The Bobwhite Post

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Stealth Bombers, B-52's , and Guerrilla Bobwhites

....The troop of bobwhites moves across the decimated summer landscape. Overgrazing and drought have taken their toll on the habitat, leaving little usable space. The vulnerability of the covey to the enemy is evident; their nervous "head bobbing" and uneasy gait are tell-tell signs. The covey has to be extremely careful, as danger lurks around every grass blade: terrestrial tanks (varmints) threaten "foxholes" of incubating hens; slithering submarines (snakes) take the unsuspecting bobwhite; feathered bombers (hawks) sometimes dive upon the troop; and the danger of heat stress is ever present. To make matters worse, winter is on its way, and the colder temperatures soon will bring in the stealth bombers (Cooper's hawks) and a suite of other feathered friends. Despite the danger, the troop presses on.....

While the story above is embellished quite a bit for effect, it brings to mind an interesting issue, that of hawk migrations and bobwhites.

The migration routes of numerous raptor species converge in the Rio Grande Plains ecoregion of Texas. Raptors (hawks) migrate through this ecoregion both during their winter and spring migration, resulting in a high diversity and abundance of raptors. The issue arises, how do these seasonal changes in raptor abundance and diversity affect bobwhite survival?

Bobwhites sustain a high level of mortality, enduring about 70%-80% annual mortality. Studies suggest raptors are a significant source of mortality for bobwhites accounting for more than 50% of the predation on bobwhites. However, not all raptors are created equal, and thus probably have different impacts on bobwhites. The larger-bodied *Buteos* such as red-tailed hawks can be described as the late model B-52 aircraft. Generally, *Buteos* tend to be slower moving and have less maneuverability compared to *Accipiters* such as Cooper's hawks. *Accipiters* can be envisioned as the stealth bombers of today, acquiring high speeds and demonstrating swift maneuverability. Because of the economic importance of bobwhites and the high concentration of raptors in south Texas, we investigated the relationship between bobwhite mortality and raptor abundance. Our main objectives were to:

- document raptor diversity and abundance; and
- correlate bobwhite mortality with raptor abundance.

Photo by Fernando Holschneider

The migration routes of numerous raptor species converge in South Texas. Understanding the relationship between bobwhite mortality and raptor abundance will involve determining migration timing and patterns for each species.

We monitored 164 radio-collared bobwhites during September 2000 and February 2001. We categorized bobwhite mortality as avian, mammalian, or unknown following the criteria of previous researchers. Bobwhite remains consisting of clipped wings, skeleton stripped of the muscle, and/or a bent radio antenna were classified as avian. Bobwhite remains consisting of scattered feathers, little skeletal remains, and/or a chewed transmitter were classified as mammalian. When it was difficult to confidently assign the cause, the kill site was listed as unknown.

To estimate raptor abundance, we conducted raptor surveys during mid-afternoon hours along a 15-mile road transect about every 15 days. We recorded all potential raptor predators of bobwhites, identifying them to species when possible.

We used correlation to relate raptor abundance with bobwhite mortality. Correlation determines the strength of a linear relationship exists between 2 variables (raptor abundance and bobwhite mortality in our case). It determines whether as 1 variable increases the other also increases, or conversely, as 1 variable decreases, the other also decreases. The closer the correlation coefficient is to 1, the stronger the linear relationship. We need to be cautious when interpreting the results. Correlation only determines the strength of the linear relationship between 2 variables. It **does not** imply cause-and-effect.

We observed a total of 310 raptors, representing 15 identified species. Red-tailed and white-tailed hawks accounted for a large percentage (37%) of the raptors observed. A weak correlation (-0.11) existed between total raptor abundance and total bobwhite mortality. As a matter of fact, total bobwhite mortality appeared lowest when total raptor abundance was highest. Because this did not make sense, we tested the correlation between *Accipiter* abundance and raptor predation of bobwhites, which resulted in a stronger correlation (0.86). However, a discrepancy existed between this latter relationship, especially during December - January, when *Accipiter* abundance had begun to decline but raptor predation of bobwhites continued to rise. By simultaneously comparing the abundance and arrival of other raptors, we noticed an interesting trend. During this same time period, the abundance of white-tailed hawks substantially increased. While *Buteos* generally are not considered major threats to bobwhites, white-tailed hawks may be an exception. Studies in south Texas reported that birds comprised 30% of the white-tailed hawk's diet, consisting almost entirely (98%) of bobwhites.

Our limited data suggest that general raptor abundance may not be a good indicator of bobwhite mortality. The data implies that it may be wrong to speculate that high raptor abundance results in high bobwhite mortality. Perhaps a better indicator would be to consider the species that may represent the greatest threat to bobwhites. It is important to note that raptors are protected species. Habitat management is key to minimize predation.

We acknowledge the low sample size and narrow scope of our study. The information above is based on 1 field season. However, we believe this study will provide insightful information on a relatively unknown subject.

....the days are becoming longer, and the warm breeze promises that better times are coming. The covey rejoices, filling the country side with "bob-whites." The breeding season is upon them, and reinforcements soon will be on their way.

