

Texas Quail Index

Result Demonstration Report 2016

Cooperators:

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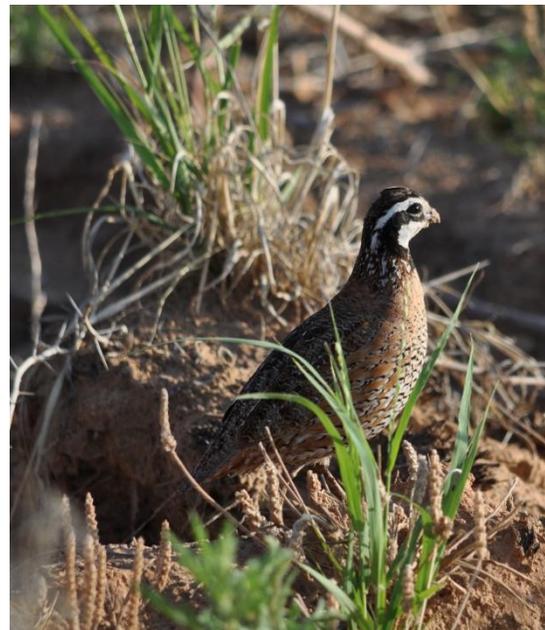
Dr. Dale Rollins, Statewide Coordinator

Bill Whitley, Land Owner Cooperator

Background and Objective

The Texas Quail Index (TQI) is a statewide, citizen science data collection effort with the goals of educating local community members about quail, providing landowners with the information they need to monitor and manage for quail on their properties, and spreading awareness about the decades-long decline of bobwhite and scaled quail populations in Texas.

We are fortunate enough now to have 3 years of data accumulated under the TQI, allowing us to make some interesting and meaningful comparisons. In 2014, following several years of drought, quail numbers were some of the lowest on record; this fact is reflected in TQI call counts, habitat evaluations, and roadside counts for that year. With the return of rain in 2015, quail populations rebounded as well. Now, in 2016, there has once again been significant rainfall and quail populations appear to be holding strong in most regions of the state, much to the delight of quail enthusiasts.



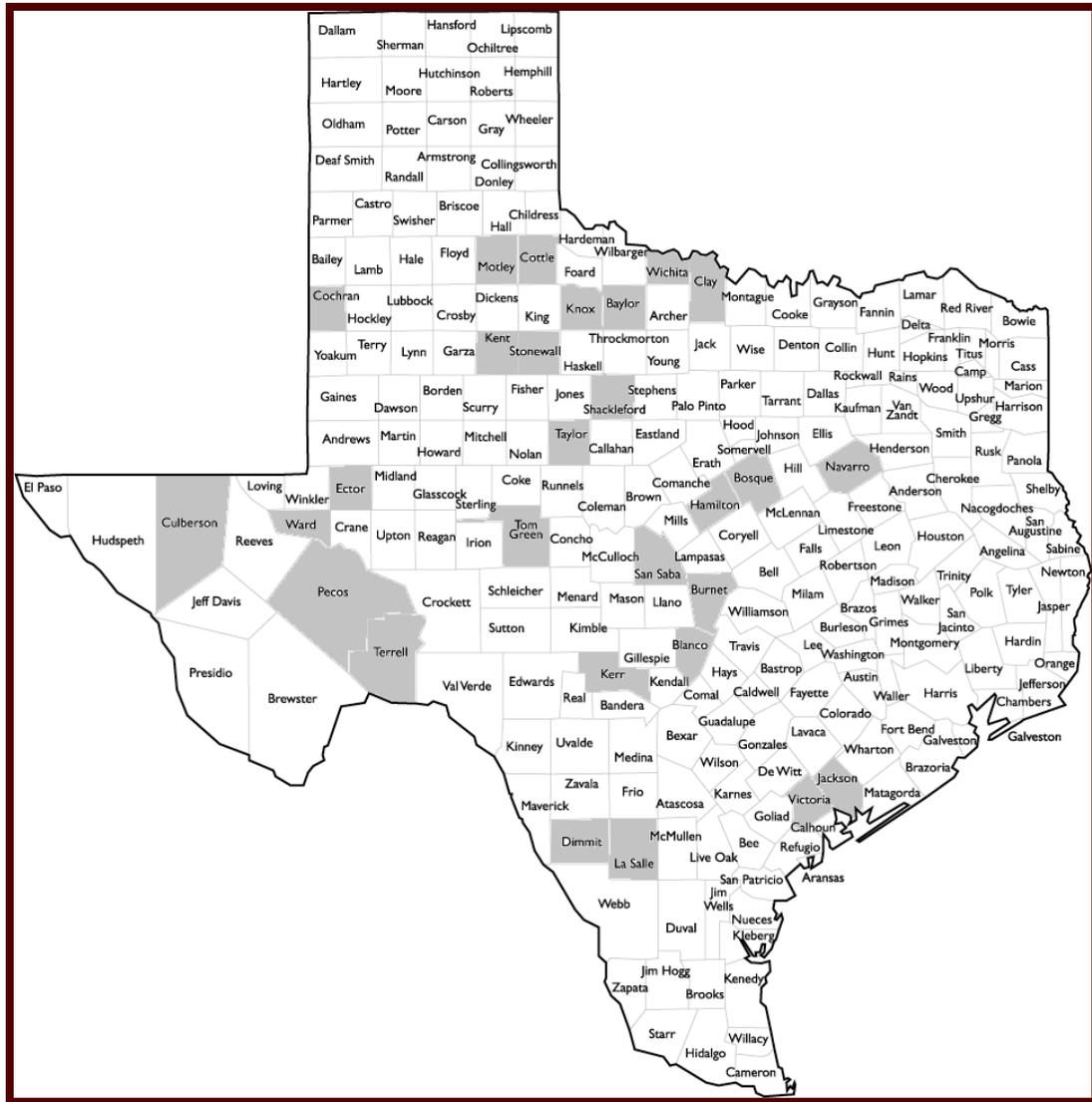
A male northern bobwhite. Photo courtesy of Becky Ruzicka.

