Where Did They Go?

By: Leonard Brennan,
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With the recovery of bobwhite populations in South Texas currently upon us, we should reflect on how the birds got through three years of drought-induced bottleneck. As a so-called "r-selected" species, quail populations are driven---especially in South Texas---by rapid rates of population increase and decrease. We either seem to have a famine or feast, so to speak, when it comes to wild bobwhites for hunting.

We know that abundant---or at least above average---rainfall typically results in abundant quail populations in South Texas. With more than 10 million acres of habitat in South Texas, the table is set for sustaining quail populations. However, it is essential to understand that while habitat sets the table, rainfall puts the food on the plates and allows quail numbers to recover. In the context of this dynamic, one of the mysteries in quail ecology is what did they do during the drought? Or, in other words, "Where did they go?"

During periods of drought, especially droughts that last longer than a year or two, quail seemingly disappear from the South Texas landscape. Pastures that supported seemingly hundreds or thousands of quail the year before are absent of quail for months or even years at a time. We have all seen this, unfortunate as it may be. Val Lehman was the first to quantify this phenomena on the Canelo Pasture of King Ranch, as noted in a previous edition of this e-Newsletter. Between 1947 and 1948, Lehmann documented about one bobwhite per two acres on the Canelo. During 1951 and 1952, Lehmann's bobwhite counts on the Canelo Pasture were zero. Zero. No bobwhites on nearly 1,000 acres of pasture that only a year before had hundreds. Where did they go? We know that bobwhites returned to the Canelo after the drought of the 1950s ended. Meanwhile, where did they---the bobwhites---go? Certainly, they had to go somewhere. Where would that somewhere be? They couldn't just disappear into the soil like earthworms, even though that's what they seem to do during drought.

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Student Highlight

Fast-forward from the 1950s to the early 2000s. My colleague Dr. Fidel Hernández set up a long-term research project on three pastures at the San Tomas Hunting Camp on the Encino Division of King Ranch. Brush cover on these three pastures ranged from heavy (32% brush cover) to moderate (11% brush cover) to relatively sparse (5%) brush cover. Bobwhites on these three pastures were radio-marked and tracked from 2000 through 2008. The data from these radio-marked bobwhites provided information on how long the birds in each of these pastures survived, where they went, where they nested, and so on. The initial analyses of these data indicated that there were only very subtle---and no statistically significant---differences in overall survival of bobwhites in these pastures. The short-term implication was that bobwhite survival was independent of brush cover.

Now fast-forward a few years later to Steve DeMaso and his Ph.D. project under the direction of Dr. Hernández. One of Steve's dissertation chapters used simulation modeling to ask a "What if" question. In this case, DeMaso asked: "What if I use the survival and reproductive data from these three pastures to examine if there are any cumulative effects on the populations in relation to brush cover?" Using a bobwhite population simulation model developed in another chapter of his dissertation, DeMaso projected bobwhite population trends for the three (heavy, moderate and low brush cover) pastures. The results were completely unexpected. DeMaso found that "demographic performance was greater on the 11% and 32% brush canopy cover classes." Overall, simulated bobwhite population abundance was, on average, two to three times greater on these two cover classes than on the 5% brush cover pasture (See Figure). And, most remarkably, estimated population persistence was 91 to 100% on the 11% and 32% brush cover pastures, respectively, while it was only 54% on the 5% brush cover pasture. Translation: on the pastures with moderate to heavy brush cover bobwhites had a near certainty of surviving continuously for up to 100 years; on the pasture with 5% brush cover, their chance of surviving dropped by nearly 50%. The implication of this finding is that bobwhites NEED brush cover for their populations to persist. Without brush, population persistence comes into question. Thus, "Where do bobwhites go during drought? Answer: Most likely they go to the brush."

