \times 0.50 \text{ (\% identified as does)} &= 179 \text{ does} \\ 357 \text{ Deer} \times 0.30 \text{ (\% identified as fawns)} &= \underline{107} \text{ fawns} \\ \text{TOTAL} &= \text{357 deer} \end{aligned}$$

In addition, deer identified as bucks, does, and fawns from spotlight surveys combined with daylight herd composition counts will provide important information on the buck to doe and fawn to doe ratios. These ratios are important population parameters of your deer herd that allow you to measure the success of your management program.

For example: 179 does / 71 bucks = 2.52 does per buck

107 fawns / 179 does = 0.59 fawns per doe

**How can Texas Parks and Wildlife Department help me?** On written request, department wildlife biologists and technicians provide technical assistance to landowners on wildlife and habitat management planning, including establishing deer management programs and deer spotlight surveys. Under the Private Lands Enhancement Program, department personnel are available to assist landowners with setting up and conducting an initial spotlight survey. In addition, assistance is available for interpreting census data collected by landowners and with formulating harvest recommendations based on that information. Literature and data forms are available on request. For assistance, contact Texas Parks and Wildlife Department, Wildlife Division, 11942 FM 848, Tyler, TX 75707 or your local Texas Parks and Wildlife Department wildlife biologist.