Many are saying that the quail decline is over.

The resurgence is certainly encouraging, as are countless reports from people who are seeing and hearing quail in areas where they were previously scarce. But quail are not out of the woods yet. They will still require careful management of their habitat and resources, monitoring of their populations, and continued

public interest in the future. This will be especially true if [current predictions](#) hold and we enter into another dry La Niña year in 2017.

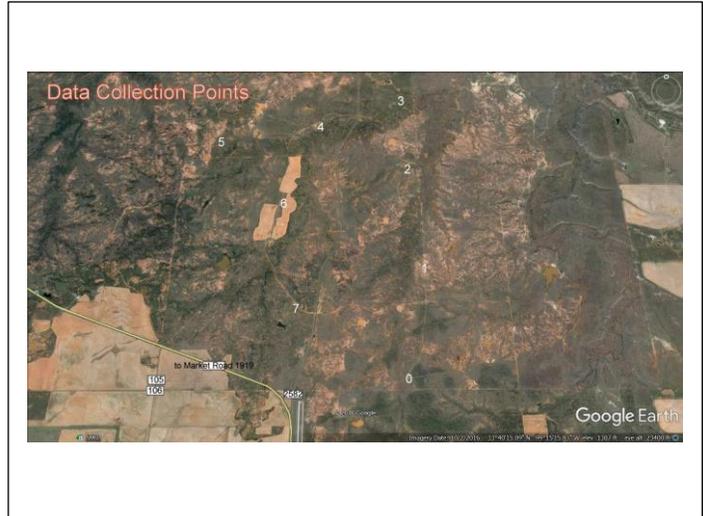
Thank you to all of our Texas Quail Index participants: our County Agents, Texas Parks and Wildlife personnel, volunteers, Master Naturalists, and landowner cooperators. You make this immense effort possible, and we hope you will continue to be an integral part of the “quail equation.”



This year’s cooperators (shaded above) include 28 counties in 8 ecoregions.

Methods

Texas Quail Index participants must first establish a data collection transect: a series of 8 points (numbered 0-7) on the chosen study site where all subsequent demonstrations will be conducted. These points must be accessible, spaced at least a mile apart, and located away from distracting traffic or equipment noise. The required TQI demonstrations are as follows.



Google Earth image of the TQI route for Baylor County.

Spring Call Counts

Counting the mating calls of bobwhite and scaled roosters in the spring is one way to gauge the population's reproductive potential for the year. Cooperators position themselves at each point along their transect starting 15 minutes prior to sunrise and listen for quail calls (counting individual roosters as well as call frequency) for 5 minutes. A total of 3 spring call counts are required between May and June each year.



A male bobwhite calling from a mesquite tree.
Photo courtesy of Becky Ruzicka

Because quail are short-lived birds, high rates of reproduction are critical for maintaining populations. We can estimate their success with dummy nests, which consist of 3 chicken eggs placed in a suitable nesting substrate (bunch grass, prickly pear, or low-growing shrub) to simulate a clutch of 12-14 quail eggs. These dummy nests are then checked at 2



Volunteers setting up dummy nests. Photo courtesy of Bosque County.

and 4 week intervals to determine if they are intact (eggs undisturbed) or depredated (eggs moved or broken). If a nest is depredated, eggshell evidence or footprints may be used to infer the predator responsible. Cooperators set 4 lines of 6 nests each for a total of 24 dummy nests; they also record an estimate of the number of suitable nesting substrates in the area.

Predator Surveys

Game cameras are an excellent tool for learning what types of predators are present on a property. Cameras frequently capture shots of “mesomammals” (e.g. raccoons, skunks, foxes) as well as hogs, coyotes and bobcats. Depredation events by these species can account for up to 80% of quail nest failures, and



many of them prey on adult quail as well. TQI cooperators set out 2-8 Bushnell Trophy Cam game cameras for 2 weeks during the month of July. These are placed about 2 feet off the ground in areas where predators are likely to be spotted, such as along roads or near water sources. Photos are analyzed for both the species and number of predators observed.

