# ROLLING PLAINS QUAIL RESEARCH FOUNDATION

**2018 ANNUAL REPORT**

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# ABOUT US

THE ROLLING PLAINS QUAIL RESEARCH FOUNDATION (RPQRF) IS A 501(C)(3) NONPROFIT FOCUSING ON ONE THING: UNDERSTANDING AND MANAGING BOBWHITE AND SCALED QUAIL IN WEST TEXAS. EVERYTHING WE DO CENTERS AROUND QUAIL AND QUAIL HUNTING, AS REFLECTED BY OUR MISSION:

## TO PRESERVE TEXAS' HERITAGE OF WILD QUAIL HUNTING FOR THIS, AND FUTURE, GENERATIONS

THE FOUNDATION AND ITS RESEARCH RANCH WERE ESTABLISHED TO PROVIDE A LIVING LABORATORY TO DEVISE LAND MANAGEMENT STRATEGIES FOR THE BENEFIT OF QUAIL AND ALSO AS AN EXEMPLAR PROPERTY TO DEMONSTRATE THE BEST METHODOLOGIES AND TECHNIQUES TO OTHER "STUDENTS OF QUAIL."

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# MAYBE NEXT YEAR

## PRESIDENT'S MESSAGE

**Justin Trail**
President

In a year like this I am reminded that we are working on the margins, and that nothing we can do (at this point) can overcome poor weather conditions in the spring and early summer. That was the story for most of the Rolling Plains this year. Fortunately, the margins are worth working on in a highly productive species like quail. If we can influence the margins just a little, it may have enough impact to soften busts or even accelerate a boom. Our research and educational outreach efforts continue to focus around all things quail, and how we can influence the boom and bust cycle.

Research is expensive and takes time. We appreciate the continued support from our donors and partners. 2019 looks to be a busy year with our continued parasite and translocation research, burning, and the various other projects that make up our long-term data sets. We have revamped our website to help with the online donation process and to make it easier for all of our stakeholders to get information about quail management. Take a look at www.quailresearch.org.

My oldest bird dog is 5 years old. Most of my string of pointers and setters are 2-3 years old. They don't remember the lean years—those years when we would actually take note and report on seeing a covey or even a pair of birds. My dogs are all a little heavier


*RPQRF Justin Trail and his dad, Robert.*

than they should be this time of year. But still, when I put them down to run they hunt as hard as they always have, even though they are not finding many birds. They work their cover and run wide open, never getting discouraged. I appreciate their hard work and hope that is how the RPQRF is viewed; in good years and bad, we try to be intentional with our efforts through research, education, and outreach. It would be easy to get discouraged, but now our country is wet, winter has been mild to this point, and next year looks full of promise!

# WILL THE ICEMAN COMETH?

## DIRECTOR'S MESSAGE

**Dale Rollins**
Executive Director

As a youngster, I always reveled when we got an opportunity to attend the state fair, especially the carnival portion. I loved the cotton candy and the various arcade games. But I never liked the roller coaster . . . the ups and downs and twists and turns were too much for my nerves (and my stomach!). Our quail situation this past year has kindled similarly queasy feelings.

Indeed, we have ridden a roller coaster of quail abundance over the past two years. From record highs (2016), to record (or at least near-record) lows (2018). As amazed as I was in 2015-16 to see how the birds responded from the lows of 2011-13, I am equally (if not more) amazed at how rapidly they have "melted" over the past 18 months.

I often relate a quail population to a cube of ice. As soon as it is exposed, it begins to melt. There's nothing we can do to stop the melt, but we think (hope) our habitat management can at least provide some insulation to "slow" the melt. I felt like we accomplished this in 2017, but we've failed over the past year. A dry winter, spring, and summer set the melt in motion, and then you sprinkle the "salt" of a high load of eyeworms and caecal worms, and live daily with an expanded predator population (a lag effect from record rat abundance in 2015-16), and you've got problems.

Our numbers as of December are alarmingly low. I believe it's worse than 2012-13. Our various metrics, helicopter counts, fall covey call counts, trapping-banding data, and small mammal trends all heralded the dramatic fall. Various predators are taking about two of our radio-marked quail per week. Reminds

me of a cadence I penned several years ago for the Bobwhite Brigade:

*"A quail's life is full of tests,*
*Many critters break up their nests.*
*Possums, skunks, and raccoons too,*
*It's enough to make a bobwhite blue."*

So, will the iceman cometh this year? I'm optimistic about the vegetation on the ground now (e.g., filaree) and that which will come next spring (broomweed) as a result of the October rains. El Niño weather patterns are forecasted to last through the spring. But I'm concerned as to whether we'll have enough breeder birds left come May to take advantage of the floral bonanza. And our rodent populations are a polar opposite as to what they were in 2015. Can the quail pull a rabbit out of their hat again and rebound as they did in 2015?

Stay with us as the carnival ensues. We'll keep you posted as to how our various metrics shape up next Spring. Until then, remember the advice of Franklin D. Roosevelt, "When you get to the end of your rope, tie a knot and hang on."


Kawasa

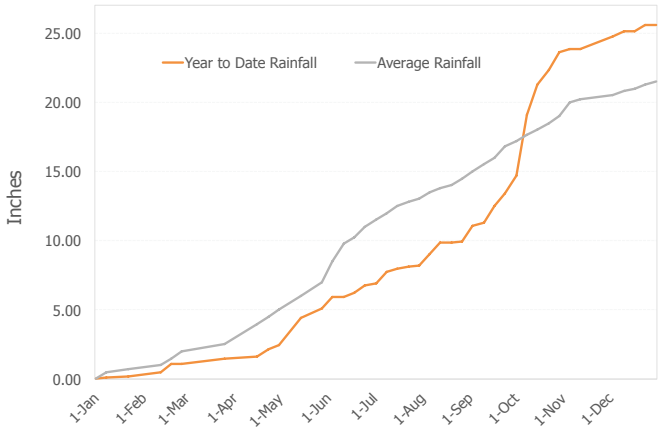
# LONG-TERM DATA COLLECTION AT THE ROLLING PLAINS QUAIL RESEARCH RANCH

Through the generosity of The Richard King Mellon Foundation and The Conservation Fund, a 4,720-acre ranch in Fisher County was purchased in October 2006. Our Research Ranch makes RPQRF the only conservation group in the world with its own property dedicated exclusively to understanding quail through science. It functions as the nexus of our operations and all decisions and actions on the Research Ranch are based on quail. Our full-time staff and team of graduate students work year-round to develop the best practices for quail management, prescribed burning methodologies, grazing procedures, predation management strategies, and pinpointing which grasses and "weeds" make ideal quail habitat. We also trap and study as many as 5,000 quail annually and use the latest technologies – radio telemetry, GPS, thermal cameras, helicopters and even drones – to count and track quail populations. Then we share what we learn so others may follow.

# THE YEAR IN REVIEW

## 2018 WEATHER

Too little, then too much, but too late—that pretty well summarizes our precipitation for 2018. The Fall of 2017 was very dry and that drought lingered through September. The dry fall, winter, spring, and summer combined to put a choke-hold on quail reproduction, and to a lesser degree survival. Our fields grew no winter wheat nor any annual sunflowers, and only stunted common broomweed studded the rangeland. Not a single dove was shot at the Ranch this past season. I cannot ever remember a time when we were unable to grow at least some winter wheat.




*Summary of cumulative 2018 rainfall.*

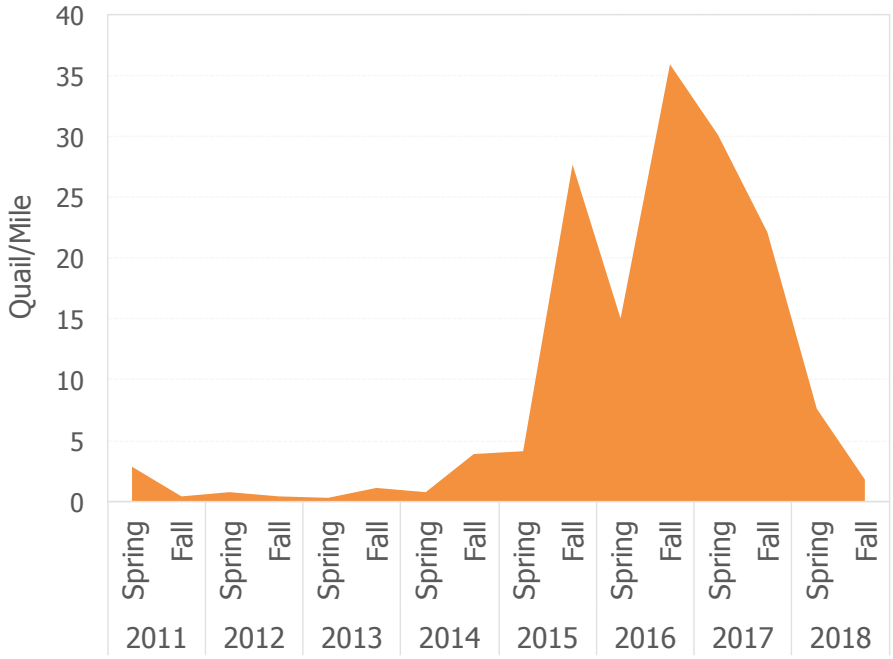
The bonanza began in early October, and continued for about three weeks. We received half of our annual average precipitation during this period. While the October rains were a blessing for cool-season vegetation (e.g., filaree), the long cold and wet spell may have resulted in us losing birds from coccidiosis.

Our automatic weather recorder became defective in October, so the rainfall results presented here are based on FarmLogs (www.farmlogs.com). Our total precipitation for 2018 was 25.46 inches. An El Niño weather pattern is forecasted to stay in effect through Spring 2019 which should bode better for reproduction and survival.

# MONITORING QUAIL ABUNDANCE

## AT RPQRR

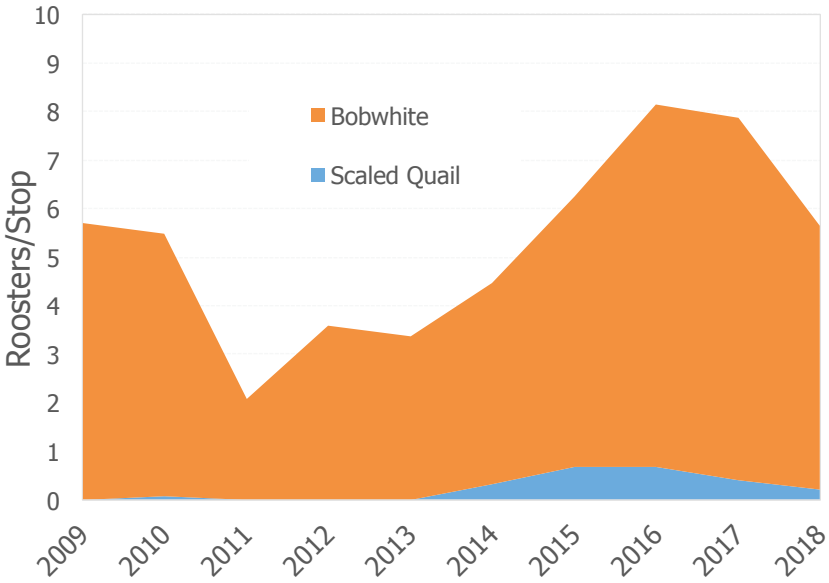
Since RPQRR was established in 2007, we have implemented various ways to monitor quail abundance over time. These efforts include helicopter surveys, call counts (spring and fall), mark-recapture (using leg-banded birds), and fall roadside counts. Our goal in collecting these data over time is two-fold. Primarily, we would like to track changes in the population over time and investigate factors that may be influencing those changes. Secondarily, we want to be able to determine which of these provide reliable indices of the population relative to the time and expense of conducting counts to provide landowners with guidance for monitoring quail on their own property. It is important to keep in mind that the best use of relative abundance indices, such as call and roadside counts, is for comparison on the same property over multiple years.




