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CKWRI Quail eNews

News from the Richard M. Kleberg, Jr. Center for Quail Research at the Caesar Kleberg Wildlife Research Institute

Richard M. Kleberg, Jr. Center for Quail Research

Caesar Kleberg Wildlife Research Institute

CKWRI Quail eNews - November/December 2013

In this issue of the eNews, Dr. Brennan continues his essay on quail populations, focusing on the dynamics of the quail covey for survival. Part I, published earlier this summer, highlighted the pairing up, nesting, and post-hatching dynamics of quail populations.



HOW QUAIL POPULATIONS WORK, PART II: COVEYS

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Question: Why do bobwhites—and other species of quails—form coveys during the winter?

Answer: To increase their chances of staying alive until it is time to nest in the spring.

The answer to the question posed above, while correct, is also a bit of an oversimplification. This is because there are numerous, and sometimes complicated factors, that drive quail covey dynamics over the course of a winter. In this essay, my goal is to explore and explain the factors that influence bobwhite covey dynamics and put these factors in a context that allows us to understand this extremely important component of the bobwhite's annual cycle.

***Providing the science
behind quail
conservation and
management.***

**November/December
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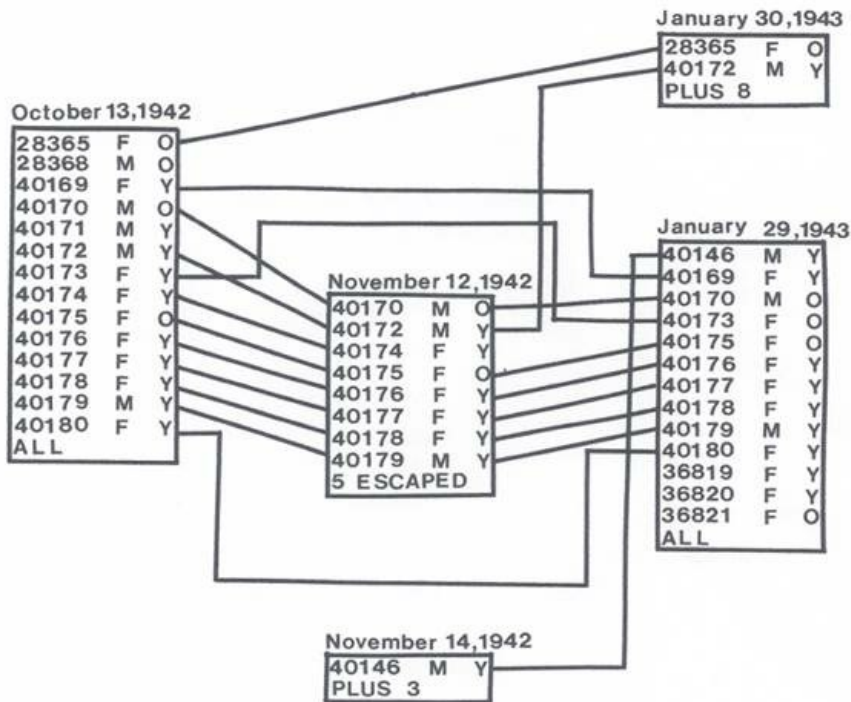
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Coveys: A Dynamic Social Unit

Bobwhite coveys do not remain stable during the course of a winter. That is, once a covey is formed, the birds in that covey tend not to remain in that same covey through the winter. Thus, covey membership is fluid, flexible, and dynamic. Seventy years ago, Val Lehmann saw this when he analyzed his banding returns from trapping thousands of bobwhites on King Ranch. These data were presented in figures that covered 21 pages in Appendix E of his landmark book *Bobwhites on the Rio Grande Plains of Texas*. I have scanned and posted three examples here to illustrate how covey dynamics play out over the course of a winter in South Texas.