A bobcat captured on a game camera.

Quail population densities are closely tied to habitat quality, so it is essential to have some way of grading habitat in terms of its usability for quail. In the Texas Quail Index, this is done with habitat evaluation forms tailored to [bobwhite](#) and [scaled](#) quail. The forms guide cooperators in assessing 7 critical parameters of quail habitat:

1. **Nesting cover:** % of the area with suitable grass or brush for nesting
2. **Woody cover:** % of the area featuring adequate escape/loafing cover
3. **Abundance and variety:** # of species of food plants present
4. **Availability:** distribution of food plants
5. **Water:** % area within acceptable distance of a water source
6. **Interspersion A:** distribution of woody cover
7. **Interspersion B:** # of species of woody cover

An “Evaluation Value” indicating the overall quality of the habitat is calculated based on the individual parameter scores.



Roadside Counts

Just as spring call counts indicate breeding potential, roadside counts—conducted in September—can indicate breeding success. Cooperators perform 3 such counts in the fall, during which they drive a 10-20 mile route during the early morning or late afternoon hours and count all quail observed, distinguishing between adults and juveniles if possible. A value of “quail per mile” is calculated from these data and compared across regions and counties.



A male bobwhite crossing the road. Photo courtesy of Becky Ruzicka.

Rainfall



The total amount of precipitation received during the study period is recorded either from a rain gauge placed on the property or a local weather station. Habitat quality is largely dependent on the timing and amount of rainfall in any given year, making it an important factor in evaluating quail populations.

Results

Spring Call Counts

There were a total of 1,691 bobwhite quail roosters counted in 2016 across 28 counties and 8 ecoregions. The statewide average this year was lower than last year, with **3.2** bobwhites heard per stop compared to **4.2** in 2015. The past two years both compare favorably to 2014, when drought conditions produced the lowest statewide average recorded for the Quail Index—**2.5** bobwhites per mile marker. The ecoregions with the highest bobwhite densities were the Rolling Plains with an average of 6.2 bobwhites per mile marker, and the South Texas Plains with an average of 3.4. At the county level, call count values ranged from 0 to just over 8 roosters per mile marker (Fig. 1). As a point of comparison, the Rolling Plains Quail Research Ranch—a property managed specifically for quail habitat—reported an average of over 7 roosters (bobwhite and scaled) per mile marker this year.

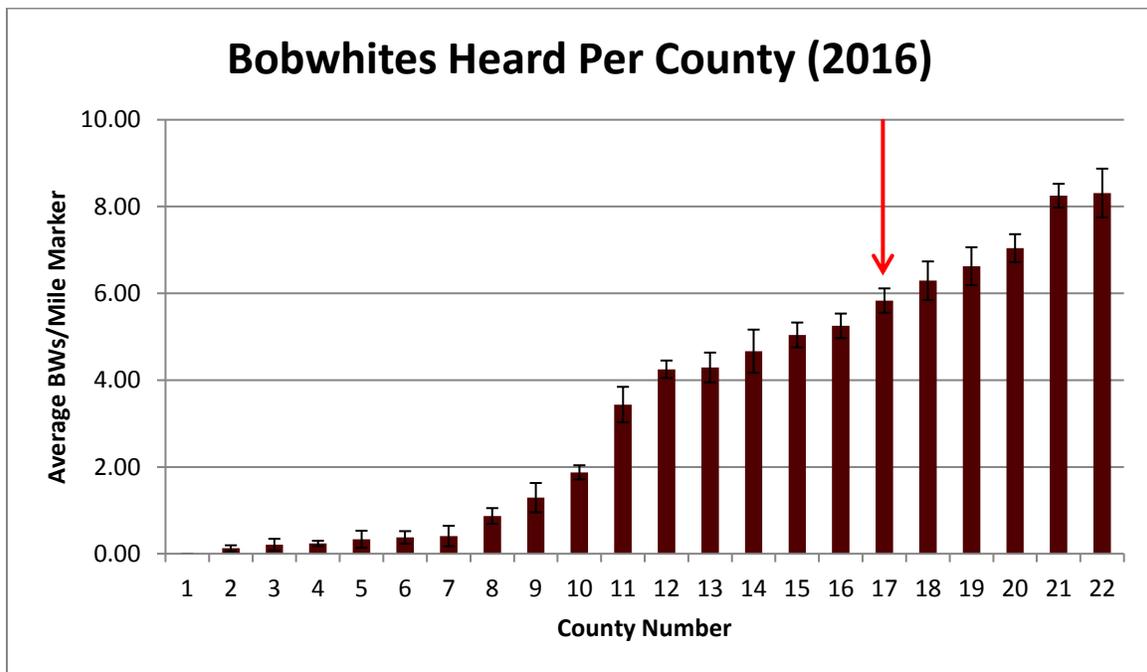


Figure 1: Average bobwhite roosters heard per mile marker for all counties in 2016

The arrow marks Baylor County in Figure 1. The county's overall average in 2016 was 5.83 and ranged from 4 to 8 at individual mile markers (Fig. 2). Baylor County is in the 75th percentile in 2016 for bobwhites, meaning its call counts were higher than 75% of participants.

