

QUAIL HABITAT



FIELD DAY

MAY 4, 2018

Axe, Plow, Cow, Fire, and Gun



TEXAS A&M
AGRILIFE
EXTENSION

Today marks RPQRR's 10th annual field day!

To see past field day reports, visit:
www.quailresearch.org/publications

“The central thesis of game management is this: game can be restored by the creative use of the same tools which have heretofore destroyed it - axe, plow, cow, fire, and gun. Management is their purposeful and continuing alignment.”

Aldo Leopold, *Game Management*, 1933

Topics

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- Other Topics
 - Restoring Wild Quail: Translocation Efforts of RPQRF
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 - Comparative Study of Coyote Diets

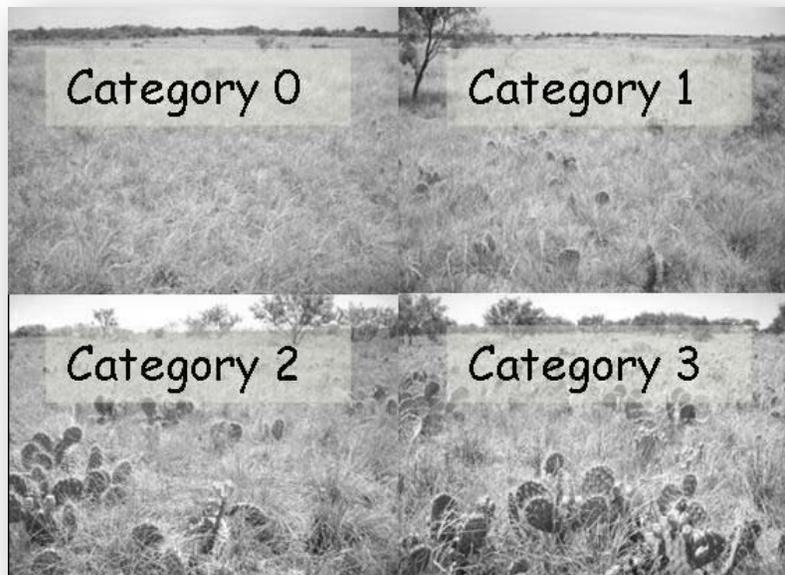
Axe

Quail-friendly Cacti Management

Dr. Dale Rollins

Cacti (*Opuntia* spp.) are a double-edged sword for quail managers in the Rolling Plains. Its presence, and often over abundance, can impact "huntability" for hunters and bird dogs. Conversely, it provides important nesting cover (i.e., "habitability") if rangelands are grazed too closely or when drought limits nesting cover (as in 2018). Perhaps 50% of the RPQRR had cacti densities that were problematic (Category 2 & 3) for hunting prior to 2010. Since that time we have addressed problematic areas with herbicides, prescribed burns (in various months), grazing practices (patch-burn grazing), roller chopping followed by herbicides, and various combinations of these tools. Our goals are to (a) minimize collateral damage to shrubs, (b) achieve satisfactory levels of control (e.g., >70% reduction), and be strategic in our areas to be targeted. Strengths and weaknesses of these various treatments will be demonstrated. Traditional dormant season burns (e.g., March) have not been effective for killing prickly pear (perhaps 30% reduction 3-yrs post-burn). Growing season burns (e.g., August) were very effective for reducing prickly pear, especially when the area was pretreated with glyphosate (July 2010). Plant succession following these burns depends on season of burn, with August burns resulting in dense (desirable from our standpoint) broomweed canopies 14 months post-burn.

Herbicide applications of Tordon or Surmount following a "good burn" (e.g., March 2010) provided >90% reduction. We have also monitored shrub response to various herbicide treatments, with or without prior burning. The most susceptible shrubs to these treatments were hackberry and wolfberry.