To understand these examples, the following notations need to be understood. Each rectangle represents a covey. The columns of numbers on the left side of each rectangle are band numbers from individual bobwhites, followed by gender (male or female) and age (old or young of the year). The dates on the top of the rectangle indicate when the covey was caught, and the notation inside the bottom of the rectangle indicates if the entire covey was caught, or how many other birds were in the vicinity and we not captured, or how many, if any, escaped from the trap. Time, of course, moves from left to right. The solid lines indicate the transfer of a bird from one covey to another covey.

In example one, eight bobwhites from the original covey join a different covey. Eleven birds from the original (October) covey spent time with at least three different coveys over a 100-day period.

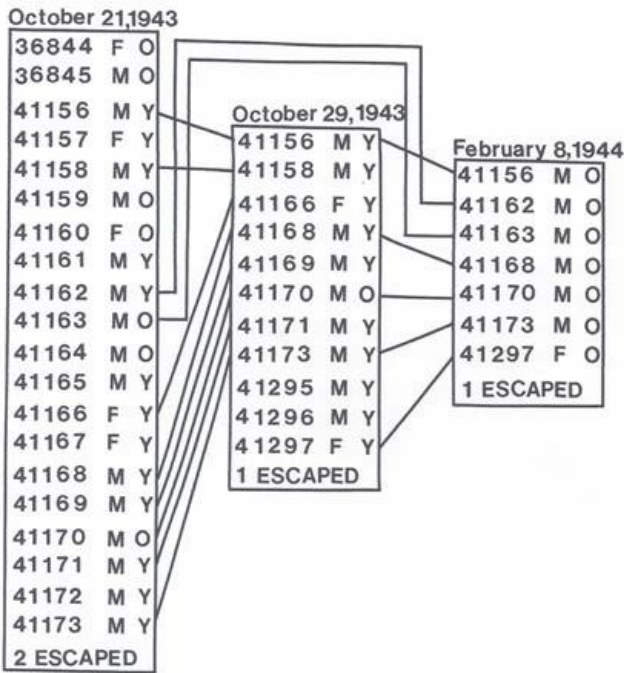


In example two, ten individuals from a large covey of 22 birds join a small covey of 4 bobwhites. Five birds from this covey, along with two bobwhites from the original large covey end up in a third covey by early February.

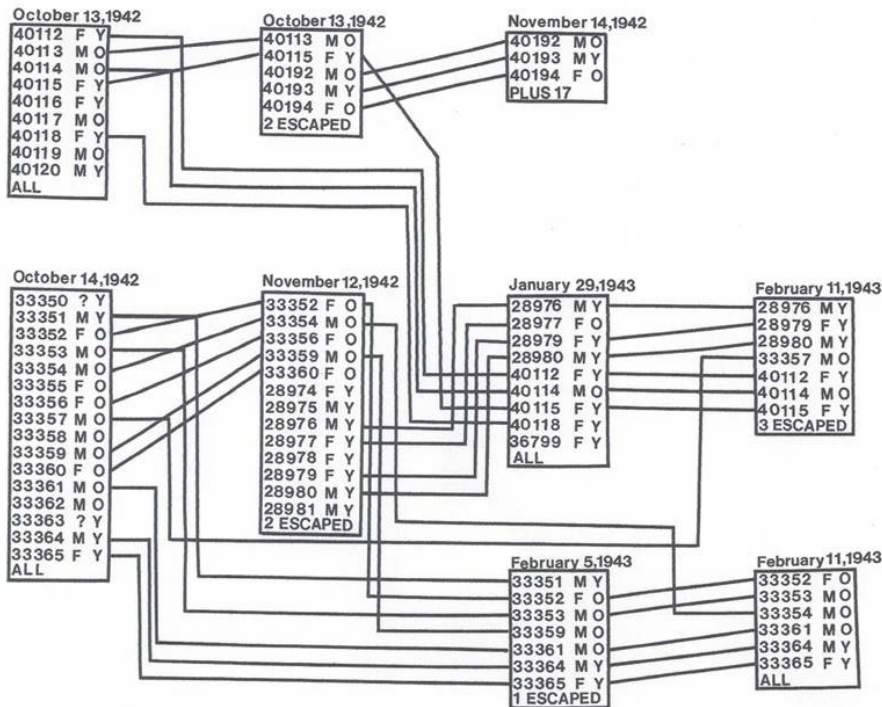
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In example three, which is an extremely complicated case of covey dynamics, the take home interpretation is that 25 birds spent time in nine different coveys over one fall-winter period. A dynamic social unit indeed!