***Helicopter counts at RPQRR, 2011-2018.***

# HELICOPTER COUNTS

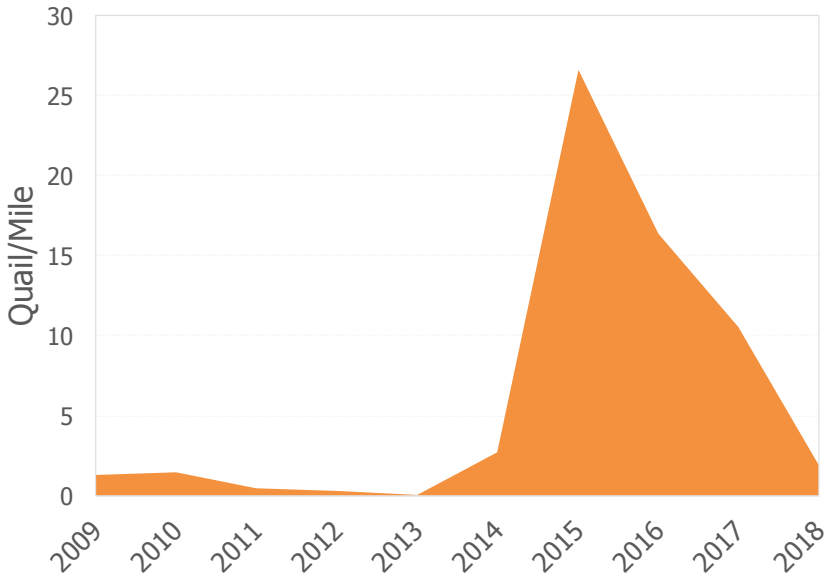
Every year we conduct two helicopter surveys: one in the fall (November) and one in the spring (March). We fly the same transects with a total sampling effort of 52 miles. These surveys are flown "low and slow" (compared to typical deer surveys) to maximize our ability to see coveys. During these surveys we record each covey observed and the covey size. We use our helicopter counts as both an index and estimator of quail abundance on the ranch. Both species of quail (bobwhites and scaled quail) are combined in these data due to the difficulty separating the species in flight. We average the covey size across all observations each year, then use the average covey size to calculate an abundance index whose units are number of quail per mile. During years when > 60 coveys were detected, density surface models (DSMs) were developed to provide density estimates across RPQRR. In November of 2016, we recorded our highest ever count of just over 35 quail/mile. Spring 2017 counts were lower than fall, as one would expect given over winter attrition, however it was also the highest spring count on record. The record highs and volatile population growth we observed in those years were contrasted by an equally volatile return to the lows observed in previous years.




***Bobwhite and scaled quail spring call counts at RPQRR, 2009-2018.***

# SPRING CALL COUNTS

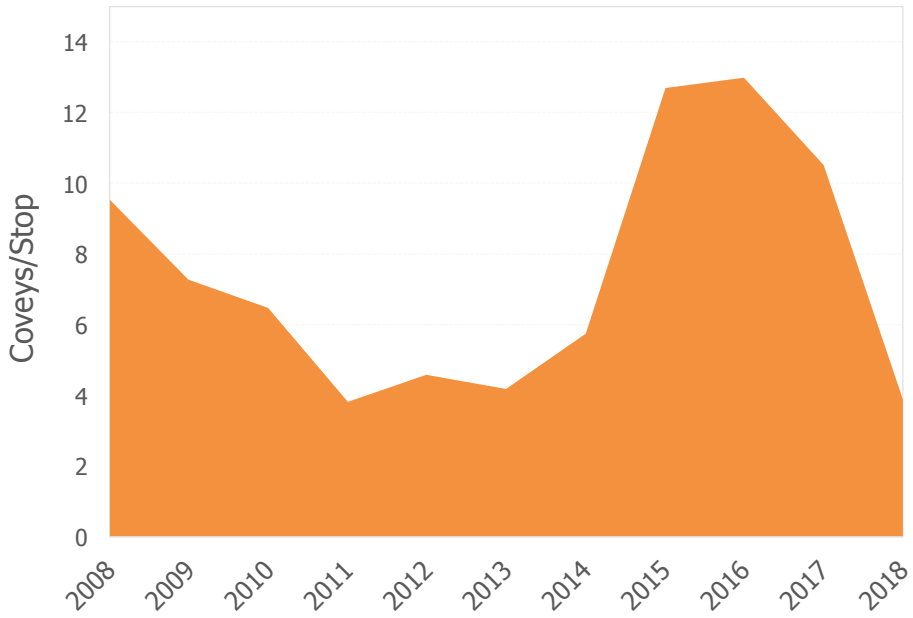
Spring cock call counts or "call counts" can be used to index quail abundance over time. The best use of these counts is to obtain an average value for a property (i.e., average no. cocks heard at all stops combined) and compare how that value changes over time. These kinds of counts give only a rough indication of the population due to the high degree of variation in calling rates. The number of cocks calling is driven almost as much by the current weather and willingness to breed as by abundance on a particular property. Spring call counts are conducted at 25 "mile markers" across the ranch. The ranch is divided into an east and a west transect. The west line contains 13 mile markers and the east makes up the additional 12. Each year counts are conducted twice a week starting mid-May and continuing until mid-July. We follow trends in both bobwhites and scaled quail over time, although bobwhites are more prolific callers and thus easier to index using this method. Our data approximately reflect the changes in abundance over time. Based on these data, an average of >7 bobwhite roosters per stop indicates high abundance, while counts averaging <3 bobwhite roosters per stop indicates low abundance. Scaled quail call counts are likely best used as an indication of presence/absence only.




***Roadside counts at RPQRR, 2009-2018. These counts combine both bobwhites and scaled quail.***

# ROADSIDE COUNTS

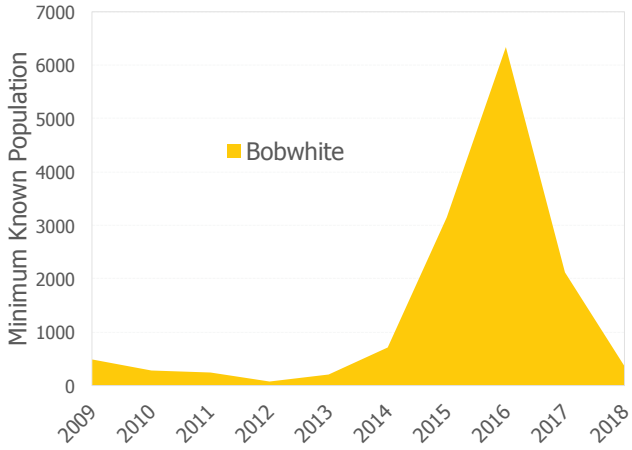
Roadside counts are easy to conduct—you simply drive a prescribed route during early-morning or late-afternoon hours and count the number of quail observed. Roadside counts are effective on small (~3000 acre) properties, as well as larger properties. We repeat our counts four times during September; two during morning hours and two during afternoon hours. Both species of quail (bobwhites and scaled quail) are combined in these data due to the difficulty separating the species in flight. The number of birds observed per mile is an index to quail abundance. Our counts this fall showed a decrease of approximately 50% from 2016. Each year during August, Texas Parks and Wildlife Department biologists conduct similar roadside counts on 20-mile routes across much of Texas. In RPQRR's first ten years, we have documented that our counts are highly correlated (r = 0.99) with TPWD counts across the Rolling Plains. Based on our work at RPQRR, roadside counts are also one of the most accurate indices for predicting fall hunting abundances.



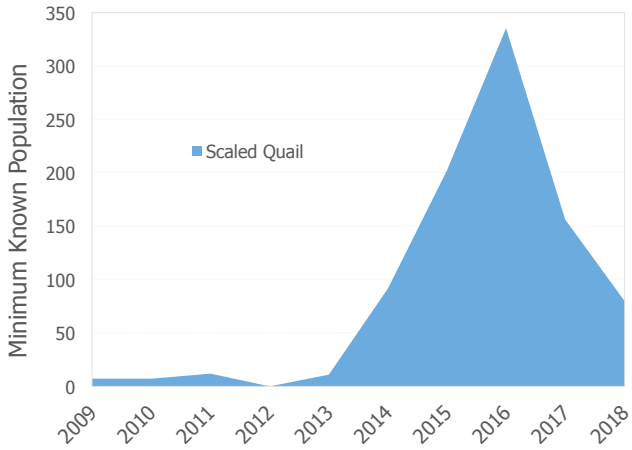

***Bobwhite fall covey call count at RPQRR, 2008-2018.***

# FALL COVEY COUNTS

In October, we measure bobwhite abundance by listening at dawn for "covey calls." Covey call counts are the most time intensive measure of relative abundance because researchers can only listen at one site per day. Covey call counts are used extensively throughout the Southeast as a population monitoring tool and can be used prior to hunting season to identify local hotspots. We listen at all of our odd-numbered mile markers for a total of 2 counts per stop and record number of different coveys heard.



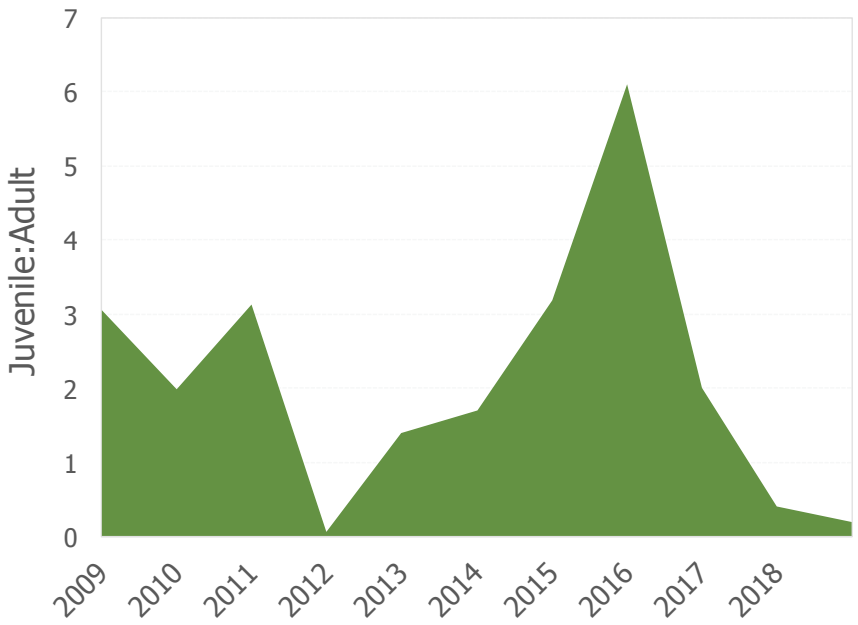

***Minimum known population of bobwhite quail at RPQRR, 2009-2018, based on fall trapping (i.e. number of uniquely-banded individuals captured).***




***Minimum known population of scaled quail at RPQRR, 2009-2018, based on fall trapping (i.e. number of uniquely-banded individuals captured).***

# TRAPPING

We trap RPQRR intensively twice a year with baited walk-in wire traps. We have several goals for our trapping efforts: 1) to affix radio-collars to monitor survival and reproduction, 2) monitor relative abundance and minimum known population, 3) gain an estimate of annual production (i.e. juvenile to adult ratio), and 4) estimate true abundance using mark-recapture data analysis techniques. Our trapping data since fall of 2015 have documented the bobwhite population explosion the Rolling Plains experienced and the subsequent decline. We have also documented the persistence of a scaled quail population on RPQRR post-translocation in 2013 even through the bust we experienced this past year. Scaled quail populations followed the same general trend of the bobwhite populations, however proportionally the scaled quail population crash was less severe. The juvenile to adult ratios we calculate from these trapping data are an estimate of production, or the number of new recruits to the population each fall. Trends in production over time tend to reflect the subsequent population boom or bust.