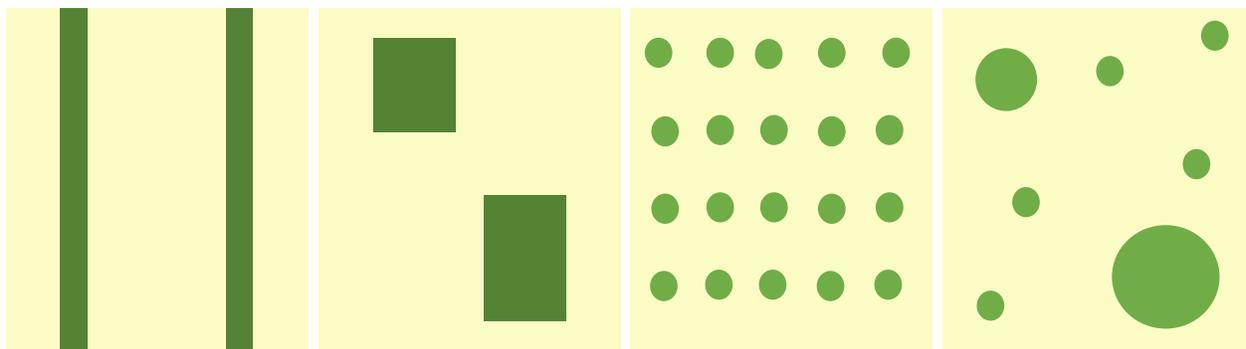


Axe

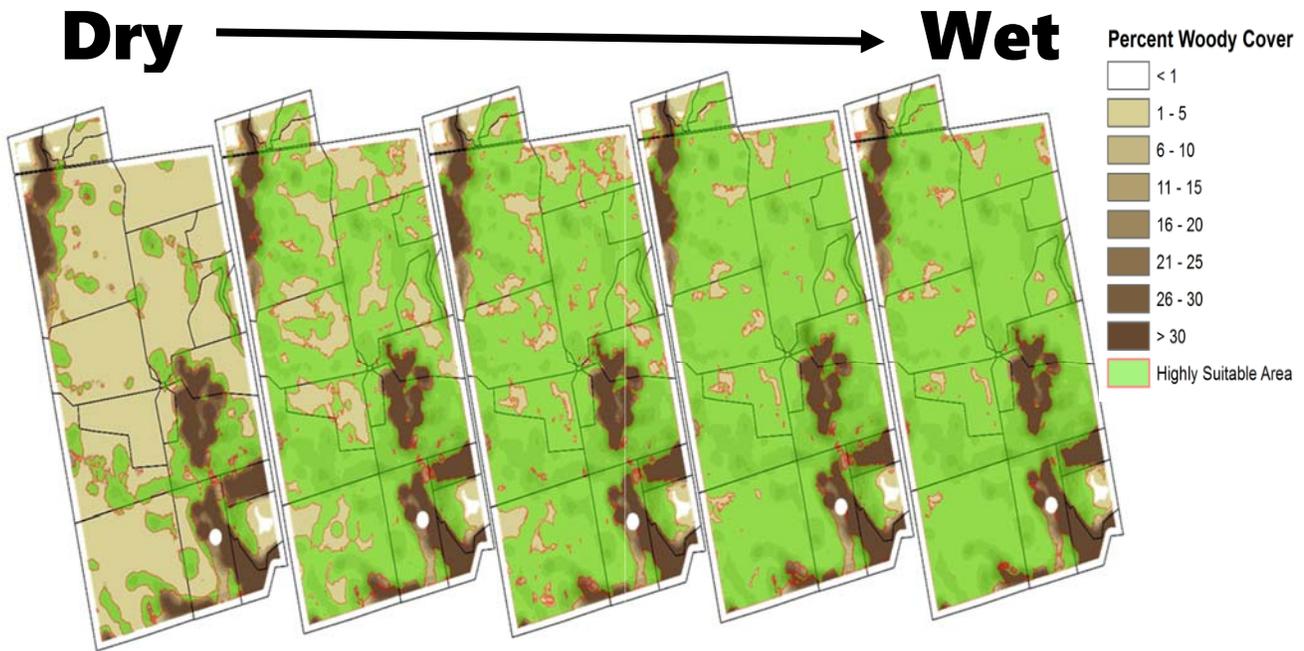
Brush Sculpting for Bobwhites

Lloyd Lacoste and Bradley Kubecka

Brush is an essential part of quail habitat in the Rolling Plains. It provides overhead and ground-level protection from predators. Brush provides thermal relief in the heat of the day and protect quail from wind and snow on blustery cold days. Many brush species also produce mast (i.e., fruits and seeds) that can be used by quail and other wildlife as a food source. Land managers want to know how much brush we should have to best manage for quail, and how the brush should be configured across the landscape. To help answer this question, we evaluated spatial shifts in habitat suitability for northern bobwhites in relation to brush density at RPQRR from 2009-2016. This span of years included dry and wet years. We defined highly suitable habitat on an annual basis by identifying areas that held 95% of the bobwhite population. We found that bobwhite habitat use constricted to areas possessing the greatest percent woody cover when conditions were driest and expanded into areas of lower percent wood cover when precipitation increased. Woody cover requirements for bobwhites varied by location and year and no single patch configuration tended to perform best, however larger and clumpier woody patches tended to be occupied by proportionally more bobwhites during dry years. Areas of dense brush may be important refugia for bobwhite populations during times of extreme drought. Managers pursuing brush management should consider 6-20% canopy cover at varying patch sizes and configurations when sculpting brush for bobwhites. The goal should be heterogeneity of brush across the landscape.