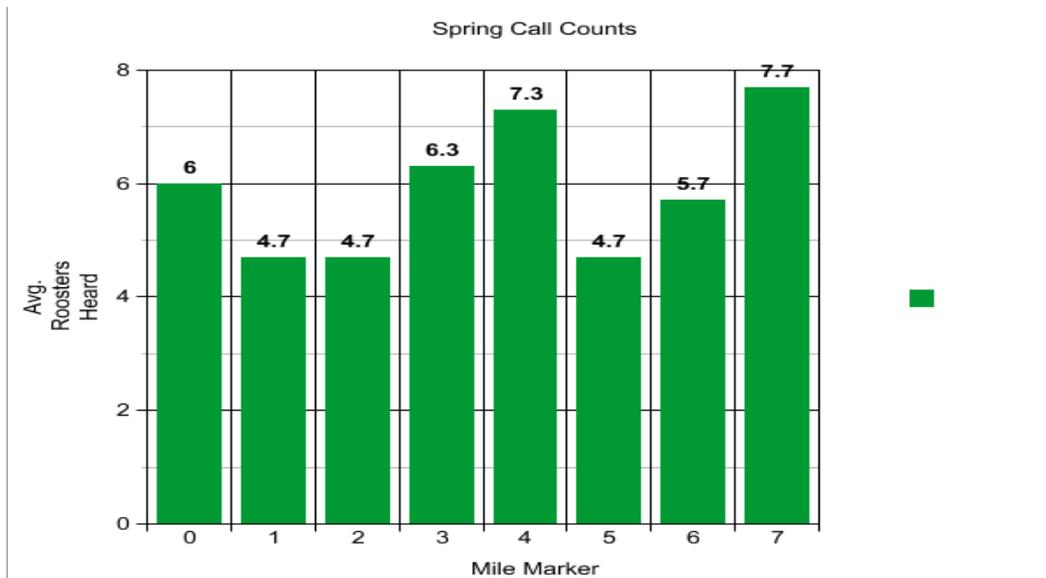


Figure 2: Spring call counts for Baylor County, showing 2016 values.

Dummy Nests

Statewide dummy nest survival at the 4-week mark was about 10% lower this year than last year (**48%** survival vs **60%** in 2015). Given that quail eggs require 23 days of incubation to hatch, a nest will have to remain unpredated for 3-4 weeks for a chance at a success. The breakdown by ecoregion also indicates that nest survival was lower this year, with values ranging from **29%** in the High Plains to **56%** in Cross Timbers. Most individual counties experienced a decrease in survival rate as well, with some rates in 2016 being less than half the rate in 2015 (Fig. 3). Although nest survival this year may seem low, it is important to keep in mind that *any survival above 40% suggests that predation pressure is not a significant limiting factor in quail nest success*, so most of these values represent acceptable predation levels.

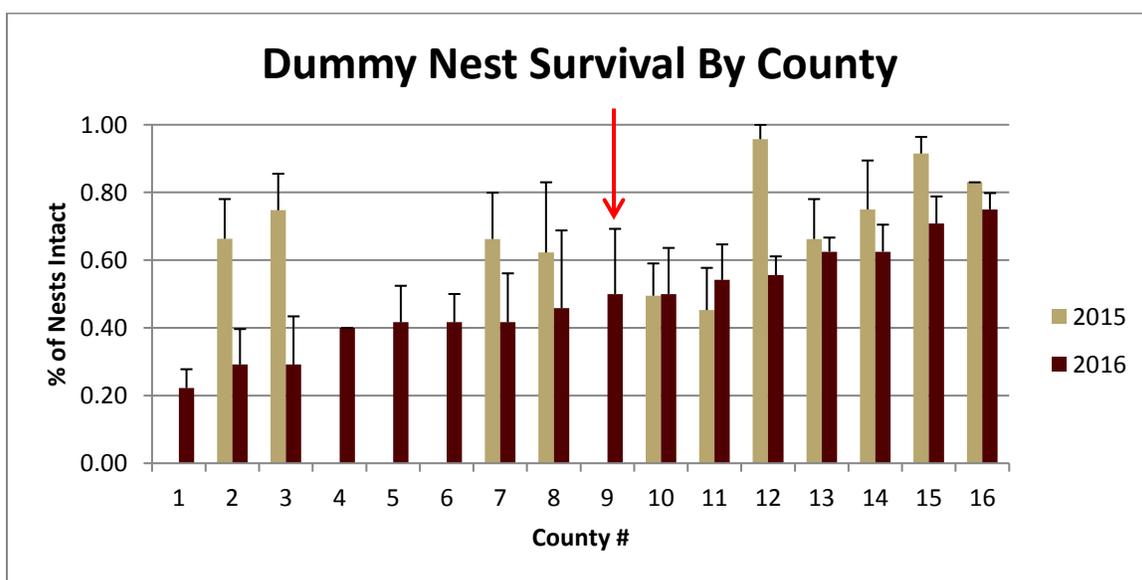


Figure 3: A nest was counted as “survived” if all eggs were intact and unmoved. The percent of such nests left after 4 weeks is shown for all participating counties.

