# Aircraft Census – How It's Done

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A primary consideration in the management of white-tailed deer is obtaining information concerning the status of the deer herd. The Southwest's prime deer habitat is characterized by stands of dense brush, so some conventional census methods such as the Hahn walking cruise line and the night-time spotlight survey have proven unsuccessful. This has been especially true where the management goal is the production of quality animals. Without a reliable census to provide information regarding a population estimate, buck per doe ratio, fawn survival, age class structure of the buck herd and other habitat factors, management attempts are futile. A more efficient means of obtaining deer population and herd composition estimates on the brushlands is aerial surveys using fixed-wing aircraft and helicopter.

The fixed-wing aircraft census has been used by the Texas Parks and Wildlife Department since 1959 in the Rio Grande Plains to gather data relative to issuing antlerless deer permits and, later, buck deer permits. With the aid of an airplane, much more acreage can be covered with a considerable reduction in manpower and in a relatively short period of time.

The helicopter survey is widely used throughout southern Texas to census deer herds, primarily on privately owned ranches. It has proven to be an efficient means of gathering data for making sound harvest recommendations and developing management plans for the production of quality deer. This paper describes the basic techniques used in conducting both a fixed-wing and a helicopter game survey.

## Fixed-Wing Aircraft Game Surveys

Game surveys conducted with an airplane are an ideal way to conduct a census of large expanses of land, such as a portion of or an entire county.

Fixed-wing aircraft game surveys should be conducted in the fall, from September through middle November, after antler development has been completed and the fawns are large enough to be traveling with the does. The airplane also can be used to conduct late winter or post-season counts.

The aircraft used should have the capacity to fly at speeds of 65 to 85 m.p.h. (105 to 130 k.p.h.). The airplane must have room above the cockpit wings to allow adequate visibility for the observer. The Texas Parks and Wildlife Department currently uses a Cessna 182, but a comparable aircraft will do equally well. The basic survey crew should consist of an experienced game survey pilot and two experienced observers. It is imperative that personnel experienced in airplane game surveys be utilized, both for safety reasons and for the efficiency and accuracy of the census.

As presently used by Texas' Wildlife Division biologists in the South Texas Regulatory District, the aerial transect technique involves flying along a predetermined transect at an altitude of approximately 150 feet (45 meters) at a ground speed of 65 to 85 m.p.h. (105-130 k.p.h.). All deer observed within a 100-yard or 100-meter strip on either side of the airplane are counted and recorded. Deer beyond the 100-yard or 100-meter limit are not counted.

The flight path, or transect, is plotted on a map clearly showing the beginning and ending points, which should be readily discernable landmarks—usually right angles in major roadways, bridges, microwave towers, buildings or others. Similar landmarks throughout the length of the transect are plotted and serve as checkpoints to aid in navigation and enable observers to isolate data from various segments of the transect. The sample area is calculated by multiplying the length of the transect, converted to yards or meters, by the width (200 yards or 200 meters). The resulting area is then divided by 4840 square yards per acre (10,000 square meters per hectare). Results are tabulated as acres or hectares per deer to determine deer density.

Surveys should be conducted in the early morning or late afternoon, peak periods of deer activity. Morning counts should begin as close to sunrise as possible and usually terminate no later than 2 hours after sunrise. Late afternoon counts should be initiated 2 hours before sunset. Flights should be avoided on heavily overcast or extremely windy days. Ideally each transect should be flown several times with several adjacent transects, perhaps miles apart, to increase the accuracy of the census.

During the fixed-wing survey, the deer observed are classified as bucks, does and fawns. The data is generally recorded on a tape recorder, and later transferred to permanent records. Additional data which can be taken are observations of predators (coyotes, bobcats and cougars). From these observations, estimates can be made of the area's total deer density, buck to doe ratios and fawn survival rates.

These data can then be expanded to deer populations over a larger area. It should be remembered that these aerial transects at best provide trend data and are best utilized when comparing results of several year's flights.

One of the major problems encountered with the fixed-wing aircraft census is visibility. The observer must have a clear view of the ground so that deer can be counted and classified. Quite often an airplane flies too fast for the observer to adequately see all the deer within his 100 yards due to dense brush and canopy. This may result in a very conservative count.

## Helicopter Game Surveys

The most commonly used and widely accepted method of conducting a game survey on private ranches in South Texas is the helicopter census. It is considered the most efficient census method available to wildlife managers in the Brush Country, portions of North Texas, the Hill Country and the Trans-Pecos, which do not have extremely dense stands of juniper. For census on a ranch management unit, the helicopter method is unsurpassed.