Optimal Covey Size

Further scrutiny of Lehmann's band-return data shows a pattern of large coveys breaking up into smaller ones, and smaller ones joining members to create larger coveys. Note especially example two where the large covey split into two smaller ones. Also note, in example three, how the small covey of seven birds captured on 13 October 1942 ended up in two larger coveys later that winter. Why all this shuffling around? Why not just stay put and ride out the winter with the birds in your original covey? To understand this, we need to fast-forward from 1943, when Lehmann collected these data, to 2003, when an important paper appeared in the peer-reviewed scientific literature.

In 2003, Dr. Chris Williams and two colleagues published the paper: Optimal group size and northern bobwhite coveys in the journal *Animal Behaviour*. Based on a study of 386 radio-marked bobwhites in 137 coveys in Kansas, Dr. Williams and his colleagues found that: (1) "Small coveys (1 – 7 individuals) had lower group persistence and individual survival, and

used increased movement to create or join larger groups where survival was higher” and (2) “Large groups (15 – 22 bird) had lower individual survival, increased group movement and individual mass loss.”

Thus, bobwhites in small or large coveys did not live as long as bobwhites in medium- or optimal-sized coveys (about 11 birds), and bobwhites in large coveys suffered from loss of body mass or weight. Williams and his colleagues hypothesized that “...*regulation of an optimal covey size of 11 was promoted by high group persistence, low group movement, improved feeding efficiency, improved individual predator detection and improved individual survival.*” Thus, bobwhites form coveys during the winter in order to live longer, and maintain body mass; the “best” size for a bobwhite covey is about 11 birds. This is why large coveys tend to break up into smaller ones and small coveys tend to join up and form larger ones.

Many Eyes

Animal behavioralists often invoke the “many eyes” hypothesis to explain why animals form social groups. When an individual is a member of a group, there are numerous other individuals who are also on the lookout for predators as well as on the lookout for food. The data collected seven decades ago by Lehmann, as well as the more recent information from Dr. Williams seems to indicate that being on the lookout for predators is a primary reason why bobwhites form coveys, and that quite possibly, decreased foraging efficiency, or some related factor, is a reason why bobwhites in large coveys of more than a dozen birds seem to want to break up and form smaller ones of just under a dozen individuals.

Finally, and from a somewhat selfish human perspective, bobwhite covey dynamics is one of the main reasons why we cherish this species as a game bird. The explosive flight of a covey rise where eleven or so birds fly in about 50 different directions would probably not happen if bobwhites were not subjected to intense natural selection from predators over the past couple of million of years or so. Without coveys there would be no covey rises. Without covey rises there would be no quail hunting. Granted, chasing single birds after a covey rise is an important aspect of quail hunting. However, the seasoned quail hunter appreciates that the top priority of those scattered single bobwhites is to get back into a covey as quickly as possible.



Photo by Eric Grahmann

Further reading:

Lehmann, V. W. 1984. Bobwhites on the Rio Grande Plains of Texas.
Texas A&M University Press, College Station

Williams, C. K., R. S. Lutz and R. D. Applegate. 2003. Optimal group size of northern bobwhite coveys. *Animal Behaviour* 66(2):377-387.



Photo by Chase Currie

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The mission of the Richard M. Kleberg, Jr. Center for Quail Research is to develop a scientific basis for the sustainable management and harvest of wild quail populations throughout South Texas and elsewhere.



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