“Candidates of destruction”—the predators responsible for disturbing the dummy nests—were also quantified this year for the first time (Fig. 4). After pooling records from all participating counties, the most commonly recorded predators were raccoons, snakes and coyotes. Other nest visitors included bobcats, foxes, rats, birds, hogs and javelinas.

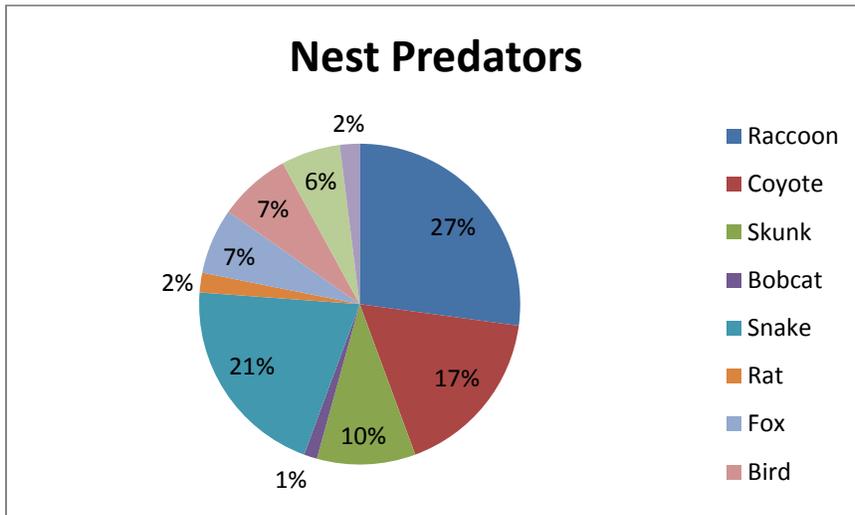
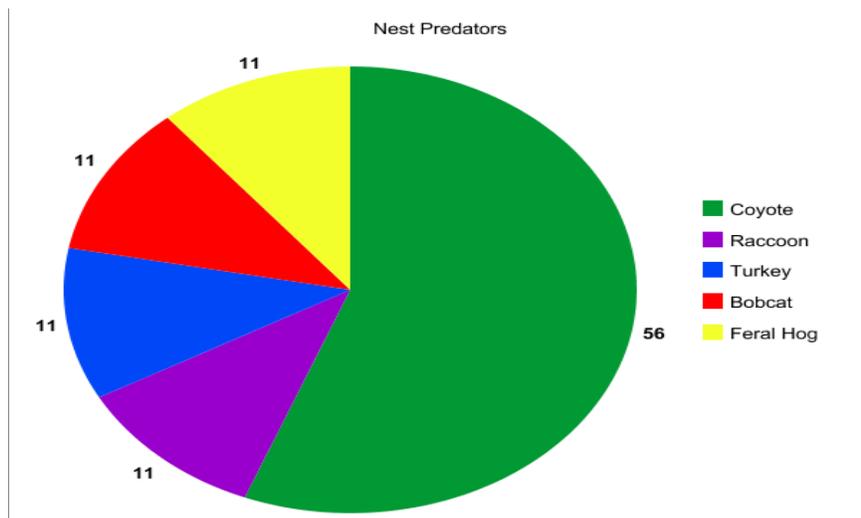


Figure 4: A breakdown of the most common predators identified by all TQI participants. More than a quarter of depredation events were attributed to raccoons.

Baylor County is denoted by the arrow in Figure 3. Four-week survival averaged 50% and ranged from 17% to 83% across 4 transects. This puts Baylor County in the 53rd percentile for nest survival in 2016. Nesting success was highest in the prickly pear substrate type. The most frequently recorded nest predators were coyotes, which accounted for 56% of depredation events. The average number of nesting clumps estimated per acre was 1,836, which is above the recommended threshold of 300 suitable nesting sites.

Figure 5: Baylor County nest predators based on percentages. Coyotes destroyed the majority of dummy nests.



Predator Surveys

A total of 422 predators of 14 species were recorded this year. Hogs were the most frequently photographed with a total of 152, followed by coyotes with a total of 120 (Fig. 6). These two together made up nearly 90% of all predators caught on camera. Other frequently photographed subjects were bobcats, foxes, raccoons, and corvids. The “other” category includes miscellaneous turkeys, skunks, javelinas, and birds of prey.