It is absolutely imperative that qualified and experienced personnel, both pilot and observer, be utilized when conducting a helicopter game survey. Otherwise the expense and time involved in procuring the data will be for naught.

The observer's visibility must be clear to the ground, in order to observe any animals which move. The height and density of the vegetation is not as critical with the helicopter method as with the fixed-wing method. This is due to the helicopter's extreme maneuverability. In essence it serves as a moveable observation platform.

The interest in the production of high quality white-tailed deer and demands for improved management practices, plus additional hunting opportunity, dictate the need for the most efficient census method possible. The helicopter technique has proven to be just that.

The most commonly used helicopter is the Bell Model G4-A. Comparable aircraft which provide good visibility and maneuverability should work equally well.

There are basically two types of helicopter game surveys. The most commonly used type is the complete count. The other basic type is the percentage count. It will be discussed later.

Complete helicopter surveys are designed to obtain total counts of all deer present on a given area. Admittedly, there is no possible way to count all the deer, but more individual deer can be seen with the helicopter than by any other method. Many biologists believe it is more accurate than any other census method available to the wildlife manager, under proper conditions and circumstances.

A helicopter game survey crew should consist of one experienced biologist-observer and an experienced pilot who has spent considerable time flying at a low altitude. Occasionally, a second observer is used. In that case, one observer counts all the deer which move to the left, while the other observer counts everything which moves to the right. The pilot assists by pointing out deer the observers might not be able to see.

Each deer observed is classified and recorded on a prepared form. They are classified as bucks, does and fawns. The bucks should be further categorized according to antler development into spikes, obvious culls, young bucks, mature, excellent mature and trophy.

The complete survey is accomplished by censusing one pasture at a time. Strips adjacent to each other are flown until the pasture has been completely censused. The distance between transects varies, depending on brush density and canopy, deer movement and weather conditions. However, they are normally flown approximately 200 yards (185 meters) apart. If a dense thicket that appears to be a likely bedding area for deer falls between the transects, the transect may be momentarily abandoned to circle the thicket to jump any deer bedding or hiding in it. The original transect is then continued. Once the initial pasture has been censused, the next pasture will be surveyed likewise, until the entire ranch or management unit has been completed.

The altitude at which the helicopter is flown also depends on the aforementioned factors. Normally the taller the vegetation, the higher the aircraft will be flown. Generally the surveys are flown at an altitude of approximately 30 to 60 feet (10 to 20 meters) above the vegetation.

The ground speed at which the helicopter is flown is again dependent on several factors, such as brush density and canopy, deer movement, wind speed and direction and other weather and habitat conditions. Normally helicopter surveys are flown at approximately 30 m.p.h. (50 k.p.h.).

Most helicopter game surveys are conducted during the fall, just prior to the hunting season for the formulation of harvest recommendations. Flights, when possible, should be conducted early in the morning and later during the afternoon, peak periods of deer activity. Census time can be extended by using an external loud speaker to provide additional noise to spook deer out of their beds or hiding places. As weather cools, flight time can be extended as well. The actual amount of flying time will vary from day to day. Under ideal flying and counting conditions, approximately 2,000 acres (810 hectares) can be censused per flight hour.

In some cases it is impractical to conduct a pre-season helicopter game survey because of an extremely dense brush canopy. In such cases post-season (late winter–after brush defoliation) counts are more accurate and efficient.

In addition to information concerning population estimates, buck to doe ratios, fawn survival and age class distribution of bucks, an experienced biologist-observer can measure the quality and distribution of vegetation types, obtain estimates of other game populations such as javelina, feral hogs or even quail populations, obtain population estimates of predators such as coyotes, bobcats and cougars and learn the distribution of wildlife populations. He can also learn quite a bit about the livestock operation, distribution of watering facilities, where to plant food plots for wildlife and where to plan brush control if necessary. An experienced biologist-observer can learn more about an area during a helicopter game survey in a shorter period of time than by any other method.

Another option with the helicopter census is to conduct a percentage count. The most commonly used percentage count is a 50 percent count. With this option, transects are spaced approximately 400 yards or 400 meters apart. Deer are counted out to a 100-yard or 100-meter limit on either side of the aircraft. Otherwise, the same basic techniques are used as with the complete count. The results are expanded to the entire acreage.

The accuracy of helicopter counts is dependent on a great variety of factors which can vary from day to day. Helicopter counts are not an exact science. Care must be taken not to duplicate or recount deer already recorded. Only experienced personnel should be allowed to make the actual counts and observations.

## Literature Cited

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