Each of these diagrams represents 20% brush cover on the landscape. But which configuration is the best? Results of our research indicates the last configuration may be the most beneficial.



These maps of RPQRR indicate percent brush cover (shades of brown) and habitat suitability index (green). In dry years, the highly suitable habitat is correlated with the areas of highest percent brush cover.



One of the areas on RPQRR that served as refugia during extreme drought conditions.

Axe

Blueprints of Quail Coverts and “Storm Shelters”

Dr. Dale Rollins

Escape cover for bobwhites is only loosely defined. It can be satisfied by dense stands of tall grasses (unusual for west TX, but common for the coastal prairie), or various shrubs and cacti with the proper dimensions. I refer to mid-day loafing coverts as “quail houses,” i.e., a shrub about the size of a Volkswagen beetle, a shrub that is dense above, but open at ground level. On RPQRR, such shrubs include agarito, littleleaf sumac, lotebush, and others. I define a “storm shelter” as a woody refugia where quail go when pursued by a raptor. Storm shelters are larger than quail houses and include catclaw acacia and brush complexes (species don’t matter too much), but a desirable feature of such structures are burrows underneath them. When we monitored how bobwhites escape from raptors, they went “underground” into burrows (became fossorial) 38% of the time. Larger clumps of tall prickly pear (*Opuntia* sp.) also afford good storm shelters. Quail houses should be available about every softball throw apart. Storm shelters should be identified before any mechanical brush control is conducted, and subsequently spared from clearing.



Learn more on YouTube. Search for the following webisode titles or scan the QR code with your smartphone:

“Quail Houses”



“Half-cutting Mesquites to Enhance Quail Cover”



“Softball Habitat Evaluation Technique”



Plow

Food Plot Plantings

Lloyd Lacoste

The most robust bobwhite populations in the state of Texas occur in semi-arid environments (e.g., Rolling Plains and South Texas Plains) which are dominated by El Nino/ La Nina weather patterns. Food plots are often ineffective in semi-arid landscapes because of the irony that *"when you need them (in dry years), you can't grow them; and when you can grow them (wet years), you probably don't need them."* Furthermore, the utility of a food plot is contingent on food being a limiting factor for bobwhites in the management area where it is planted. Food is rarely a limiting factor for bobwhite populations. But, as Dr. Rollins says *"food plots don't always work, but they rarely fail"*—the soil disturbance itself usually promotes desirable forbs.

However, a cornerstone of management philosophy is to increase the amount of useable space. If food plots are planted in an area that is not fully useable, it is possible to increase habitat quality and quantity with food plots. At RPQRR, we use this concept to manage Conservation Reserve Program (CRP) fields recently withdrawn from the program. The CRP fields at RPQRR are largely dominated by Kleingrass. Critical brush cover is limited due to the previous program requirements. We plant food plot strips between terraces to increase bare ground, plant diversity, and to provide overhead screening cover. The strips are planted with a mixture of wheat, hairy vetch, milo, and *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.



Planting food plots at RPQRR.

Plow

Seasonal Discing to Manage Plant Succession

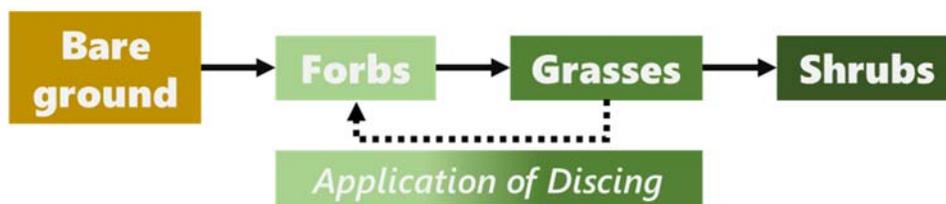
Lloyd Lacoste

Plant succession is defined as the “orderly, predictable process of change in plant communities.” In practice that means that an area of bare-ground, if left undisturbed, over time will transition to a community dominated by forbs, then to a grassland community, and finally to a community dominated by shrubs.



