



Photo by Fidel Hernandez

FROM THE FIELD: The 21st Century Manager: Modern Surveys for Quail Management



Photo by Jason Hardin

The late naturalist Aldo Leopold wrote, “Census is the yardstick of success or failure in conservation.” For many years, biologists have attempted to develop practical ways to count wildlife. However, despite years of research, obtaining reliable estimates of wildlife populations is difficult, bobwhites included.

There are two general types of survey techniques that exist. The first type involves measures of relative abundance. For bobwhites, these include call counts,

roadside counts, or covey flush rates. These data provide only a comparative measure of bobwhite populations (e.g., high/low). The second type provides a measure of absolute abundance (i.e., density) but requires more time and effort. Distance sampling is an example of this type of survey and has become a popular method for obtaining bobwhite densities. It is an improvement over measures of relative abundance because it accounts for the fact that not all bobwhites are observed during regular counts. How does the technique work?

Suppose there are 100 golf balls randomly placed on a manicured fairway. If you were asked to walk down the center of the fairway on a marked line transect and locate the golf balls, you might feel confident in finding all 100. However, what if the grounds keeper was laid off, the grass became rank, and you were asked to find the same 100 golf balls in grass that was now a foot high, would you still feel as confident finding all 100 balls? Probably not. You would have a good chance of finding golf balls directly under your feet, but your odds of finding balls farther away would be less. Distance sampling accounts for the decrease in detection that occurs with increasing distance between object and observer.

In order to correct for varying detectability, distance sampling requires measurement of right-angle distances between detected objects (coveys in our case) and the transect. This information can then be used to determine the distance over which one effectively find coveys and estimate the number of coveys missed, thereby yielding an estimate of total coveys in an area (observed + missed). The calculations involve a bit of calculus, but fortunately free software exists that does the calculations for you.

Although distance sampling is well suited for estimating bobwhite density, the vastness of South Texas ranches makes implementing the technique quite a challenge. Walking transects have been

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the traditional method of counting quail, but as you can imagine, it is arduous and time consuming. Plus, it sometimes yields unreliable density estimates because of low encounter rates with coveys. So, in an attempt to find a better way of counting quail, we tried alternative modes of transportation to cover transects such as helicopters.

Keeping in mind the fairway example, imagine flying on a helicopter down the center of the transect instead of walk-

ing. It would take less time, effort, and be a lot more fun. However, using helicopters to traverse transects raises new challenges for observers such as estimating perpendicular distances, accurately counting coveys from the air, maintaining a straight line, and efficiently recording data. So, the objective of my thesis project was to address these limitations and improve helicopter surveys for quail. As a result, we developed and tested an easy-to-use, electronic distance-estimation system that permitted observers to estimate distance accurately and manage data efficiently, while enabling the helicopter to travel a straight line. Surveys involve three observers, one in the front seat of the helicopter and two in the rear, to detect coveys when they flushed. The system consists of five main components: 1) a lightbar to guide the pilot along the transect, 2) a global positioning system linked to rugged tablet personal computers (PCs) for data storage and instantaneous helicopter location, 3) two laser rangefinders used by the rear observers to mark the location of flushed coveys, 4) a nine-key number pad worn on the observers' wrist to enter covey size data, and 5) CKWRI software, uploaded on the tablet PCs, used to enter, store, and analyze the raw field data.

We have refined the survey as follows. An R-44 helicopter flies a suite of transects at 20 yards above the ground and at a speed of 20 mph. When a covey is detected the observer notifies the pilot and counts the number of bobwhites. While the observer is counting, the pilot maneuvers into a hovering position. Once the helicopter hovers, the observer uses the rangefinder to mark the location of the covey flush. The information (e.g., distance, angle, etc.) is uploaded directly into the tablet PC. The observer then is prompted to enter the covey size and uses his/her wrist keypad to enter the information. The entire sequence takes

about 10 seconds. We tested the technique in a controlled setting to ensure its accuracy before implemented it as a survey method in the field.

For our control test, we used mock coveys (decoys) ranging in size from 2 to 14 "birds". We used experienced observers (i.e., prior practice with the equipment), and followed the same protocol used in actual bobwhite surveys. Our results indicated that we were precise in targeting the covey location, having an error of only plus or minus 9 feet. We also found that observers were fairly accurate in counting quail from the air. Our estimates of covey size were only off by one bird from the actual size. In addition, with the aid of radio-marked coveys, we determined that we were detecting about 94% of the coveys located on the transect. A comparison between walking and helicopter surveys indicated both yielded similar density estimates. Thus, although this technique is still in its experimental stages, our preliminary results show that helicopter surveys may be a practical and cost-effective alternative to estimate bobwhite density on large acreages.

