

A 5-Year Commemorative Issue



The Bobwhite Post

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The South Texas Quail Research Project: What have we learned?

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Time has a way of sneaking up on us. Summers that used to linger forever as kids now seem to end before they even begin. We soon lose track of time and its ever accelerating pace. Until one day, we wake up and realize just how much time has passed. This usually happens at the landmark ages of 30, 40, or 70.

We experienced a similar realization with the South Texas Quail Research Project this fall. It seems just like yesterday that we radiocollared our first bobwhite. Today, 1,250 radiocollared bobwhites later, we can hardly believe that 5 years have transpired since its beginning.

From a research perspective, 5 years is a birthday worth celebrating for a project. Not many field studies live past the terrible twos. Five years also provide us with an ideal time for self-reflection, assessing where we've been, what we've learned, and where we're going. As such, we've dedicated this issue to such reflection. On behalf of the Caesar Kleberg Wildlife Research Institute, thank you for your generous support and interest throughout the years. Perhaps we'll meet again... in another 5 years.

In the Beginning

The South Texas Quail Research Project (STxQRP) was initiated in August 1998 as a long-term radiotelemetry study under the direction of Dr. Andy Radomski. He developed the project with a primary focus on bobwhite survival and nesting ecology. When Andy left in the fall of 1999, we assumed the responsibility for the direction of the project. Since then, we have expanded the Project beyond bobwhite survival and nesting ecology to also include bobwhite movements, home range, and density, mammalian predator abundance, raptor abundance, habitat conditions, and weather. Because of the research infrastructure provided by the STxQRP, we also have been able to conduct additional studies at relatively minimal costs. These side studies have been conducted under the supervision of Dr. Lenny Brennan and have included the quantification of hunter-covey dynamics and documentation of nest predators.

Our goals for the South Texas Quail Research Project are to collect sound, scientific data regarding bobwhite ecology that is of a quality publishable in peer-reviewed, scientific journals, while providing land stewards with accurate information regarding bobwhite management.

Study Area

The South Texas Quail Research Project is located on the Encino Division of King Ranch, Inc. in Brooks County. Three pastures (approximately 2,500-3,000 acres each) are used as study sites in which bobwhites are trapped and radiocollared. We conduct trapping throughout the year in order to maintain >50 radiocollared bobwhites on the ground at all times. We collect information year round on all variables.

What Have We Learned?

As a result of continued support, the South Texas Quail Research Project has been able to build an extensive, long-term database on bobwhites. Because data are continuously being added, conclusive analyses cannot be conducted until



Photo by Dale Rollins

The long-term nature of the South Texas Quail Research Project has been made possible through the generous support of donors who have a dedicated interest in bobwhites. Thank you for your continued support of our quail research efforts.

5-Year Commemorative Issue

the conclusion of the project. However, we have analyzed portions of the data set for professional presentations and manuscripts thereby generating preliminary results in the process. Herein we report these preliminary findings. It is important to stress that these results represent preliminary findings resulting from initial data analyses and not final conclusions.

Population Demography

Bobwhite survival. Bobwhite populations generally experience low survival. Some radiotelemetry studies across the US have reported extremely low annual survival estimates, as low as 6%. It is estimated that a stable population requires about 20-30% annual survival. We have trapped over 1,900 bobwhites and radiocollared over 1,000 bobwhites since the beginning of the Project. We generally have documented annual survival rates of about 20-25% for the Project. *Conclusion: Bobwhite populations in our study area generally exhibit annual survival rates indicative of a stable population.*

Nest success. Bobwhites also sustain a high rate of nest depredation. Only about 30% of bobwhite nests are successful. Over the course of 5 years, we have located 234 nests. Annual nest success rates have ranged from about 40% to 65%, with an average nest success of 60%

over the 5-year period. It is important to note that these high nest success rates occurred in an area without any active predator control program. *Conclusion: Nest success in our study area generally is greater than what is commonly reported for bobwhites across their geographic range. These relatively high nest success rates occurred in areas without any active predator control program.*