Seasonal discing can be used to set back succession to a lower state with more bare-ground and increased forbs in an area dominated by grass. This increased plant diversity will typically increase the amount of insects providing critical brooding habitat for chicks. Additionally, greater forb diversity and abundance increases overhead cover from predators and open space at ground level for greater mobility.

At RPQRR we experimented with discing every other month for several years to determine the best time to disc in order to get the most desirable effects. We determined that November discing provided the best stands of annual sunflowers and the best brooding habitat. The timing of the rainfall after discing maybe just as important as when the disturbance occurs. We suggest that you experiment on your property to determine what month(s) will provide the best results for you. Different soil types may require disturbance at different times, and some soils (very sandy soil) may produce unwanted results (i.e., grass burs). Creating small test plots will help you determine when discing will produce the results that you desire.



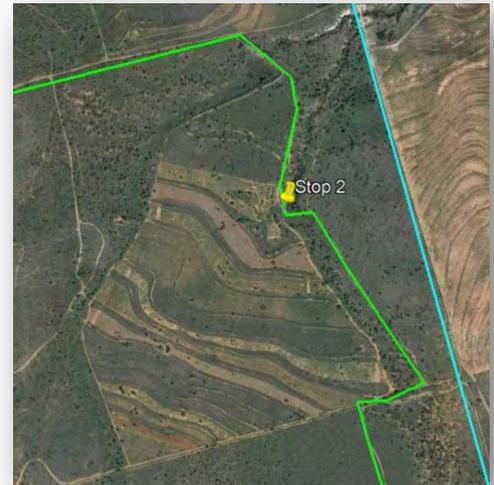
A simplistic diagram of plant succession in a Rolling Plains ecosystem. The application of discing can return the landscape from a grass dominated community to a forb dominated community.

Plow

Post-CRP Management: Creating Heterogeneity

Dr. Dale Rollins

The RPQRR has 340 acres of former Conservation Reserve Program ("CRP") fields planted originally to Kleingrass. Now, about 30 years later the Kleingrass has succeeded to a mixture of Kleingrass, silver bluestem, and other grasses (some bermudagrass and Old World bluestems). An analysis of nesting preferences in 2012 showed that bobwhites nested in CRP as to its availability (i.e., neither avoided nor preferred). However, once eggs hatched, little use of CRP by broods was noted, suggesting something (perhaps arthropods) was lacking. We did not re-enroll our contracts beginning in 2013 as we believed the ability to manipulate brush canopies above what was allowed in the CRP program would make such sites more suitable for bobwhite habitat. Thus, beginning in 2014 we began to seek methods for increasing floral diversity, and presumably useable space for bobwhites. These methods included discing (late-winter), spring burning (Feb-Mar), winter food plantings (wheat, hairy vetch), and summer food plantings (milo). We implemented these practices on a terrace by terrace basis to enhance "edge." We have also "half-cut" appropriate mesquites to serve as mid-day coverts, and conducted individual plant treatments (IPT) with the "Brush Busters" technique to sculpt the mesquite regrowth in these CRP fields. Burns were conducted during Feb-Mar 2017 and 2018. Our plantings have been mostly unimpressive because of dry weather the past two years. As time goes on, we will be able to analyze how well bobwhites use the interior portions of the CRP fields. We observed "good" use of CRP fields in 2016-17 season but "less" this past hunting season.



Cow

Patch-burn Grazing and Bobwhites

Dr. Dale Rollins

The concept of patch-disturbance has good potential for enhancing bobwhite habitat. In 2008 we initiated a patch-burn grazing regime in two pastures ("Ellie" and "Suzie") as an attempt to develop a "quail-friendly approach" to prickly pear control. Our goal was to see if grazing with cattle post-burn would increase consumption of prickly pear and result in patch-disturbance that would favor desirable plant communities for quail. We burned 2 or 3 polygons (about 10% of each pasture) and stocked cattle (Angus cows) at a stocking rate of 20 AU/hd for the period Dec – July. Two cows in each pasture were fitted with GPS collars so we could track their movements at 30-minute intervals. Cattle were attracted to burned areas immediately after burning, but little consumption of prickly pear was noted until about 14 days post-burn. The vegetation response from patch-disturbance was "excellent" from a quail's perspective, with annual sunflowers and broomweed in abundance. This experiment was terminated in June 2011 due to drought. If I was to repeat this experiment, I would burn earlier (e.g., Nov) and hope to get increased use of prickly pear by cows when other forage was less abundant. I would also try a cow with some Brahman influence to see if that increased consumption of cacti.