Biologists and managers have a need to reliably estimate bobwhite numbers so they can evaluate their management practices or regulate harvest. Our findings suggest that this new survey technique has great potential as a method for estimating bobwhite density on Texas rangelands. — Matthew Schnupp

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THE PERFECT STORM

The 2007-2008 quail hunting season in South Texas was unique by just about any standard. The 2007 nesting season was one of the most productive on record due to two major factors: widespread precipitation across much of South Texas from winter to summer and ideal nesting cover on many ranches. The result was a year of exceptionally high productivity and high expectations for a classic boom year. However, by the time people started their major quail hunting in early December, many were shocked to find pastures practically devoid of quail where they were once abundant. Many ranches existed that supported excellent quail hunting through February, but the fact that hunting success was highly variable from one place to the next generated much concern. Adding to this were numerous reports coming in from the field of emaciated quail with limited flight capacity. South Texas hunters were left asking the obvious question "What on earth could be going on?"

During the early part of February, we convened a meeting at CKWRI to brainstorm ideas about what had happened to quail in South Texas this year, and furthermore, what could be done about it. Our conclusions, while somewhat preliminary, point to a series of factors that were no less than a perfect storm of environmental and habitat factors that combined to first produce a bumper crop of birds and then, unfortunately, a bust in some, but not all, places across South Texas. Here's what we think happened.

The Buildup. As mentioned earlier, the 2007 breeding season was about as perfect as it could have been for producing quail. This was reflected in the high juvenile:adult ratio (more than 5



Photo by Jason Hardin

juveniles per 1 adult) that is typical of such conditions. To back up one year, in 2006, properties lying east of an imaginary line from Hebbronville to Refugio had phenomenal summer gains because of excellent production, whereas places west of this line did not. In 2007, conditions, both weather wise and in many places habitat wise, were excellent across the board resulting in great production. Unfortunately, conditions changed for the worst when it suddenly stopped raining.

Lack of Fall and Winter Precipitation.

Sometime around early or mid-September, the rain that had been consistently falling since January stopped. Virtually no rainfall occurred during September-February across South Texas. In fact, the period from October 2007 through January 2008 was the third driest of this four-month period during the past 90 years. The conditions that quail experienced in South Texas during this period were the driest they had experienced in nearly a century. And while we generally lament the deleterious influ-

ence of lack of rainfall on breeding productivity of quail, we seem to generally underestimate the negative implications that extreme fall and winter drought may have on quail. The 2007-2008 hunting season, however, may have provided us with some insight.

Lack of Food? Under most circumstances, food is not generally considered to be a limiting resource. A preponderance of research has shown that providing supplemental feed—primarily corn and milo—does not increase quail density or survival. The prevailing wisdom is that providing supplemental feed is a neutral quail management practice. However, the fact that the period from October 2007 through January 2008 was one of the driest on record in nearly a century meant that the situation faced by quail was far from typical. Several different observations from hunters and researchers seem to bear this out.

One set of observations came from a group of quail hunters in Brooks County. Even though they were highly success-

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ful at finding birds and bagging truck limits, the crop contents of the birds they killed were highly unusual. There were virtually no native seeds or leafy greens in any of the crops. When native seeds were present, they were primarily sunflowers instead of the typical cornucopia of croton, ragweed and partridge pea. Whether the lack of native seeds was actually a population bottleneck is unknown, but the potential for such a limitation seems to have existed. Estimates of quail abundance from pastures with and without supplemental feed seemed to support this idea, but not in a completely conclusive manner. In general, quail abundance was higher in pastures with supplemental feed. However, we do not know whether this trend resulted from a positive benefit of feeding or simply a concentration of bobwhites into the fed area.

Birds in Poor Condition? In general, quail in South Texas seem to experience an overall erosion in body mass from mid to late winter, especially during dry winters. Whether this relationship influences survival is not known conclusively. However, there are a number of things that can happen when quail and other birds are on a poor nutritional plane. First, they are more likely to be

killed by predators. Second, they have to roam over a larger area to meet their daily nutritional requirements, which, in turn, can have implications for their vulnerability to predation. Third, they may make relatively long-distance movements to places in search of better conditions. When this happens, an area that once had an abundance of birds during the breeding season may become nearly void only a few months later.

Birds in Absentia? Hunting a pasture that has seemingly good quail cover, but not finding any quail, can be a frustrating, if not maddening experience. How can there be no quail if the habitat looks good? A comparison of quail abundance with habitat structure on 10 pastures allegedly having few or many quail during this past February provided some preliminary insight into this situation. In general, pastures lacking quail tended to have a greater amount of vertical cover and a lesser amount of bare ground. It is possible that too little grazing during the past summer may have turned initially good quail habitat into poor. By the time that folks realized there was a problem, it was probably too late to do anything about it.

What Can Managers Do? In a chapter

titled "The Science of Quail Management and the Management of Quail Science," in the recent Texas Quails book, Fred Guthery and Lenny Brennan offered the following advice to the scientific manager:

- 1) Weather has a powerful influence on quail dynamics. Adequate habitat can lessen the impact of weather, but not eliminate it.
- 2) Optimal habitat occurs under many different habitat configurations. Management may not always result in improved habitat.
- 3) The successional affiliation of quail changes with site productivity. Manage for a successional stage appropriate for the given environment.

Summary. These concepts outlined above point to the boundaries of the domain in which the scientific quail manager must operate. As time moves on, and management experience accumulates, we will hopefully be able to put observations such as those of the 2007-2008 hunting season, in perspective.

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