Value of Usable Space. The primary cause of the bobwhite decline has been the cumulative effect of habitat loss, habitat fragmentation, and landuse changes. Habitat fragmentation transforms large, contiguous tracts of bobwhite habitat into smaller, isolated habitat patches. Populations inhabiting these fragmented landscapes often are characterized by reduced survival and nest success rates. Not surprisingly, bobwhite populations that have remained relatively stable generally occur in areas where large expanses of suitable habitat still exist such as South Texas and western Oklahoma. *Conclusion: Our observed high annual survival and nest success rates might be the result of our study area being located in a region characterized by large tracts of suitable habitat and perhaps explain why South Texas bobwhites have not exhibited the same drastic declines experienced across other parts of the bobwhite's range.*

Habitat Use

Brood-Roosting Habitat. Brood ecology remains one of the least understood aspects of bobwhite ecology. We documented night-roosting habitat for bobwhite broods during 1999 and 2000. We observed that vegetation height and visual obstruction at roost sites decreases with increasing age of fall broods (i.e., hatched during Sep-Oct). About 40% of broods up to 4 weeks of age roosted in dense vegetation that provided both horizontal and vertical screening, such as tasajillo and granjeno. These broods initially roosted in tall, dense shrub vegetation, but then progressively roosted in more open habitats such as grassland as they matured. However, summer broods (i.e., hatched during May-Aug) did not exhibit this phenomenon but rather commonly roosted in open grassland throughout their life regardless of age. *Conclusion: Dense shrubs are important roosting sites for fall broods, but are used less as broods mature. Summer broods, however, roost in open grasslands upon hatching. Chicks acquire the ability to maintain body temperature at about 3-5 weeks of age. Because temperatures are cooler during fall and brush offers some protection against the elements, roost-site microclimate might explain the use of shrubs by young broods during this season.*

Woody Cover. Bobwhites use woody cover for protection from the elements and predators. To assess

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the value of woody cover for protection from predators, we compared bobwhite use of woody cover during the migration period of raptors (Sep-Feb). We compared the amount of woody cover contained within the home range of bobwhites surviving the migration period to those killed during the period. Bobwhites that survived the fall migration contained home ranges with more % woody cover (20%) than bobwhites that were depredated (10%). *Conclusion: The amount of woody cover contained within a bobwhite's home range appears to influence risk of predation during raptor migration.*

Impacts of Weather

Hurricanes. Hurricane Bret passed over the study area on August 1999 resulting in >20 inches of rain and wind gusts >100 mph. We monitored 82 adult bobwhites and 15 broods before and after the hurricane. Only 11 (13%) of the adult bobwhites were killed, with 4 directly killed from exposure (drowned). The remaining 7 bobwhites were depredated, but we are unsure if they were killed in the storm and subsequently scavenged thereby appearing depredated. Broods suffered much higher mortality, with 7 (47%) broods killed during the storm. All these broods were < 2 weeks old. The 8 surviving broods were reduced from an average brood size of 11 chicks prior to the storm to an average brood size of 4 after. *Conclusion: Late summer (Aug-Sep) hurricanes can negatively impact survival of young broods (< 2 weeks of age) but probably have minimal impact on overall bobwhite production because production generally occurs during early summer (Jun) and therefore chicks are of age to withstand late-summer storms.*

Drought. South Texas experienced dry conditions for several years until July 2002, when abundant rainfall occurred and continued for the next 24 months. These unique circumstances and the long-term nature of STxQRP enabled us to compare bobwhite populations during a dry and wet period. Annual survival was much lower during the dry period (9%) compared to the wet period (25%). The reproductive effort of bobwhites also was negatively impacted. We observed fewer hens nesting during the dry period (53%) compared to the wet period (100%). Hens also laid fewer nests during the dry period (1.2 nests/hen) compared to the wet period (2.3 nests/hen). In addition, the nesting-season length was shorter during the dry period (69 days) compared to the wet period (159 days). *Conclusion: Drought negatively impacts bobwhites by lowering survival, reducing the proportion of hens nesting, reducing nesting rate, and shortening the length of the nesting season. Understanding why these variables are negatively affected by drought potentially holds the answer to the boom and bust mystery of bobwhites.*