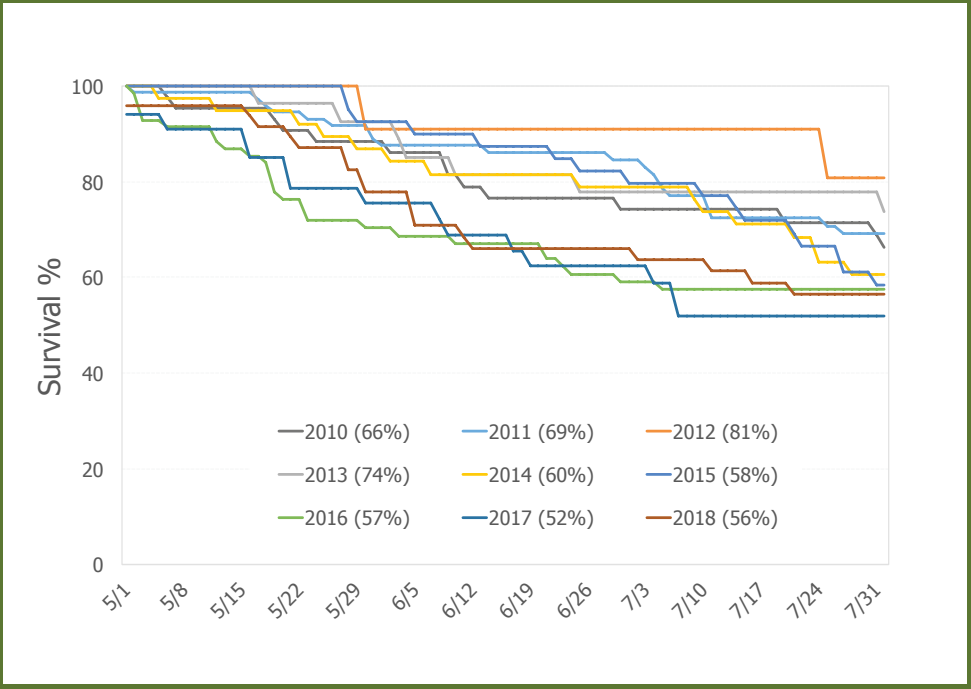



***Annual bobwhite production (juvenile:adult) at RPQRR, 2009-2018.***

# QUAIL SURVIVAL

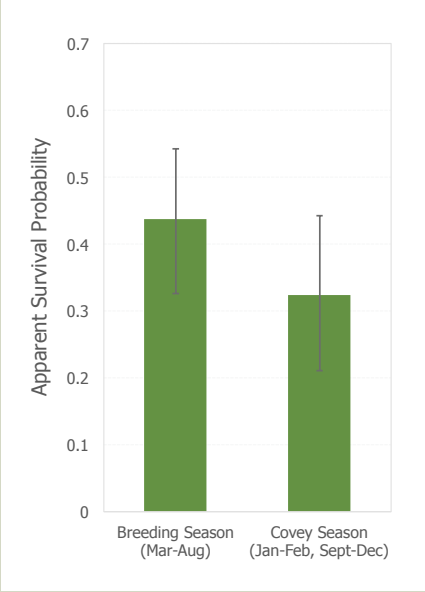
## AT RPQRR

Bobwhite and scaled quail are fitted with 6-g radio-transmitters during November trapping each year. We collar additional birds throughout the year to maintain sample sizes so that we can evaluate fluctuation in survival throughout the year. In 2018, we monitored 245 quail throughout the year. Below we report the nesting season hen survival observed over the last 9 years. Breeding season survival ranged from 52% to 81%. 2018 survival was at the lower end of our documented range. In 2018 we compared breeding season survival (spring and summer) to covey season survival (fall and winter). Survival during covey season tended to be lower than breeding season. We are currently unsure of the factor or factors influencing that difference in survival, however it could be attributed to the higher abundance of raptors during covey season (see Raptor Populations).

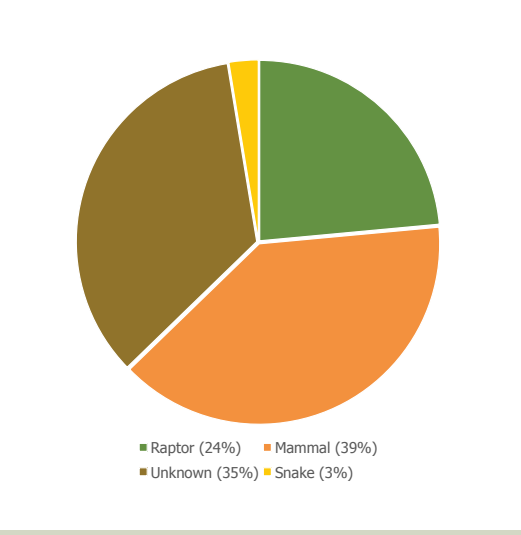



***Nesting season hen survival at RPQRR, 2010-2018.***

*Bobwhite feather evidence at a raptor kill site. Can you spot the radio-collar?*




***Estimated survival compared between breeding season and covey season in 2018.***

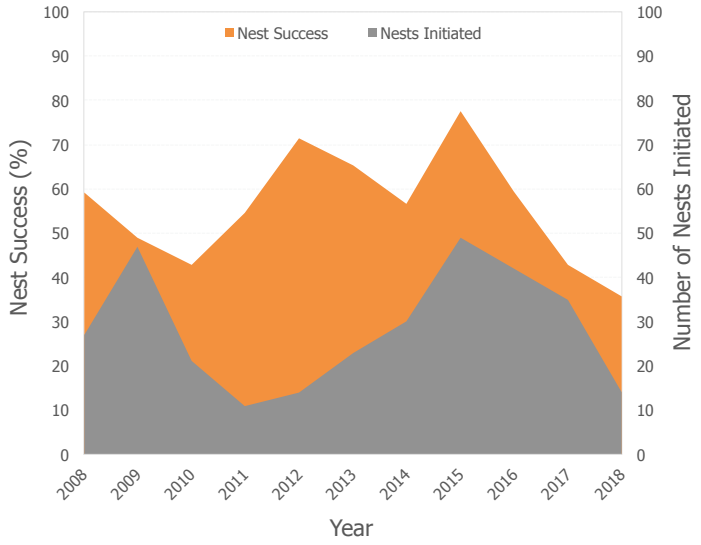



***2018 cause-specific mortality in radio-collared quail.***

# NESTING SUCCESS

## AT RPQRR

Each radio-collared hen is monitored throughout breeding season. By homing in on and recording the hens' locations daily we are able to document when they initiate a nest. Once a nest is initiated we observe it until it is hatched or depredated, recording other parameters of interest along the way, like nesting substrate, clutch size, and number of eggs hatched. The graph below summarizes nesting success and number of nests initiated over the last 10 years. In the nesting seasons that resulted in boom years (2015-2016) we observed both large numbers of nests initiated and high survival. In 2018, both nest initiation and nest survival were low. Previously, in years where few nests were initiated we, contrastingly, observed high survival. Nest success in 2018 was the lowest on record. Dry spring and winter conditions contributed to low nest initiation.



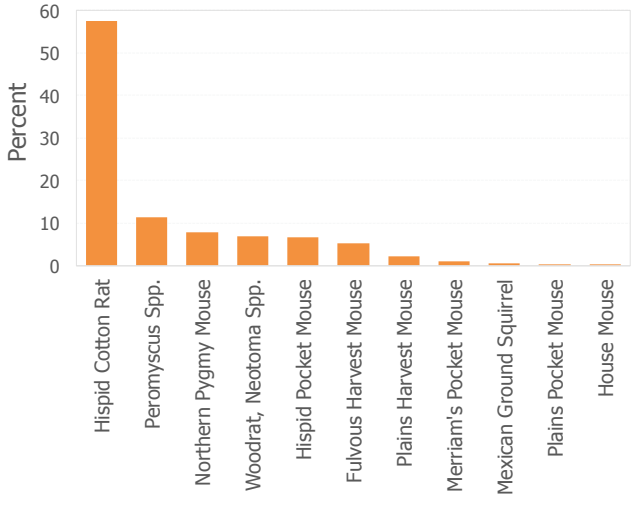

***Nest success and nest initiation from 2008-2018 at RPQRR.***

# SMALL MAMMALS

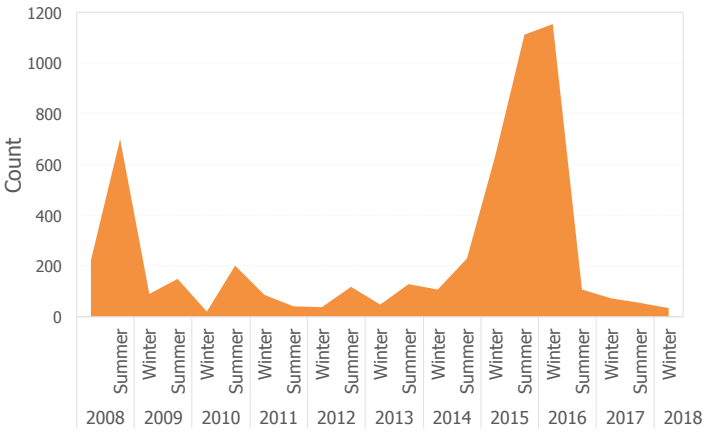
## AT RPQRR

Small mammals exhibit the same irruptive population growth as quails and both communities appear to be driven by the same environmental factors. We monitor small mammal populations at RPQRR to learn more about the link between the species' population dynamics. Research in the Southeastern U.S. suggests that small mammals serve as a buffer prey species for bobwhites. This means that when small mammals are abundant, predators focus more on small mammals thus alleviating predation pressure on quail.

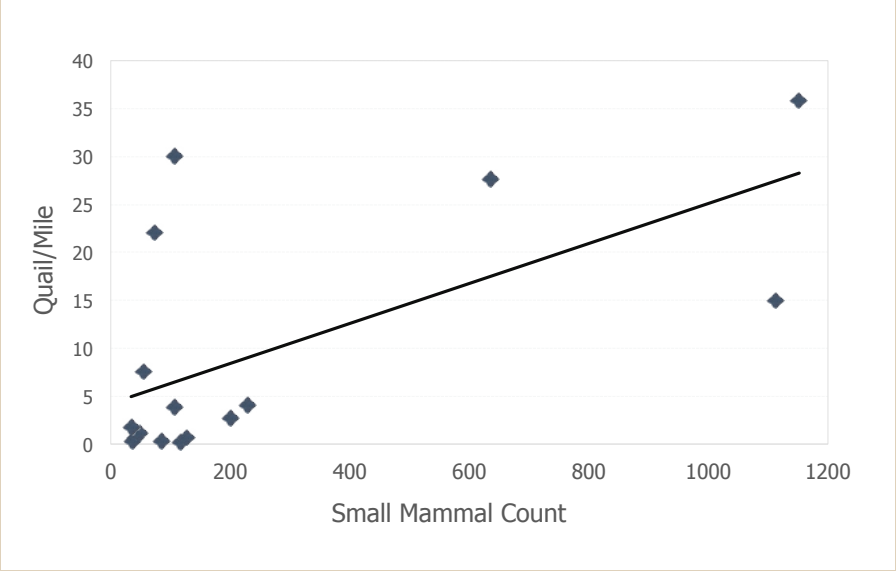
Small mammal population trends are monitored at RPQRR through biannual trapping. We trap 8 ecological sites throughout the ranch: Prickly Pear, Old Field, CRP, Food Plot, Mesquite Woodland, Rocky Outcrop, Sandy Soil, and Riparian. Twenty-five Sherman traps placed in 5 x 5 grids covering 2,500-$m^2$ are set at 5 locations within each ecological site. Each trap is checked for a total of 4 nights (i.e., 500 trap-nights / ecological site). The number of new individuals caught per trap-night serves as an index of small mammal population trends. Preliminary analysis indicates a correlation of RPQRR's summer small mammal index and fall bobwhite populations, but the mechanisms of this relationship are currently unknown. Since 2008 we have documented 11 different species of small mammals at RPQRR. The most common species across all years has been the Hispid cotton rat.