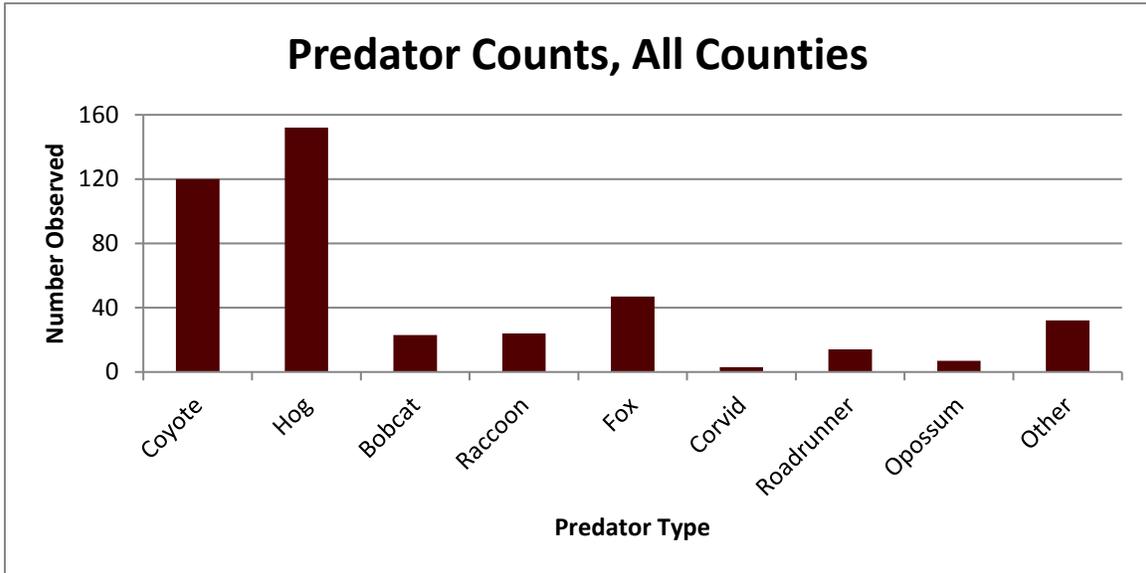


Figure 6: All predators recorded by game cameras in all participating counties.

In Baylor County, there were a total of 3 predators observed, with coyotes being the most common (87%). Some of the best game camera photos are included below (Fig.7).



Figure 7a: 6 coyotes on game camera



Figure 7b: feral hogs on game camera

The statewide average habitat evaluation value was **0.70** for bobwhites this year (Fig. 8). This is slightly lower than the 2015 average of **0.72**, but higher than the 2014 average of **0.67**. To give some context to these values, a score of 0.5-0.74 is “good” while 0.75+ ranks as “excellent.” When all counties were compared, evaluation values ranged from 0.55-0.81. The most significant limiting factors in 2016 were nesting cover with an average score of 0.57 and interspersions (B) with an average score of 0.61.

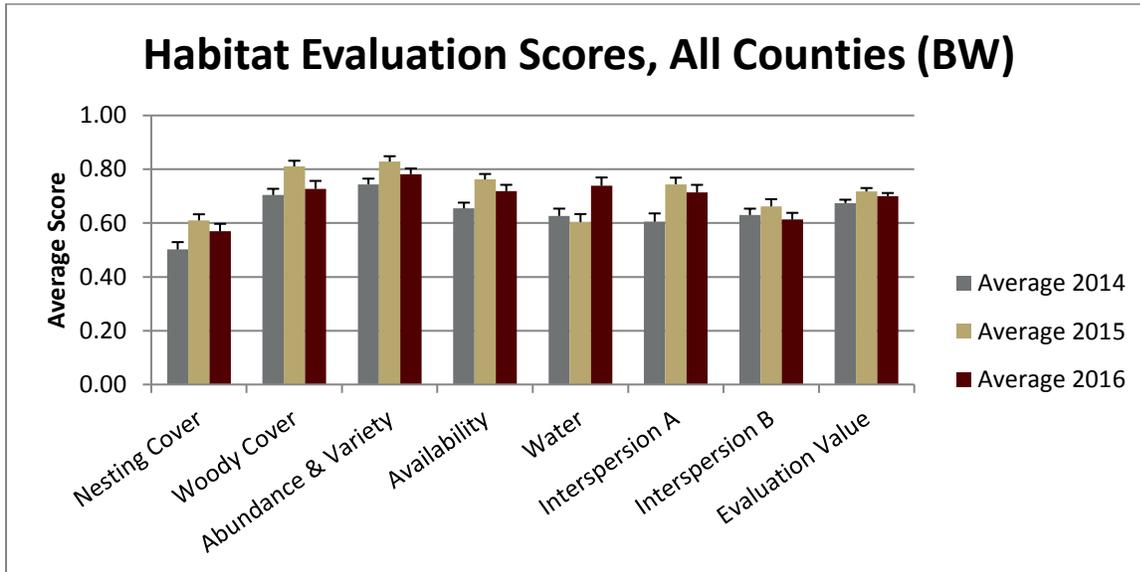


Figure 8: Statewide habitat scores broken down by year and individual parameters.