Predation

Raptors. The migration routes of numerous raptor species converge in South Texas. Raptors migrate through this region both during their winter and spring migration, resulting in a high diversity and abundance of raptors. Raptors are believed to be a significant source of mortality for bobwhites. We observed a weak relationship between total raptor abundance and total bobwhite mortality. However, we found a much stronger relationship between Cooper's and Sharp-shinned hawk

abundance and bobwhite mortality. *Conclusion: General raptor abundance is not a strong indicator of bobwhite mortality. It is erroneous to infer that high raptor abundance results in high bobwhite mortality.*

Nest Predators. Predation is the primary cause of nest failure for bobwhites. Previous research aimed at identifying nest predators is limited because it was based on speculation or used technology lacking the capacity for continuous monitoring. The recent development of infrared photo-monitoring systems has enabled researchers to overcome these past shortcomings. During the 2002 and 2004 nesting seasons, we monitored 41 depredation events. Coyotes were the predominant nest predator accounting for 11 (27%) of the depredation events. Skunks accounted for 8 (20%) of the depredation events, unidentified predators 8 (20%), badgers 4 (10%), fire ants 5 (12%), raccoons 1 (2%), rodents 2 (5%), bobcat 1 (2%), and snake 1 (2%). Our findings contrast similar research originating from southeastern US in which snakes were reported to be the most common nest predator and raptors were documented as nest predators. *Conclusion: The nest-predator community of South Texas appears to differ from other regions of the bobwhite range in terms of species composition and predominant nest predators.*



Photo by Fidel Hernández

Field Observations

Unusual Nesting Behavior. A pen-raised hen was found laying a nest during the spring of 1999. The pen-raised hen was released from an adjoining property during mid-December 1998 approximately 3 miles away. At the onset of spring, it paired up with a wild bobwhite male. The hen began laying a clutch which reached a size of 7 eggs. Unfortunately, the hen dispersed after the 7th egg and was lost.

- During the spring of 1999, we documented 2 separate hens incubate the same nest. We located the nest through a radiocollared hen. Subsequently, we found the radiocollared hen off the nest for several days and therefore proceeded to inspect the nest to determine its status. To our surprise, we flushed a non-radiocollared hen off the nest. Following this incident, the original hen returned and conducted the remainder of the incubation.

- We documented a hen incubating a nest for 3 months during summer 2003 (the normal incubation period is 23 days). The radiocollared hen incubated the eggs for about a week, but then did not return for several days. We assumed the nest had been abandoned. However, the hen subsequently returned to the nest

and resumed incubation for nearly 3 months. The hen was eventually depredated when off the nest. The nest never hatched.

Life History. The average life span of a bobwhite is only about 7-8 months. However, we have observed 21 bobwhites live longer than 1 year. Seven bobwhites lived up to 1.5 years, 9 lived up to 2.5 years, and 5 lived up to 3.5 years. As of August 2004, we have 2 bobwhites that are 3.5 years old and still alive.

- Renesting (i.e., laying more than 1 nest in a season) is a common behavior in bobwhites. The occurrence of multiple broods (i.e., successfully hatching 2 or more nests in a season) also is well documented. However, the frequency at which it occurs is less known. We have documented renesting behavior for 59 bobwhite hens. Of these, 46 (78%) hens laid 2 nests, 10 (17%) laid 3 nests, and 3 (5%) laid 4 nests. Of

the 59 renesting hens, only 16 (27%) were capable of multiple brooding.



Where From Here?

It is our wish to continue the STxQRP for another 5 years. Long-term data are critical if we are to understand the dynamics of bobwhite populations in a highly variable environment. Short-term studies only are capable of providing brief, incomplete glimpses of natural processes. The South Texas Quail Research Project represents one of the few field studies that is long-term in duration and holistic in perspective, considering not only the species but also the other components of an ecosystem (predators, habitat, and weather). Through your continued, generous support, we hope our wish will become a reality.

Until next time--

Fidel Hernández

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