***Small mammal species captured at RPQRR, 2008-2018.***




***Total small mammal counts at RPQRR, 2008-2018.***



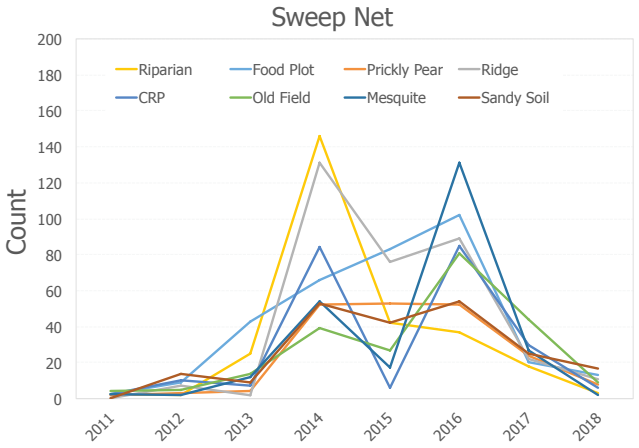

***Quail per mile observed during helicopter surveys correlated with spring and fall small mammal counts at RPQRR, 2008-2018.***

*Hispid cotton rat (left) and wood rat (right).*

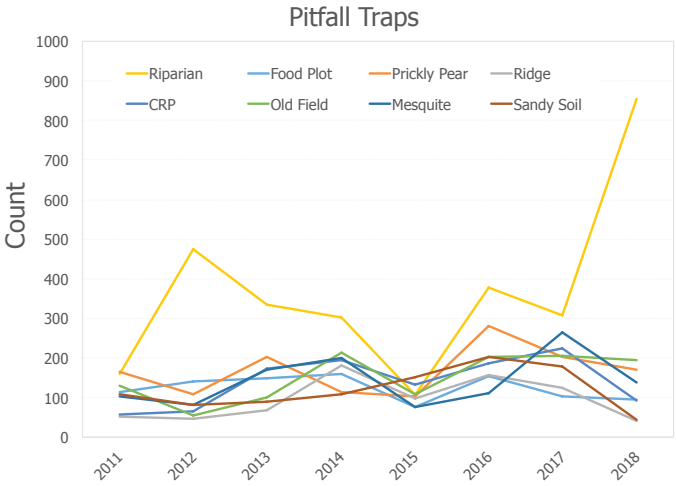
# ARTHROPOD DYNAMICS

## AT RPQRR

Arthropods (e.g., insects) are a source of protein, moisture, and essential amino acids required for egg laying, feather production, and growth of nesting hens and chicks. During July, we conduct annual arthropod surveys to estimate the relative abundance of arthropods across 8 ecological sites on the ranch. Pitfall arrays and sweep-nets are used to sample arthropod abundance and diversity at 2 micro-scales. Pitfalls tend to represent communities of ground-dwelling arthropods (e.g., beetles) whereas sweep-nets tend to represent arthropod communities preferring the canopy of herbaceous plants. Five pitfall arrays consisting of 6 traps are checked 3 times at 3-day intervals within each ecological site. Four replicates of sweep-netting occurs at each pitfall array. All arthropods are dried, counted, and recorded by Order. The relatively high number of arthropods in the riparian area pit-fall traps is due to a large number of pill bugs trapped at that site.




***Sweep net insect counts in 8 ecological sites.***




***Pitfall trap insect counts in 8 habitat types.***

"CENSUS IS THE YARDSTICK OF SUCCESS."

**A. LEOPOLD**

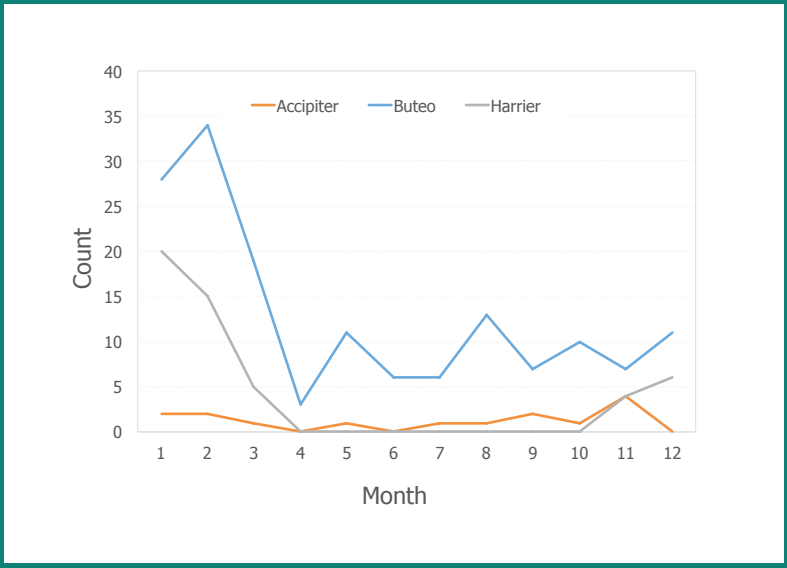
# RAPTOR POPULATIONS

## AT RPQRR

Raptors typically account for 20-40% of our "identifiable" mortalities of quail. Predation by raptors is typically greatest from October-April when the Ranch is inhabited by migrating raptors, or winter residents. We conduct raptor counts twice weekly along the two "Texas Quail Index" (TQI) routes which consist of driving along 20 miles across the Ranch and counting all "quail-threat" raptors (e.g., northern harrier, buteos [e.g., red-tailed hawk], and "accipiters" [e.g., Cooper's hawk]); we do not count kestrels ("sparrow hawks"). We acknowledge a bias in our roadside surveys towards buteos (a positive bias) and against accipiters (a negative bias because of their secretive nature).

Buteos (especially red-tailed hawks) were our most commonly sighted raptors. Resident red-tailed hawks are our most common hawk. While they do prey on quail, they are less of a threat than harriers and accipiters.

Sightings of harriers were most common during January-February, but we did not detect a seasonal increase in October-December 2018. Harriers tend to "shop with their wings" and the low availability of small mammals and quails may have influenced their migration pattern in our area. Sightings of Cooper's hawks are low across the year, but again our methods are biased negatively towards accipiters.




***Summary of 2018 raptor counts at RPQRR.***

*Adult male harrier hawk carrying its bobwhite quail prey. Notice the leg band on the quail. Photo credit: Casey Weissburg*

# HABITAT MANAGEMENT ACTIVITIES

*Disked and planted strips in one of the CRP fields at RPQRR. These strips increase usable space for quail in the CRP fields.*

# FOOD PLOTS

For food plots to be effective, food must be a limiting factor on the landscape for quail during the time that the plots are producing food. The strongest bobwhite populations in the state of Texas occur in semi-arid environments (e.g., South Texas, Rolling Plains) dominated by El Niño/ La Niña weather patterns. Food plots for quail in these environments are typically governed by the irony that "when we need them, we can't grow them; and when we can grow them, we don't need them."

However, there are situations where food plots for quail may be advantageous. A prominent management philosophy is to increase abundance by increasing usable space. At RPQRR, we use this concept and food plots to manage Conservation Reserve Program (CRP) fields recently withdrawn from the program. The CRP fields at RPQRR are dominated largely by kleingrass. Left undisturbed, this non-native grass species limits forb production. Brush cover is also limited because of the program requirements. As such, planting strips between terraces serves to increase bare ground, plant diversity, and screening cover. The plots within the CRPs are planted to a mix of wheat and hairy vetch, milo, or sorghum almum. In addition to planting in the former CRP fields, we plant food plots with the same combination of plants near the headquarters for demonstration purposes and to provide dove hunting opportunities.

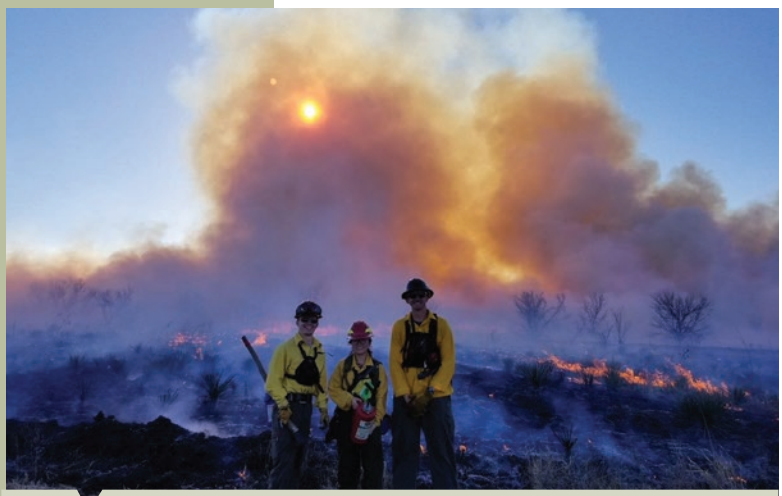
Food plots for 2018 were disappointing because of low rainfall. The cool-season mix of wheat and hairy vetch was a total failure (first time we have ever witnessed a complete bust on winter wheat). The dry fall/winter also meant no sunflowers resulting from our soil disturbance. With a La Niña weather pattern forecasted to persist through the summer, we opted for browntop millet for our summer food plots because of its short maturation date (65 days). Even then, our summer food plots were discouraging. Our stands of browntop millet were sporadic and seed yield was low going into September. There were no mourning doves harvested in September-October and recon of the fields this fall suggest low use of the food plots by quail to date. Winter food plots (planted in September) were planted to wheat and hairy vetch and thanks to record October rainfall, these plots look promising as of December.

*Planting food plots at RPQRR.*

# PRESCRIBED BURNS

Rangeland ecosystems across the West evolved with fire. As a result, the native plant species are not only well-adapted to withstand fire, but it is also often critical to maintaining plant diversity and vigor over the long term. Fires also serve to limit brush encroachment. Our Rolling Plains Ecoregion rangeland is no exception. Most rangeland ecosystems have been under a fire suppression management regime to the detriment of their overall health. At RPQRR, we have reintroduced fire to the landscape as part of our comprehensive land management plan. We burn approximately 10% of the property per year when conditions (i.e. rainfall) permit. In 2017, we established fire plots to study the impacts of seasonal burning over time.

*A prescribed fire encroaches on "Mammary Mountain" at RPQRR during a March 2018 burn.*



*Students in a Texas Tech University Prescribed Fire class pose at the end of a long, but successful day on the fire line.*

# PRICKLY PEAR REDUCTION

Prickly pear is beneficial to quail throughout their entire life history. Quail hens, particularly Scaled Quail, select nest sites in grasses protected by prickly pear. As a nesting substrate, prickly pear can offer a slight advantage for nesting success as it acts as additional concealment and mechanical protection from predators. Quail also make use of the fruits or "tunas" in their diets when they are ripe, as do many wildlife species. Large prickly pear can serve as midday loafing cover or protection from overhead predators. However, despite its many advantages, anyone who has ever hunted quail in West Texas can tell you it's possible to have too much of a good thing. When managing quail habitat, we strive for "huntability" as well as habitability. Certainly having too much prickly pear can decrease "huntability" for bird dogs. Ecologically, having too much of one species decreases in overall plant diversity.

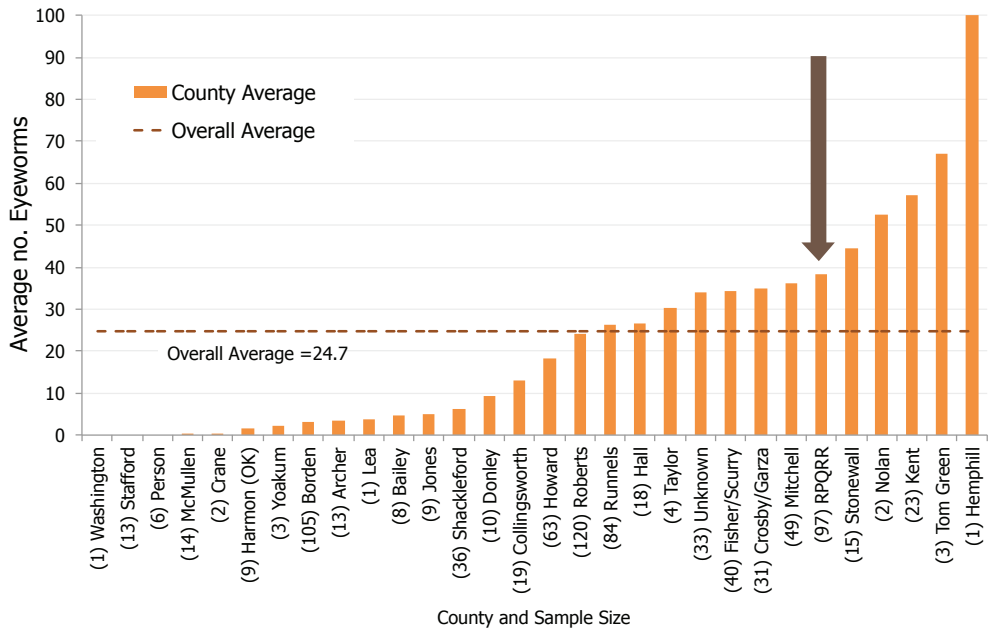
Over the last ten years at RPQRR we have begun to address prickly pear density. Our methods include prescribed burning (warm and cool season), herbicides, and integrated methods (e.g. roller-chopper plus herbicide). Many of these projects involved a collaboration with Corteva AgriSciences (formerly DOW AgroSciences). In 2018, we continued that collaboration. We treated 116 acres with two different herbicides: MezaVue and Tordon 22K.