The average habitat evaluation value for Baylor County in 2016 was .71 and ranged from .41 to .87 for individual mile markers. This places it in the 46th percentile statewide. The two greatest limiting factors in habitat quality were woody cover and diversity of woody plants. Figure 9 provides a comparison of Baylor County’s evaluation values this year versus 2015.

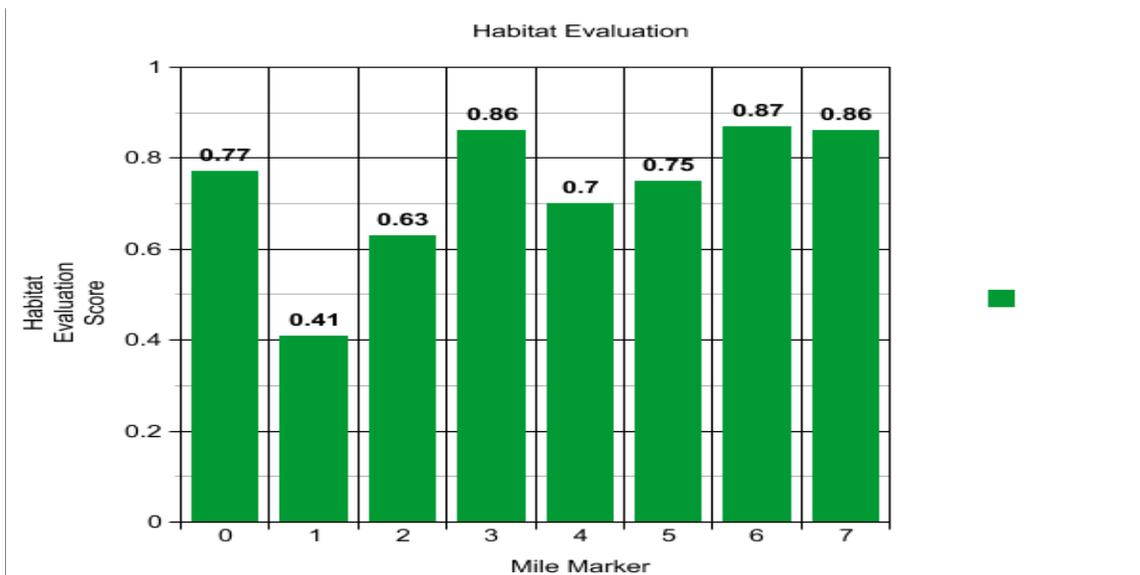


Figure 9: Bobwhite habitat evaluation values for Baylor County for 2016.

Roadside Counts

In 2016, the average number of bobwhite quail counted per mile was **5.1**—identical to the value recorded last year. Both 2015 and 2016 represent a significant improvement over 2014's **2.0** quail per mile average. Bobwhite densities remain highest in the Rolling Plains ecoregion with just over 8 quail per mile. Other data collection agencies report similar results: the Texas Parks and Wildlife Department set a new record for the Rolling Plains this year with 50.2 quail per 20 mile route, and the Rolling Plains Quail Research Ranch recorded more than 500 quail over the same distance. Individual counties varied widely, however. Several recorded no quail at all while the highest averaged more than 15 birds per mile (Fig. 10).