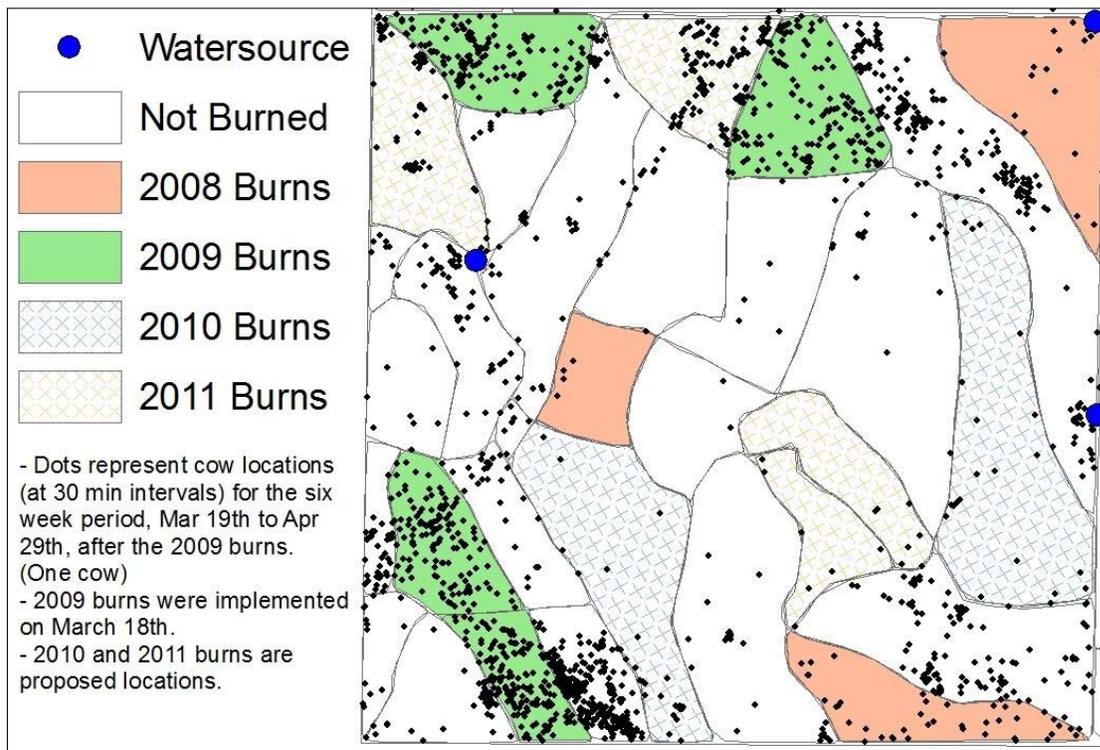
Learn more on YouTube. Search for the following webisode titles or scan the QR code with your smartphone:



*"Patch-burn Grazing
for Bobwhites"*



2009 Cow Waypoints - Six Weeks Post-Burn (Pasture1)



Cow

Cows and Quail: Where's the Beef?

Dr. Dale Rollins

Most of the quail range in west Texas is grazed by cattle. Grazing, as it relates to quail management, is a double-edged sword. On a positive note, grazing can be used to manipulate plant succession. On a negative note, much (probably most) of west Texas is overstocked for consistent quail habitat. Our objective in employing cows here at RPQRR is solely to manipulate plant succession (i.e. retard it) to enhance quail habitat. In essence, we see cattle grazing as a tool much like a tandem disc or a drip torch. This approach versus "having quail and cows simultaneously" is not the same. We are not seeking a profit by running cattle, nor are we "married" to our cattle. This ability to "put and take" (decrease stocking rate or vacate completely often on short notice) is important when contemplating the issue of cows and quail. We haven't had any cattle since June 2011, and I attribute our ability to "insulate" our quail abundance this past year in no small part to our lack of grazing. Given the variable climate in this area (mean annual precipitation of 22 inches) and that 6 of 10 years receive less than average rainfall, I consider cattle (properly stocked) to be an asset for quail management perhaps 1 or 2 years out of 10, a liability perhaps 5 to 7 years out of 10, and neutral 1 or 2 years out of 10. There are various grazing schemes, including dormant-season grazing, patch-burn grazing, and "undergrazing" (consciously reducing stocking rate by 50% or more) which permit grazing to be more compatible with quail management goals.