*A pair of bobwhites makes use of prickly pear as cover during early morning feeding.*

# RPQRF PARASITE SURVEILLANCE

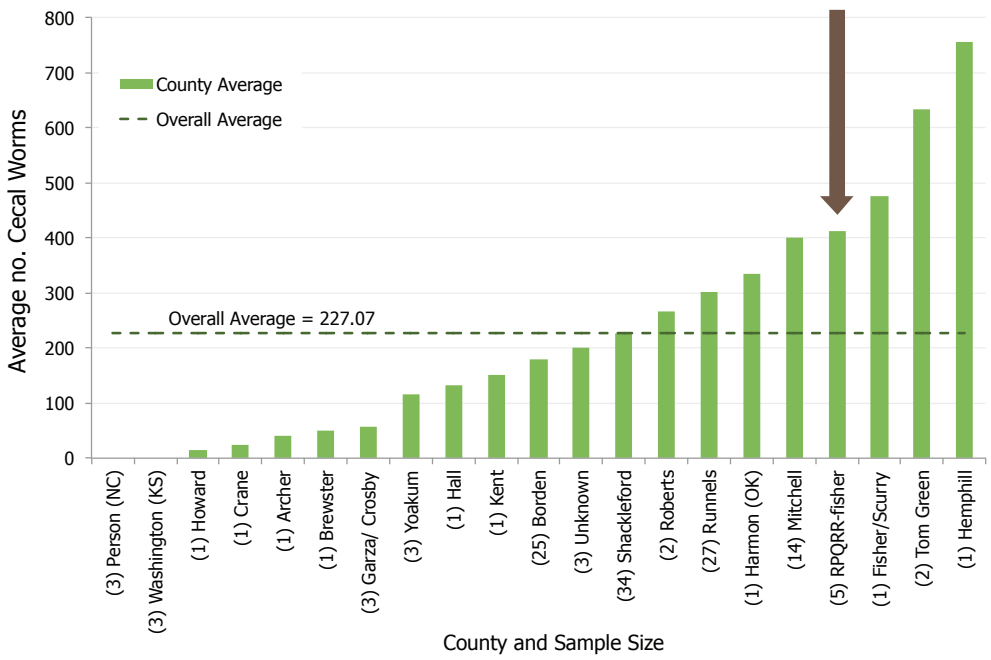
## ANNUAL SURVEILLANCE

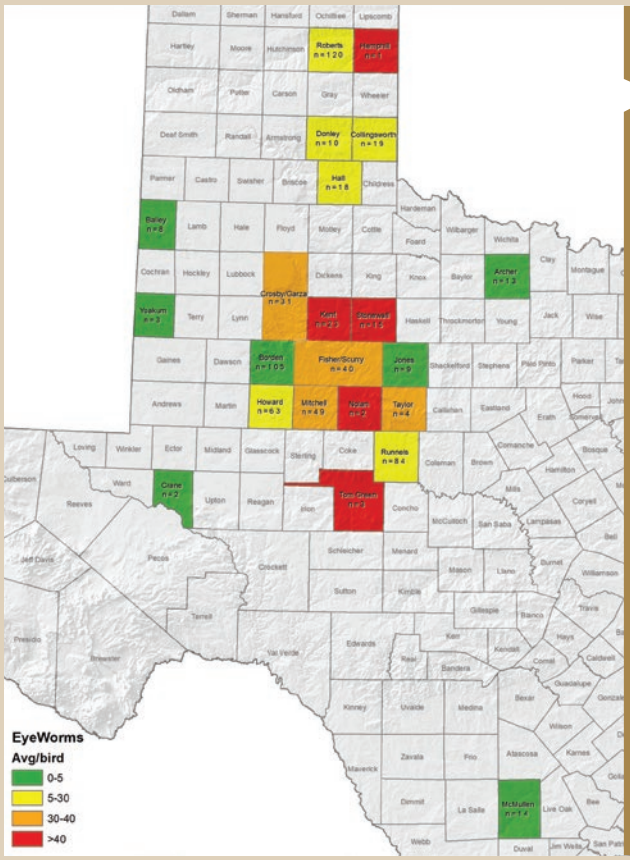
In 2018, we initiated a statewide quail parasite monitoring program. We solicited harvested quail (both bobwhites and scaled quail) head and whole body samples from hunters. This project was precipitated by the overall lack of large-scale temporal and spatial data on parasite infection rates in quail. When we initiated, Operation Idiopathic Decline (see www.quailresearch.org for more information) it was the largest disease research project ever conducted for quail, but we were only able to sustain those intensive efforts for 3 years. This study is less intensive, however we intend to keep and maintain a database of passively collected samples (i.e. collected by you, the hunter) that will allow us to monitor changes in parasite prevalence and infection rate in quail over time. This will ultimately inform us (and you) on how changes in parasite could be related to abundance of quail or what extrinsic factors drive parasite infection rates, prevalence, and intensity. Please consider contributing your hunter-shot birds to our monitor efforts. For more information, visit www.quailresearch.org.




*Eyeworm infection intensity (average number of eyeworms per bird) by county. RPQRR results indicated by arrow.*

*Caecal worm infection intensity (average number of worms per bird) by county. RPQRR results indicated by arrow.*



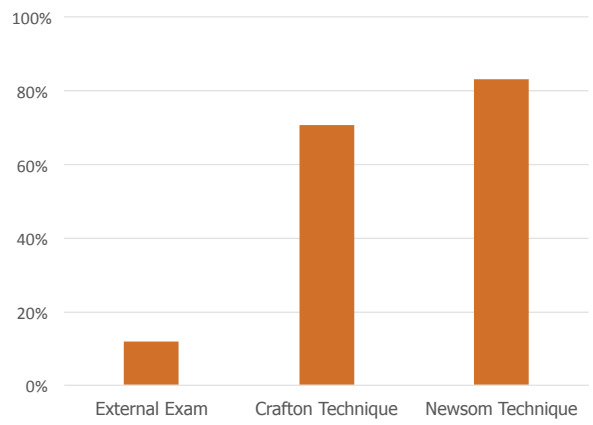




*Quail eye-worm infection intensity by county in 2018.*

## COMPARISON OF DIAGNOSTIC TECHNIQUES

Scientifically diagnosing the presence of eyeworms in quail requires a full necropsy. However, we were interested in determining the effectiveness of two less intensive methods that hunters could employ in the field to assess the prevalence of infection in the birds they harvest. We compared two techniques, dubbed the Crafton and Newsom methods, to a cursory external exam and a complete necropsy. We assumed that the complete necropsy was 100% accurate and then calculated the percent of the infected sample that each technique detected. The accuracy of the Crafton Technique was 70.6%. The Newsom Technique was 12.5% more accurate at detecting worms than the Crafton Technique (83.1% overall accuracy). External examinations resulted in a 12% detection rate.

*Comparison of 3 techniques for assessing eyeworm infection rate in quail. Number of infected quail was compared to full necropsy results.*



# RPQRF TRANSLOCATION RESEARCH INITIATIVE

Since 2013 one of RPQRF's major research initiatives has been translocation research. Our goal is to improve the effectiveness of translocation as a management tool to reestablish wild quail populations.

The gradual declines of Northern Bobwhites and Scaled Quail have resulted in local extinctions and isolated pockets of quail populations throughout their historic range. Even where quality habitat exists, anthropogenic and climatic factors can limit dispersal and prevent effective natural recolonization. Translocation has been used to successfully reestablish populations of many different gamebirds, including bobwhites in the Southeastern U.S. As such, RPQRF began researching the utility of translocating wild quail from healthy populations to reestablish populations in areas where suitable habitat still remains or has been restored. We have conducted three translocations each of bobwhites and scaled quail (Table 1).

Early efforts on bobwhites in Shackelford County (Downey et. 2017) and scaled quail in Fisher County (RPQRR) focused on the short-term feasibility by documenting vital rates and monitoring relative abundance. Both translocations documented vital rates within published ranges for bobwhites and scaled quail. Downey et al. 2017 failed to show an increase in relative abundance of bobwhites, but in Fisher County we documented an increase in scaled

*Michelle Downey releases one of the first bobwhites translocated as part of RPQRF's Operation Transfusion research initiative in Shackelford County, 2013. Michelle completed her M.S. with Caesar Kleberg Wildlife Research Institute and RPQRF in 2015. Her thesis was an evaluation of translocation for bobwhites in the Rolling Plains.*

quail abundance post-translocation. Following those efforts, we facilitated translocations of scaled quail in Cottle County (Matador WMA) and bobwhites in Stephens and Palo Pinto Counties. The focus of these translocations was to compare soft vs. hard release strategies. This was based on the success of soft-release scaled quail at RPQRR and evidence in the translocation literature that social species may benefit from a soft-release through increased site fidelity. In Stephens County, survival of soft-released hens was slightly greater than hard-released and more comparable to a sample of resident hens radio-collared during the same time interval, but was not statistically different from either. We were unable to assess the effects of release strategies in Palo Pinto County because all radio-collared hens dispersed off site. We continued research on release strategies for scaled quail in Knox County by varying the length of holding time from 1 to 9 weeks to determine optimal holding period in terms of maximizing survival and site fidelity. We also incorporated the effect of source populations (i.e. Rolling Plains vs. Edwards Plateau) into our assessment.

Our current efforts, including a new translocation project in Erath County, are described in more detail in the following abstracts.

Monetary support for our translocation work has come from a variety of generous sources:

- Quail Coalition: Park Cities, Cross Timbers, and Big Covey Chapters
- Reversing the Quail Decline in Texas Initiative and the Upland Game Bird Stamp Fund (based on a collaborative effort between Texas Parks and Wildlife Department and the Texas A&M AgriLIfe Extension Service)
- Berryman Investments
- Dan Bolin
- Circle Bar Ranch of Truscott, TX
- Stan Kimbell
- Jones Family
- Quahadi Ranch
- Brad Ribelin
- Tarleton State University
- West Texas Chapter of the Safari Club International

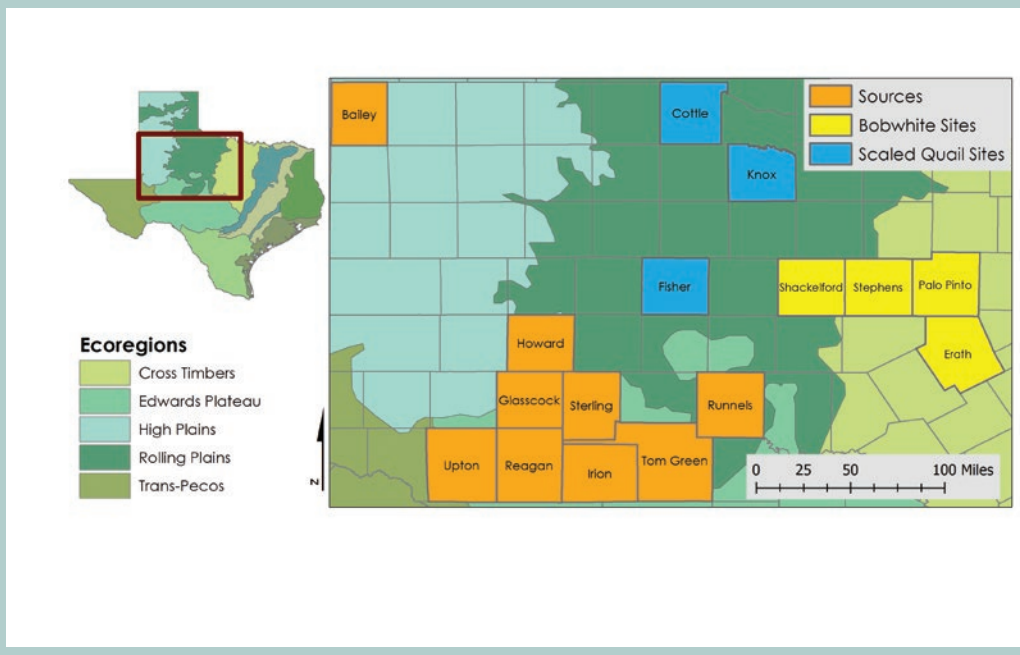



**Table 1**

*RPQRF translocation study sites in the Rolling Plains and Cross Timbers ecoregions, 2013-2018.*

# TRANSLOCATION OF NORTHERN BOBWHITES TO ERATH COUNTY

**John Palarski and Heather Mathewson**
Tarleton State University, Stephenville, TX

**Dale Rollins**
Rolling Plains Quail Research Foundation, Roby, TX

Objective: This project seeks to evaluate the feasibility of translocation to reintroduce wild bobwhites to suitable, but often isolated habitat in the Cross Timbers ecoregion and further refine the effectiveness of translocation efforts.