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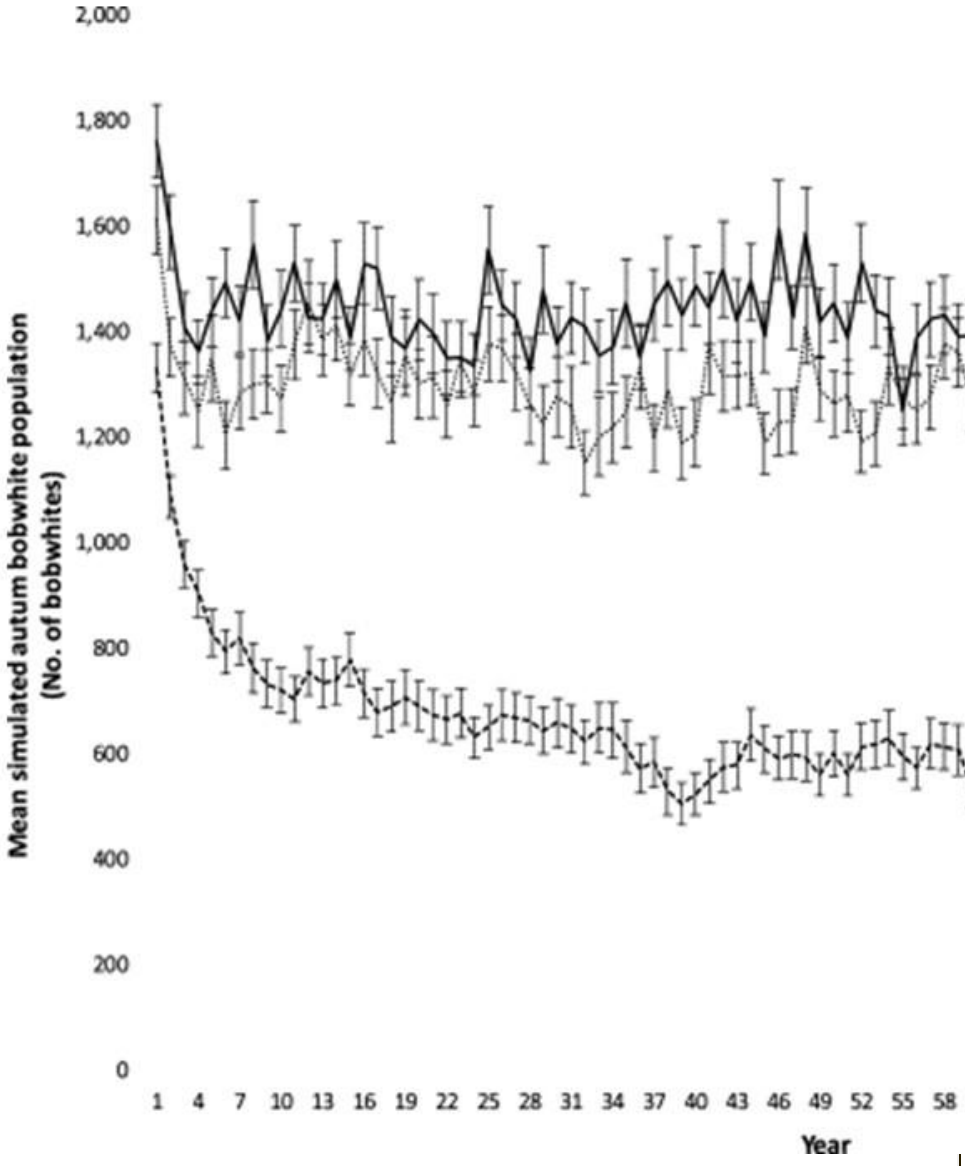

Granted, DeMaso's results were based on simulation analyses. However, such analyses allow us to ask questions that would otherwise be impossible to answer. Such analyses are also based on, or built from, real-world data. Nevertheless, we need other lines of evidence in order to support the "Bobwhites go to the brush during drought" hypothesis. One such line of evidence comes from counting bobwhites using helicopters.

Helicopter counts during spring of 2013 in Jim Hogg and Duval counties were revealing in this regard. While bobwhite numbers were low due to the drought, we were rather surprised to find that all of our bobwhite detections (more than 75 coveys on one ranch) were all in dense brush. None of the birds were out in grassy fields, and most were not even near the edge of brush-mottes but were

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well within and-or near the middle of them. The birds were in the brush, and relatively dense brush. When observations like these are coupled with results from studies like the one by DeMaso, I can argue that we are honing in on the answer to "Where do bobwhites go during drought?" They go to the brush! A recent study by Chad Parent, another of Dr. Hernández's Ph.D. students, further supports this emerging theme. Chad evaluated the influence of landscape structure and precipitation on the spatial abundance and distribution of bobwhites in 6 counties (Brooks, JimWells, Kenedy, Kleberg, Nueces, and Willacy). He documented that the numbers of coveys in landscapes with greater amounts of woody cover were highly independent of precipitation. That is, certain landscape structures associated with woody cover appeared to buffer bobwhite populations from drought.

Of course, going to the brush does not mean that all bobwhites will survive a drought. Hardly. Mortality during drought is high for bobwhites and their numbers plummet to the point that, unless you can fly over the brush in a helicopter at a low altitude, they will be virtually impossible to find. But that is the point. They do not want to be found. They go to the brush to avoid predation, minimize heat stress, and hope to find some semblance of food so that they can ride out the drought. They go to the brush. That is where they survive until conditions improve to the point to where they can kick-start their r-selected reproduction and recolonize the rest of the rangeland landscape.

Further reading:

DeMaso, S. J., F. Hernández, L. A. Brennan, N. J. Silvy, W. E. Grant, X. B. Wu and F. C. Bryant. 2014. Short- and Long-term Influence of Brush Canopy Cover on Northern Bobwhite Demography in Southern Texas. Rangeland Ecology and Management 67:99-106. <pdf>

Parent, C. J., F. Hernández, L. A. Brennan, D. B. Wester, F. C. Bryant, and M. J. Schupp. 2015. Northern Bobwhite Abundance in Relation to Precipitation and Landscape Structure. Journal of Wildlife Management. *In press*.