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Quail Quips

In 2000, Mr. Andrew Bridges, Drs. Markus Peterson, Nova Silvy, and others investigated the relationship between weather and quail abundance using 21 years (1978-98) of Texas Parks and Wildlife Department data. They reported that monthly Modified Palmer Drought Severity Index (PMDI) was a better predictor of changes in both bobwhites and blues than monthly precipitation alone. The PMDI combines a suite of weather variables such as precipitation, soil moisture, temperature, etc. They stated that monthly PMDI probably was more highly correlated with changes in quail abundance because it more accurately quantified the effects of weather on regional vegetation.

On Point ....  ... and Counterpoint

To Kill a Bobwhite Predator

I have heard throughout my education that wildlife management is "people management." Although the phrase may sound like an oxymoron, one only needs 1 or 2 weeks of post-graduation work to realize the truth of this statement. In bobwhite management, all you have to do to enjoy a lively discussion is mention predator control. Opinions vary across a wide spectrum, but what does the research tell us.

The late Dr. Sam Beasom conducted predator control on approximately 5,800 acres in Kleberg County during February-June 1971-72. He removed a total of 457 predators during the project, with coyotes and bobcats accounting for the majority of the kill (67%). Beasom reported strong increases in turkey production and moderate gains in bobwhite abundance in the experimental pasture compared to the untreated pasture. He concluded that "*predator removal definitely seemed to enhance reproductive success of wild turkeys... and to a lesser extent, bobwhite quail in the present study.*"

Drs. Fred Guthery and Sam Beasom subsequently investigated the response of scaled quail and bobwhites (and other species) to predator control in Zavala County. They removed a total of 227 predators on approximately 3,800 acres during January-July 1975-76. Pre-experiment populations were higher on untreated pastures for blues and bobwhites compared to the predator-removal area. This trend continued for the duration of the project, even after predator removal. They concluded that "*predator removal at this level had little discernible effect on density trends of bobwhite or scaled quail.*"

Why the differing results? In comparing these 2 studies, several issues need to be kept in mind, such as the nesting biology of the species and the density of predators remaining after predator control. Birds can be either determinate or indeterminate layers. Determinate layers are birds that produce only 1 nest, whereas indeterminate layers produce $\geq$ 2 nests. The more nests that a hen lays, the greater the chance for one of the attempts to be successful. Therefore, it stands to reason that predator control would be more effective when dealing with determinate layers, as they only have 1 chance to produce a successful nest. Also, the density of predators remaining after predator control is important. It does not matter how many predators are removed, but how many are left. Stating that 1,000 predators are removed means nothing.....unless it is determined that only 2 predators remain in the area, or conversely, that 60,000 remain. This is an extreme example, but it illustrates the point.

Perhaps the question to ask is not "Is predator control an effective management tool in bobwhite management?" (as this involves human judgement), but rather, "Is predator control necessary to have high bobwhite populations?" Under most circumstances, the answer is no. Given that suitable habitat exists, research indicates that weather is a primary influence driving the population dynamics of quail (see Quail Quips on Page 2). The fact that quail populations "boom" during favorable weather, without predator control, provides some evidence. However, some will argue that things have changed since quail and predators evolved. The demon of habitat fragmentation changes the playing field. Predator-prey relations are complex. I believe Dr. Reynolds accurately summarized this complexity in his article on predation by stating, *"Predation is just one of an array of interrelated factors which can influence the dynamics of a gamebird population....."*

Selected References

Beasom, S. L. 1974. Intensive short-term predator removal as a game management tool. Transactions of the North American Wildlife and Natural Resources Conference 39:230-240.

Guthery, F. S., and S. L. Beasom. 1977. Responses of game and non game wildlife to predator control in south Texas. Journal of Range Management 30:404-409.

Quail Queries:
New Ideas for Quail Research

"Farming" for weeds and insects?

It has been engraved into the minds of bobwhite managers that bobwhites are a lower successional species**. What does this mean? Basically, that bobwhites thrive in "disturbed" environments. Following disturbances such as discing, pioneer plants (weeds) become established. In addition to providing some screening cover, these weeds produce seeds and harbor insects for quail. Further, disturbed areas have much open ground that facilitates bobwhite movement and foraging. It stands to reason then, that disturbances such as discing would be beneficial to quail. However, several questions arise. What proportion of the habitat should be disced? What are the benefits of discing in terms of reproduction, brood survival, etc? Is hunting success greater in disced vs. undisturbed habitats? And ultimately, do bobwhite densities increase following discing?

Dr. Fred S. Guthery, in his 1986 book *Beef, Brush, and Bobwhites* suggested that 5%-15% of the area should be disced. However, research suggests that food generally is not limiting for bobwhites, and therefore, discing should be a neutral practice.

In 2000, Dr. Lenny A. Brennan and others investigated the effects of discing (about 3% of 700 acres) vs. feed patch management on brood habitat and hunting success in Georgia and Florida. They reported that overall, there was no consistent pattern or difference in brood habitat composition or hunting success between the 2 treatments. They stated that significant cost savings could be realized by discing rather than planting agricultural crop plants. They also recommended additional experiments evaluating varying levels of soil disturbance, considered within the context of useable space.

Given that adequate woody and nesting cover exists, can discing increase bobwhite density in semiarid lands? Improve brood survival? A study investigating the benefits, or lack thereof, of discing in semiarid lands at different intensities is needed. We are interested in conducting such research and welcome your thoughts and suggestions.

Photo by Christy Thompson

** *research indicates this can be governed by site productivity and may be incorrect for semiarid rangeland.*

Until next time--

Fidel Hernández

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