Northern bobwhite decline has been apparent across much of its former range. Within the Cross Timbers ecoregion of Texas, similar declines have been observed. Isolated populations of bobwhites remain; however, natural recolonization may not be sufficient in revitalizing them. We plan to trap and translocate 100-200 bobwhites per annum for two consecutive years. Translocated bobwhites will be sourced from healthy populations in western Texas and released on a 2,500 acre ranch in Erath County near Desdemona, Texas. We will radio-mark and release approximately 50-75 hens per annum to monitor movement and vital rates (e.g., survival, nest success, etc.). Ideally, we hope to see a strong performance in demographic rates, as well as increased populations post-translocation. This project is part of a larger, collaborative effort to rejuvenate bobwhite populations further east in Texas, and to "link up" existing populations in this region. Findings from this study will also aid managers who wish to restore bobwhite populations via translocation.

*John Palarski, Tarleton State University master's student, holds a female bobwhite trapped at RPQRR.*

# EFFECTS OF SOURCE POPULATION AND RELEASE STRATEGY

## ON MORTALITY AND DISPERSAL ON REINTRODUCED SCALED QUAIL

**Becky Ruzicka,** Rolling Plains Quail Research Foundation, Roby, TX; Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO

**Dale Rollins,** Rolling Plains Quail Research Foundation, Roby, TX

**Paul F. Doherty, Jr.,** Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO

Objective: The objective of this research project was to test the effect of two potential translocation protocol decisions, soft release strategy and source population, on wild-caught scaled quail mortality and dispersal.

Declines of scaled quail (*Callipepla squamata*) as a result of habitat fragmentation have been well documented in the last 25 years and translocation has been increasingly implemented as a means to reestablish populations. Yet translocation success remains variable and factors contributing to success are often poorly understood. We tested hypotheses concerning the influence of source population and variation in delayed release strategy (1-9 weeks) on mortality and dispersal of wild-caught, translocated scaled quail. We trapped and translocated scaled quail over two years (2016-2017) from source populations in the Edwards Plateau and Rolling Plains ecoregions to a large contiguous (>100,000 acres) release site in Knox County, Texas. We evaluated hen survival and dispersal as a function of release treatment, source population, age, release location, and year using a multi-state model that incorporated state uncertainty. We found no effect of source population on mortality and dispersal. Quail with longer release treatments had higher mortality, but lower dispersal rates. Future reintroduction efforts should be cognizant of source population and the effect of release strategy on the balance between mortality and dispersal.

# EVALUATING SCALED QUAIL TRANSLOCATIONS USING GENETIC INFORMATION

**Becky Ruzicka,** Rolling Plains Quail Research Foundation, Roby, TX; Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO

**Dale Rollins,** Rolling Plains Quail Research Foundation, Roby, TX

Objective: Our goal is to evaluate the success of the reintroduction of scaled quail at RPQRR by assessing the level of translocated quail genetic introgression into the current population.

RPQRF translocated 89 wild-caught scaled quail to RPQRR from 2013-14. Prior to translocation, each abundance monitoring technique (e.g. call counts, roadside counts, helicopter surveys, and trapping) employed by RPQRR since 2008 documented the decline and eventual disappearance of scaled quail from the property. Post-translocation, each of these monitoring tools showed a successive increase. However, it is unclear whether the resurgence of quail populations was due to translocation efforts or the influx of immigrating individuals from off site.

Many studies have assessed the genetic contribution of translocated individuals or source populations to the current population on the release site as a method to evaluate the impact of a translocation. Recent advances have made genetic tools more accessible and cost-effective. Thus, the practicality of these approaches for monitoring and evaluation purposes has improved. We will compare the genetic characteristics of the birds translocated into the area with a large sample of birds from the current population. This will allow us to assess whether the current population is the result of reproduction only among translocated quail or whether there is introgression from either resident birds not detected before the translocations took place, or birds immigrating from neighboring populations. This research can also provide framework for evaluating the impact of future bobwhite and scaled quail translocation efforts.

*A blue in hand: this juvenile scaled quail (a.k.a. blue quail) was captured at RPQRR this fall. A small sample of its breast feathers will be included in the genetic analysis.*

# HABITAT DRIVERS OF SCALED QUAIL COLONIZATION AND EXTINCTION POST-REINTRODUCTION

## IN THE ROLLING PLAINS ECOREGION OF TEXAS

**Becky Ruzicka,** Rolling Plains Quail Research Foundation, Roby, TX; Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO

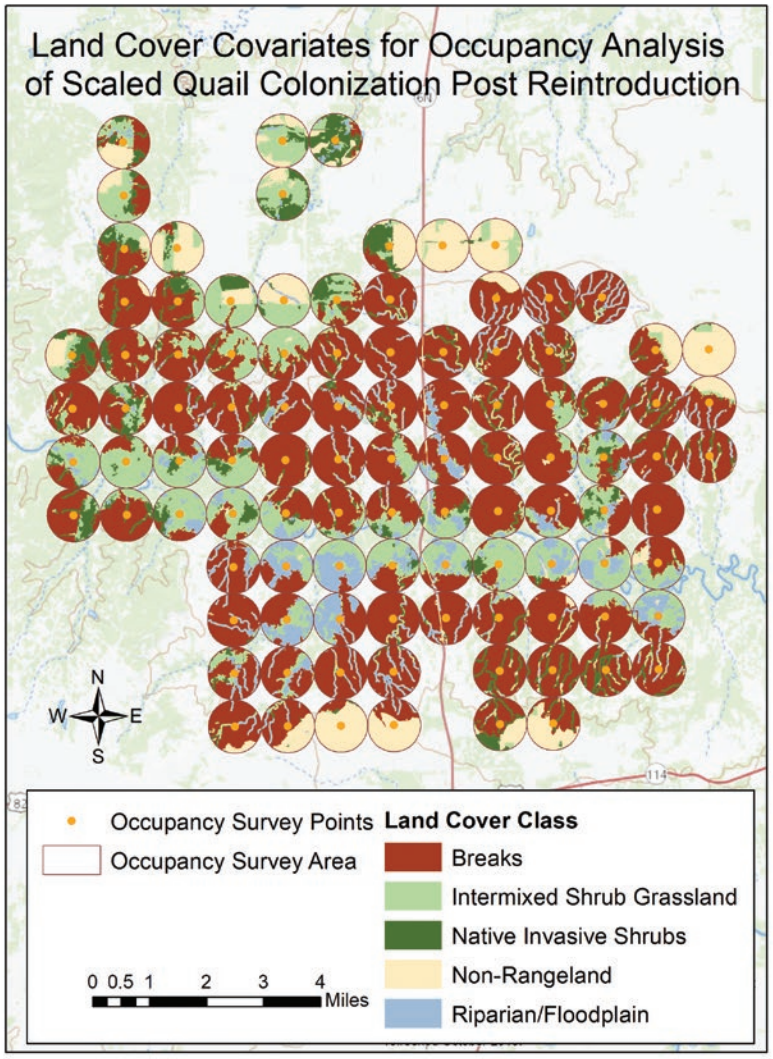
**Dale Rollins,** Rolling Plains Quail Research Foundation, Roby, TX

Photo: Kegan Crouch

Objective: Our primary objective is to evaluate how landscape-level habitat characteristics influence colonization and extinction of a reintroduced scaled quail population in a large landscape. Specifically, we would like to know: a) which land cover classes (based on a combination of soil, hydrology, and land use) and, b) brush densities maximize the probability of patch colonization post-reintroduction and minimize the probability of patch extinction.

For translocation to be a viable management tool in the future, biologists must be able to determine the suitability of habitat a priori and, thus, the likelihood of successful establishment. Although literature exists describing general scaled quail habitat preferences, few studies provide specific thresholds and no studies are explicit to the Rolling Plains Ecoregion. Monitoring dispersal of reintroduced populations increases understanding of preferred habitat. Therefore, reintroduction efforts in the Rolling Plains present an opportunity to increase understanding of habitat preference, which may be used to guide future reintroductions or habitat restoration.

Once per year from 2016-2018, we collected presence-absence data on Scaled Quail at 72 points on a 1500 x 1500 m grid across the study site. Each point was surveyed 3 times per year over a 10-day period to be able to assume closure. We used the Texas Ecological Systems Classification in GIS software to categorize land cover on the study site. The land cover covariates generated from that GIS analysis will be used to describe changes in occupancy post-release.


Land Cover Covariates for Occupancy Analysis
of Scaled Quail Colonization Post Reintroduction
N
W
E
S
Occupancy Survey Points
Occupancy Survey Area
0 0.5 1 2 3 4
Miles
Land Cover Class
Breaks
Intermixed Shrub Grassland
Native Invasive Shrubs
Non-Rangeland
Riparian/Floodplain

# COLLABORATOR RESEARCH AT RPQRR

Every year at RPQRR, we collaborate with many different researchers and graduate students at institutions across the state of Texas and beyond. RPQRR is a living laboratory for more than just quail research. Over the years we have facilitated research on monarch butterflies, horned lizards, road runners, raccoons, coyotes, and more!

**If you are interested in an opportunity to use RPQRR as a study site, contact Dr. Dale Rollins (drollins@quailresearch.org).**

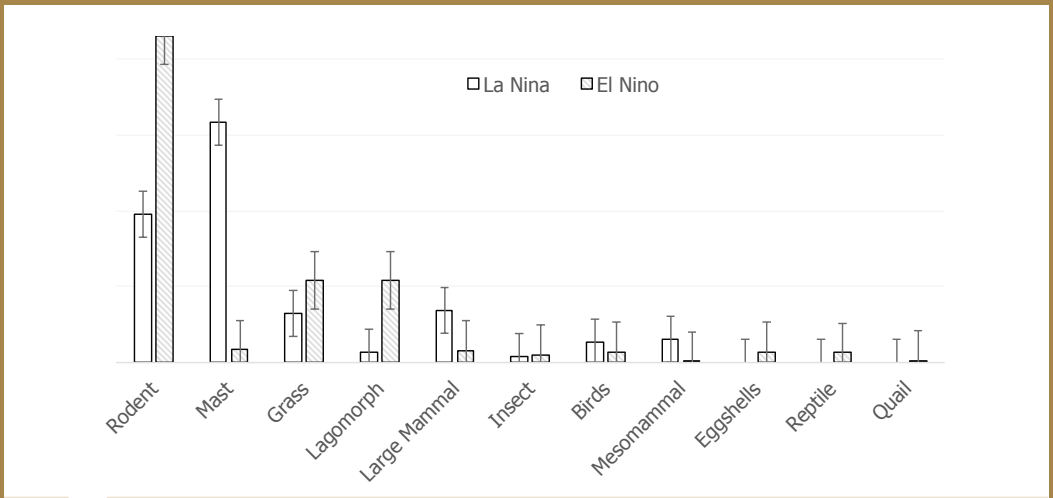
# EVALUATION OF COYOTE DIETS DURING EL NIÑO

## VERSUS LA NIÑA WEATHER CYCLES

**Cade Bowlin, Phil Gibson, John Baccus,** Texas Tech University, Lubbock, TX

**Dale Rollins,** Rolling Plains Quail Research Foundation, Roby, TX

The objective of this study was to evaluate coyote diets on a landscape dedicated exclusively to maximizing production of northern bobwhite and assess whether coyotes are important predators of bobwhites and their nests during El Niño versus La Niña weather cycles. Predation has been known to be the primary proximate cause of bobwhite mortalities from nesting to adulthood. Coyotes, raptors, fire ants, and other predators have also been attributed with the population decline of bobwhites. In order for quail and predator managers to make sound management decisions, a deeper understanding of coyote-quail dynamics is required. Coyote scats were collected monthly on the Rolling Plains Quail Research Ranch, Fisher County, Texas during a La Niña weather pattern (Tyson 2012, n=356 scats, 2011) and also during an El Niño weather pattern (Bowlin 2018, n=480 scats, 2015-2017). Scats were analyzed using micro- and macroscopic techniques to identify food items present. During all three years of the La Niña collection period, precipitation was below 30-year mean with 2011 one of the hottest, driest years in Texas recorded history. The El Niño period that was in place across the Rolling Plains during 2016 resulted in above average rainfall and record abundance of bobwhites on RPQRR. Abundance of bobwhites varied greatly between the 2 study periods (0.13 bobwhites/ha in 2011 vs. 2.3 bobwhites/ha in 2016). No quail remains or remnants of eggshells were identified in coyote scats collected during the La Niña period. Only 3 scats (<1%) collected during the El Niño period contained quail vestiges and 14 scats (2.9%) contained eggshells. Mast (e.g., prickly pear, mesquite) was especially important during La Niña, but not El Niño coyote diets. Diets of coyotes during the 2016 period were dominated by cotton rats. These results show that coyotes were not important predators of quail or their nests irrespective of quail abundance. As such, through proper habitat management techniques and favorable environmental factors, quail production can be maximized in the presence of coyotes. Quail management should focus on proper habitat management primarily and predator management secondarily.