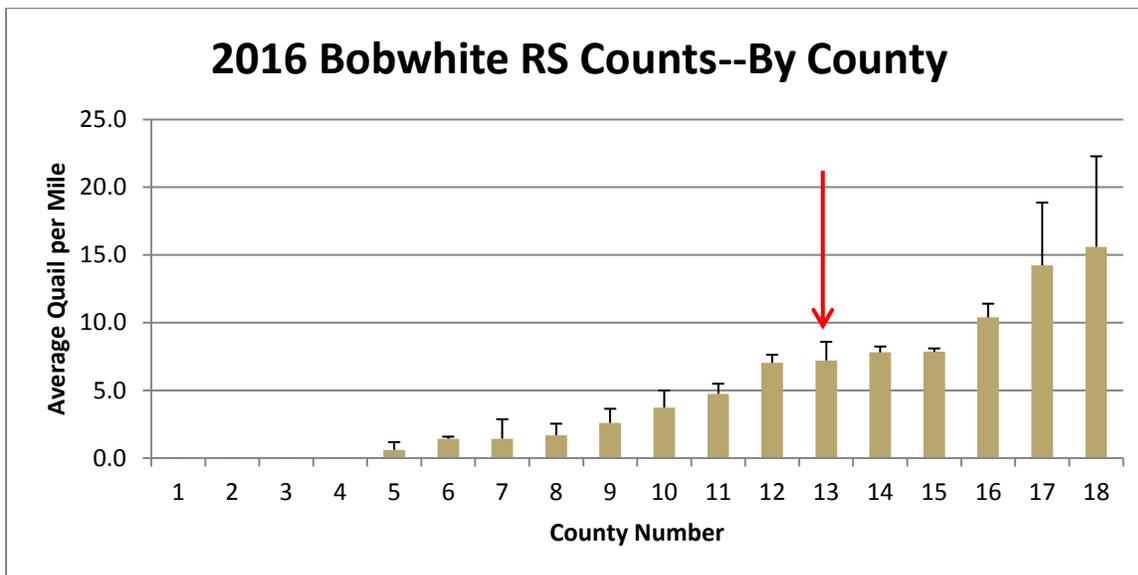


Figure 10: Roadside count results (quail seen per mile) for all participating counties.

The average number of quail recorded per mile in Baylor County was 7.21, which places it in the 69th percentile statewide. The arrow on Figure 10 indicates Baylor County relative to all cooperators statewide.

Rainfall

The total rainfall for the year as of Nov. 24, 2016 was 28.21 inches, which is above the average of 27 inches. According to the U.S. Drought Monitor, the Baylor County study site is in non-drought conditions as of October 18, 2016 (Fig 11.)

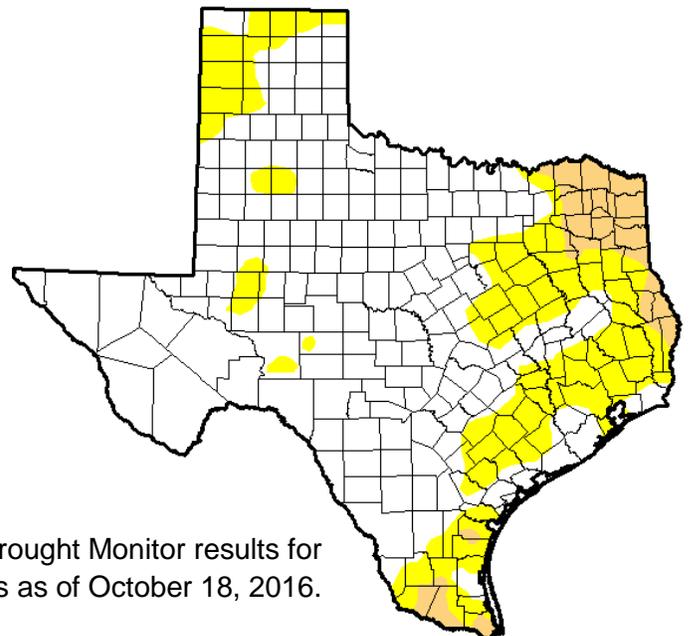


Figure 11: U.S. Drought Monitor results for the state of Texas as of October 18, 2016.

Discussion and Conclusions

Spring and early summer rains combined with cooler temperatures equaled a tremendous breeding season for quail in Baylor County. Visual observation of 2-4 hatches appeared to be evident throughout the ranch with very good brood numbers of young quail. The Baylor County TQI consisted of 8 miles of ranch roads in northern Baylor County with 8 “mile marker” stopping points to set dummy nest transects, evaluate habitat, set game cameras and listen for bob-white rooster calls. The terrain and habitat varied a lot throughout the ranch which led to varied data collection results.

Lack of plant and woody plant diversity led to lower rooster call counts and fewer roadside count numbers at certain mile markers. Data collection point number 1 scored the poorest on my habitat evaluation and also recorded the fewest rooster calls. Other low rooster call numbers also occurred at mile markers 2 and 5; both of these locations were low on habitat evaluation scores and also recorded the most predator counts on game cameras. The mile markers that scored the highest on my habitat evaluation recorded very good rooster call numbers and had limited number of predators on camera.

From a dummy nest survival standpoint, prickly pear nesting sites had an 86% survival rate compared to bunchgrass at a 27% survival rate over a 4 week period.

Predators observed on game cameras included coyote, bobcat, raccoon, feral hog and turkey, all which can play a predation role from eggs to adult birds. Coyotes were not only the main contributor to dummy nest destruction but were also the most common found on the game cameras.

Coyote and feral hog control may be needed if quail numbers want to continue to rise.

Baylor County did not participate in the TQI in 2015 due to personnel changes so comparison is made to 2014.

Acknowledgments

TQI fosters landowner and community involvement and provides tools for interested stakeholders to assess the “quail-equation” in their community. Thank you to Dr. Dale Rollins and to Amanda Gobeli for their leadership on this project area and for the training on how to conduct this research and results demonstration. Also, thank you to Mr. Bill Whitley for use of his property to conduct this valuable research project. We hope to continue the TQI in Baylor County in the future and for this to be an educational resource for our community.