*Percent of coyote scats containing prey categories collected monthly on the Rolling Plains Quail Research Ranch, Fisher County, Texas, during La Niña (2011, n=356) and El Niño (2016, n=360) weather patterns.*

# COYOTE DIET STUDIES DURING A PERIOD OF MODERATE TEMPERATURE AND MOISTURE CONDITIONS

**Hong Seomun, Melody Harrington, Philip Gipson, John Baccus:**
Texas Tech University, Lubbock, TX

Objective: Since April 2018, we have utilized non-invasive techniques to determine seasonal diets of coyotes in relation to availability of animal and plant foods on the Rolling Plains Quail Research Ranch. Our findings, conducted during a period of moderate temperature and moisture conditions, are compared to those of an extreme La Niña period 2009-11 (Tyson 2012) and during an El Niño period 2015-17 (Bowlin 2018).

The foods eaten most commonly by coyotes during the La Niña period included cotton rats and mice with prickly pear and mesquite seeds next in importance. During the El Niño period, rodents were again the most important food category including cotton rats, wood rats, and mice. Plant tissue, including mesquite beans, and prickly pear tunas were also eaten. Coyotes did not appear to be important predators of quail during the La Niña and El Niño periods.

Food remains in coyote scats that we collected from April through November 2018 contained both animal and plant tissues. During April and May coyote scats contained mostly the remains of small mammals and beetle exoskeletons. A shift from predominately animal remains began in June when the first ripening mesquite beans were observed. Mesquite beans continued to be common in scats through early July. The frequency of mesquite beans declined from mid-September and their last observance was in October. Seeds from prickly pear tunas were first observed in scats

during July. From August through October prickly pear seeds were the most frequently observed food remains in coyote scats. The frequency of prickly pear seeds in scats declined during November. In October we observed seeds of Bumelia in coyote scats and they were more common in scats during November. Plant remains were observed more often than remains of small mammals and rabbits in coyote scats during summer and fall 2018.

We monitored the availability of fruits from April through November and there was a high level of correlation between fruit and mesquite bean availability and their consumption by coyotes. These findings suggest that coyotes may take advantage of abundant fruit and mesquite bean availability and concurrently reduce consumption of small mammals and other animals.

It is noteworthy that we have found a higher level of consumption of plant fruits and seeds during our more moderate moisture and temperature conditions than was noted in either the previous La Niña or the El Niño periods. Perhaps this reflects a greater abundance of fruits during periods of moderate weather and the tendency of coyotes to opportunistically feed on more easily obtained foods, as some researchers have suggested. Alternatively, the diets of coyotes, during the previous La Niña and El Niño periods, suggest selection of some species of small mammals and certain fruits and seeds, even when they are relatively uncommon. Our intense sampling strategy includes monitoring the availability of fruits and seeds every two weeks and concurrent collections of coyote scats in order to note precisely when each species of plant food becomes available and how long it takes for coyotes to start to use each plant food and at what point they cease to consume particular fruits and seeds. High availability of small mammals and plant fruits and seeds may contribute to minimal predation on quail.

*Mature mesquite beans are an important food source.*

*Ripe prickly pear tunas.*

*Coyote scats containing mesquites beans (L) and prickly pear seeds (R).*

# QUAIL AND RAINFALL:

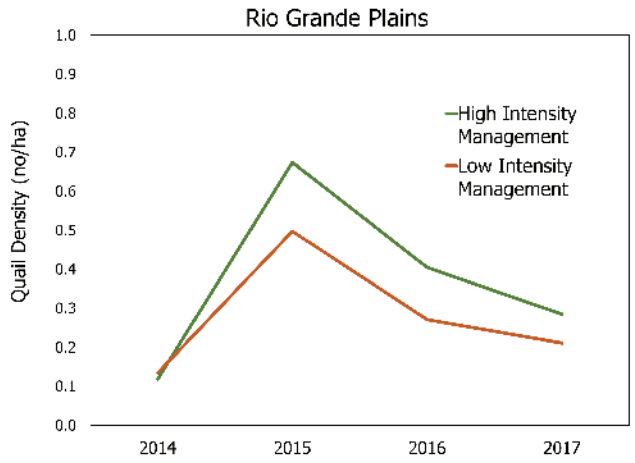
## DOES MANAGEMENT MATTER?

**Alec D. Ritzell, Fidel Hernández, Eric D. Grahmann, and John T. Edwards,** Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX

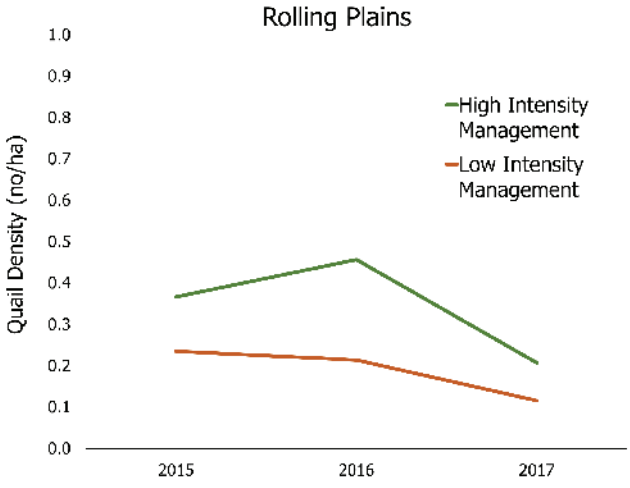
**Dale Rollins,** Rolling Plains Quail Research Foundation, Roby, TX

Objective: to evaluate the efficacy of bobwhite management at mitigating the effects of rainfall on semi-arid rangelands.

Rainfall is a strong driver of quail populations on southwestern rangelands and may account for a large portion (70-90%) of the variability in regional quail production and abundance. Landowners have attempted to modulate these boom-and-bust fluctuations via management, but presently it is unknown whether quail management indeed can increase or stabilize northern bobwhite (*Colinus virginianus*) populations on semi-arid rangelands subject to erratic rainfall. The study involves 10 ranches located in the Rio Grande Plains (n = 6 ranches; 20,000 ha total) and Rolling Plains (n = 4 ranches; 15,000 ha total) ecoregions of Texas. Quail density is being estimated on these ranches during December 2017 and 2018 using helicopter surveys and will build upon a longer-term dataset (2014-2018) of quail density. For this analysis, we categorized ranches into 2 relative categories of management intensity: low or high. Our preliminary results suggest that management may be able to increase quail density beyond that of less managed properties but may not completely eliminate the inter-annual fluctuations (Figures 1 and 2). However, this study is in-progress and conclusions cannot be drawn until project completion. Results from this research will aid landowners in determining the effectiveness of management for increasing quail abundance and reducing population variability.




***Mean bobwhite density (no/ha) in the Rio Grande Plains by management intensity, December 2014-2017.***




***Mean bobwhite density (no/ha) in the Rolling Plains by management intensity, December 2015-2017.***

# MONITORING EYEWORM AND CAECAL WORM INFECTION LEVELS IN BOBWHITES

## USING A MOBILE RESEARCH LABORATORY PLATFORM

**Kendall R. Blanchard, Kelly Commons, Cassandra Henry, Matthew Z. Brym, Aravindan Kalyanasundaram, Ph.D., and Ronald J. Kendall, Ph.D.,** The Wildlife Toxicology Laboratory, Texas Tech University, Lubbock, TX

**Dale Rollins,** Rolling Plains Quail Research Foundation, Roby, TX

Objective: to quantify and compare infection levels of eyeworm and caecal worm in the Rolling Plains Ecoregion with a mobile research laboratory.

Northern bobwhite quail (*Colinus virginianus*), a popular gamebird among hunters, have been declining over recent decades in the Rolling Plains ecoregion of the United States. Previous investigations have revealed a high prevalence of eyeworms (*Oxyspirura petrowi*) and caecal worms (*Aulonocephalus pennula*) in this area. This prevalence has been observed alongside numerous reports of bobwhites flying into objects as well as up to 100% infection in some areas of this ecoregion, prompting a need to better understand host-parasite interaction and other factors that influence infection.

In this study, a mobile research laboratory is used to detect and quantify infection levels in bobwhite from March 2018 to October 2018 at Cottle County, Garza County, and Mitchell County in the Rolling Plains ecoregion. Due to the indirect life cycle in which these parasites operate, eyeworm and caecal worm eggs are expelled through infected bobwhite feces, consumed by an insect intermediate host where they develop into larvae and are once again consumed by the bobwhite. Therefore, cloacal swabs and feces were collected from bobwhite at each field site. DNA from feces was then extracted and run using highly specific and accurate quantitative PCR (qPCR) in the mobile laboratory for non-lethal, quantitative assessment of infection via parasite egg presence.

Results indicate a decline in bobwhite this year compared to last year which is consistent with our trapping efforts. Furthermore, statistical comparisons also indicate a significant increase in eyeworm and caecal worm infection between 2017 and 2018 in addition to significant differences in infection among field sites.

Based on these results, the mobile laboratory is an effective way to monitor infection levels for future treatment methods in addition to assessing factors that may influence infection such as climate, diapause, and intermediate host populations.


*Mobile laboratory used to detect and quantify parasite infections in wild quail.*

*Processing samples in the mobile laboratory.*

# MITIGATION STRATEGIES FOR THE MONARCH BUTTERFLY

**Matthew Brym, Cassandra Henry, Ronald J. Kendall,** Ph.D.,
Wildlife Toxicology Laboratory, Texas Tech University,
Lubbock, TX

Objective: to enhance conservation of the monarch butterfly (*Danaus plexippus*) through restoration of breeding and migratory habitat in West Texas.

Monarch butterflies (*Danaus plexippus*) are an iconic species that have been experiencing a dramatic population decline over the past 20 years according to the US Fish & Wildlife Service. The primary reason cited for this decline is loss of habitat, particularly the loss of milkweed plants upon which monarchs are uniquely dependent. Monarchs require adequate sources of milkweed and flowering plants throughout their migration, and this is especially important as the butterflies pass through Texas. Consequently, the protection and restoration of habitat in Texas is critical to monarch conservation.

We planted several species of native milkweed, such as antelope horn milkweed (*Asclepias asperula*) within plots at the Rolling Plains Quail Research Ranch (RPQRR) to serve as breeding habitat for monarchs. These plots were also seeded with a variety of native flowering plants to provide food for migrating monarchs. Plots are being monitored for utilization by monarchs during both the spring and fall migrations. Additionally, we are monitoring native stands of milkweed at the RPQRR to get a better idea of how monarchs are using milkweed resources in West Texas. We appreciate the financial support provided by BASF to make this work possible. Researchers have cited loss of monarch breeding and migratory habitat as major factors

*Fifth instar monarch caterpillars feeding on a broadleaf milkweed at RPQRR.*

contributing to the decline of these butterflies. Some estimate that approximately 1.6 billion milkweed must be added to achieve conservation goals for monarchs. Consequently, the wide scale restoration of monarch habitat across their range, particularly in critical areas like Texas, may be necessary for effective conservation of this iconic species. Our documentation of monarchs utilizing both restored and native habitat illustrates the potential of such initiatives to help offset the threat of habitat loss, and may encourage further expansion of these efforts.

Research into habitat restoration for monarchs will allow for the development of best practices that can be used by landowners and land managers interested in monarch conservation.

*Monarch butterfly feeding on Texas gayfeather at RPQRR.*

# MONITORING TEXAS HORNED LIZARDS

## IN THE ROLLING PLAINS OF WEST TEXAS

**Bradley Lawrence,** Dallas Zoo Department of Herpetology, Dallas Zoo Management, Inc.

Objective: Our goals have been to determine Texas Horned Lizard population density estimates, determine habitat preferences, and gather basic life history traits including movement patterns, environmental preferences, behavior and spatial relationship with Harvester Ants. We began preliminary data collection in the Summer of 2010 and have continued through the 2018 active season, which is typically May through October.

Once extremely common throughout their range, Horned Lizards in general are now known to be in decline. The Texas Horned lizard is no exception. It is perhaps the most threatened member of this group, with estimated population declines of greater than 30% across its range (Texas, Oklahoma, Kansas New Mexico, and northern Mexico) and even higher in its population epicenter, Texas. Populations have disappeared in East and Central Texas, and are decreasing in North Texas as well. Such across the board declines have prompted local and state governments to provide limited protection to Horned Lizards. Currently the Texas Horned Lizard is listed by Texas Parks and Wildlife (TPW) as a “Threatened Species”. This status provides limited protection by prohibiting private ownership and/or collection from the wild without a TPW permit and outright banning any related commercial activity.

Our current method of collecting data consists of road surveys or “road cruising.” The well-established system of roads at the RPQRR allows us to efficiently sample many habitats and cover many acres in a reasonable amount of time. Once spotted, the lizard is captured by hand. GPS coordinates are taken along with environmental conditions, UVB exposure, morphometric data, behavior, and potential prey interactions. The lizards are then marked with an electronic tag (PIT Tag), a tool used to determine population density through mark and recapture. In addition, we are collaborating with Drs. Dean Williams and Amanda Hale, Biology department of Texas Christian University, in their efforts to determining fine scale sex biased spatial distribution patterns of this population as well examining the overall Texas Horned lizard genetic diversity in the Rolling Plains and across Texas. This is accomplished by opportunistically taking DNA samples from captured animals with a cloacal swab.

To date we have spent over 1000 hours sampling roads resulting in close to 1900 captures. Approximately 1200 have been PIT tagged and 150 have been recaptured at least once. In addition to our normal data collection, this year we were able to have a more direct impact on the wild populations of Texas horned lizards. We brought 5 gravid female horned lizards back to the zoo. Once they laid eggs, we returned the females back to the exact location at which they were captured. All offspring hatched from these females, 46 total, were released at Mason Mountain Wildlife Management Area in conjunction with TPW. The genetics from RPQRR represent wide genetic diversity and will be part of a great “seed” project at Mason Mountain WMA. TPW has done an incredible job preparing the property for horned lizard reintroduction over the past few years. This area once supported horned lizards on its own. There is good vegetation, habitat and food source (harvester ants), and quail. Next year we hope to get more clutches from wild ranch lizards. Animals reproduced at the Dallas Zoo will be released at Mason Mountain WMA as well.

*Horned lizard hatchlings at the Dallas Zoo from RPQRR female lizards. These lizards were reintroduced at Mason Mountain WMA.*

# EXTENSION AND OUTREACH ACTIVITIES

Our mission dictates that we generate new research involving the "quail equation," but we also have a responsibility (and the desire) to share our findings with our stakeholders. RPQRF is always busy hosting various groups, from our annual field day to smaller groups (e.g., Master Naturalists). We partner with many other conservation-focused organizations including Texas A&M AgriLife Extension Service, Texas Wildlife Association, and the Quail Coalition. In addition to on-site programs, our team also travels to present to groups across the state each year. At RPQRR our ranch gate is always open, stop in for a tour! Our programs for 2018 included:

1) DALLAS SAFARI CLUB CONVENTION (JAN)
2) STATE REPRESENTATIVE DREW DARBY (FEB)
3) TPWD VIDEO CREW (FEB)
4) QUAILMASTERS CLASS (MAR)
5) TEXAS TECH'S PRESCRIBED BURNING CLASS (3 TIMES DURING MAR-APR)
6) ANNUAL FIELD DAY (MAY)
7) UPLAND BIRD CLASS FROM SAM HOUSTON STATE UNIVERSITY (MAY)
8) MIDLAND CHAPTER OF STEWARDS OF THE WILD (MAY)
9) TARLETON ST. UNIVERSITY "BUG CLUB" (AUG)
10) TPWD REGIONAL AND DISTRICT BIOLOGISTS (REGIONS I AND II) (SEPT)
11) VISITING TEAM OF KOREAN WILDLIFE BIOLOGISTS (SEPT)
12) BIG COUNTRY CHAPTER OF TEXAS MASTER NATURALISTS (OCT)
13) WILDLIFE ECOLOGY CLASS FROM ABILENE CHRISTIAN UNIVERSITY (NOV)
14) BOBWHITE BRIGADE EARLY-BIRD HUNT
15) TEXAS PARKS & WILDLIFE FOUNDATION'S HALL OF FAME DINNER
16) STEWARDS OF THE WILD - MIDLAND CHAPTER'S FALL DINNER
17) TEXAS A&M AGRILIFE'S QUAIL APPRECIATION DAYS

And check out our new website (quailresearch.org) to find:

1) NEW WEBISODES (6 NEW ONES ADDED FOR 2018)
2) FREQUENTLY ASKED QUAIL QUESTIONS (FAQQS)
3) E-QUAIL NEWSLETTER (12 ISSUES)

*The 2018 QuailMasters class gets "hands-on" experience and learning opportunities at RPQRR.*


*Sam Houston State University's Upland Gamebird Management Class learning about bobwhite habitat at RPQRR.*

# SOCIAL MEDIA PRESENCE

**FACEBOOK @RPQRR**
WWW.FACEBOOK.COM/RPQRR

**BY THE NUMBERS:**

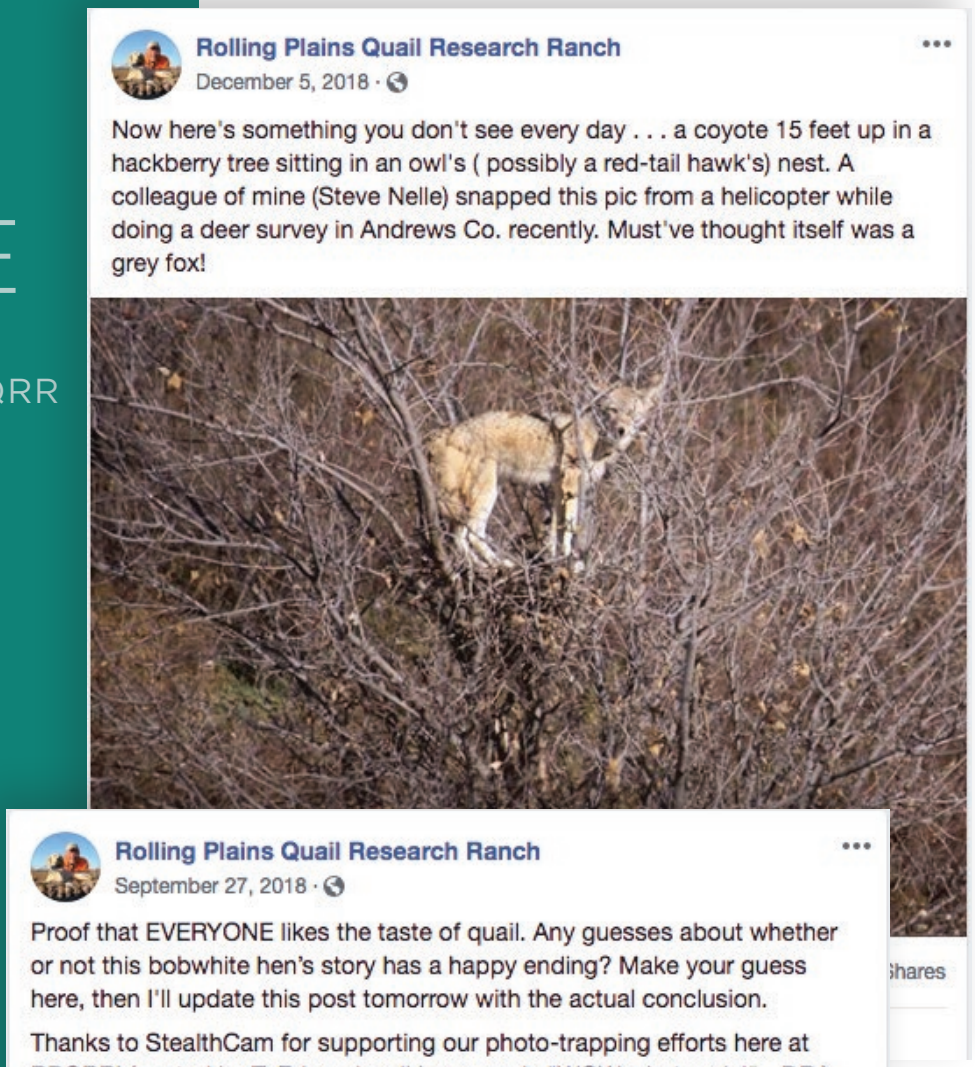
Year to Date Followers: 7,611

Total Daily Page Engaged Users: 143,204

(number of unique users who engaged with the page)

Cumulative Daily Reach: 976,716

(number of unique users who saw content)





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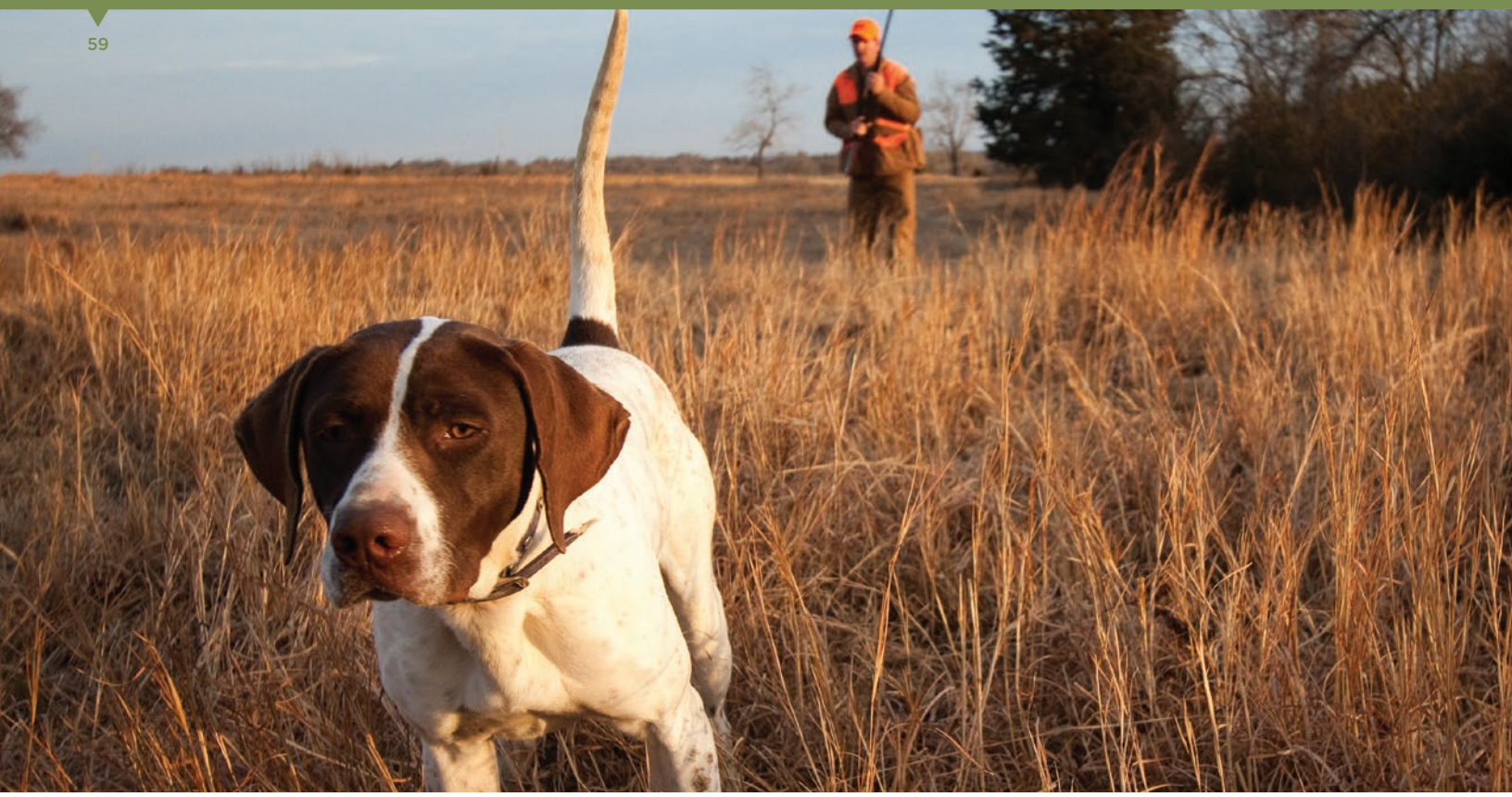

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