Cattle grazing is another tool for managing quail habitat.

Fire

Seasonal Burn Plots to Increase Forb Diversity

Lloyd Lacoste

In 1959, Herbert Lee Stoddard, the 'Father of Bobwhite Management' established 84 one-half acre fire plots at Tall Timbers Research Station (TTRS) IN Tallahassee, FL. His objectives were to evaluate the effects of fire return intervals on vegetation. For nearly 60 years, the plots have been burned systematically and serve as excellent demonstration and research plots for TTRS.

Burning in semi-arid regions, however, can yield drastically different responses based on post-burn weather conditions.

As such, the RPQRR

established 31 one-acre fire plots in West Texas. The plots will have replicates of varying fire return intervals along with paired non-burned plots. Our goal is to be able to determine fire frequencies most conducive to forb diversity in the Rolling Plains. The first two plots were burned in March 2018. We will be monitoring changes in forb diversity over successive years.



Fire test plots established at RPQRR in 2017.



Fire

Fire: A Crescent Wrench for Quail Managers

Dr. Dale Rollins

An adjustable (e.g., "Crescent") wrench is one of the handiest tools for do-it-yourselfers, be they shade-tree mechanics or habitat managers. A Crescent wrench may not be the perfect tool for all situations, but it's a good place to start. Fire (i.e., prescribed burning) is such a tool in Leopold's toolbox. Relative to quail habitat, a properly-timed burn can set back plant succession, foster quail-friendly forbs (especially legumes), promote vigor in desirable bunchgrasses, increase seed production (e.g., western ragweed), and increase arthropod abundance. Burning can also provide some reduction in prickly pear and tasajillo, especially if followed by an application of herbicide (e.g., Surmount). But "fire-return interval" (e.g., fire frequency) must be adjusted according to our climate (semi-arid rangelands). Burning too frequently could diminish availability of mid-day coverts (e.g., lotebush). The importance of fire as a tool for bobwhites increases as one moves eastward (i.e., areas receiving greater precipitation, e.g., > 35 inches annually). We have burned in nearly every month of the year over the past 10 years, but most of our burns are "dormant-season" burns (Feb-Mar).



Fire

How We Burn

Lloyd Lacoste

The first step in burning is planning. We typically choose more burn units at RPQRR than we can burn during a burn season then prioritize them in order of importance. Burn units are “polygons” utilizing our existing road system so that these 2-track or graded roads can act as fire guards.



We attempt to strategically burn the polygons based on “sensitive smoke receptors” such as US Hwy 180 and FM 611, thus we only burn units when winds will not put smoke over roads. We also burn the polygons in an order such that each previous burn gives us an additional blackened area in case of escape. That is to say, we burn the furthest north east polygon with a southwest wind first, then continue in a southwesterly direction. At RPQRR we use the Texas Department of Agriculture burn plan. Spot weather forecasts can be requested on the NOAA website, but in most cases we are in contact with them repeatedly by phone even while we are conducting the burn.

Prior to the burn, equipment should be tested to verify it is in good working condition. Maps should be made of the burn area and any hazards should be identified. We notify neighbors, Texas Forest Service (TSF), and Texas Commission on Environmental Quality (TCEQ). The local fire dispatch is notified not to send anyone unless we request assistance. We also ask that they relay that information to the people filling the next shift. We will contact TSF, TCEQ, and dispatch after completion to notify them that we are done.

During the burn, one person is designated as the “burn boss”. This person will assign tasks for each individual, describe any hazards it may, and how we intend to burn the unit. We often burn several small units 20 to 200 acres to give volunteers opportunities to perform many different tasks. Our goal is to provide learning opportunities and act as

an outdoor classroom for learning how to utilize fire on the landscape. Enlisting volunteers also helps to fill out a crew large enough to conduct a safe burn.

After the burn, we discuss what went right and how we can improve our efforts. That evening, we will “mop up” the fire by removing any smoldering logs that are close to the fire guards and continue to monitor to assure that any remaining hot spots do not create embers that start a fire in an area that we did not intend to burn.



Special thanks to all the volunteers who have helped us with prescribed burns.

Gun

Quail Banding and Band Recovery

Becky Ruzicka and Brad Kubecka

Humans have been attaching metal bands to birds for centuries. The earliest known record of a banded bird dates back to the late 16th century: Henry IV's banded Peregrine Falcon was lost in France and found in Malta 1300 miles and 24 hours later! Organized bird banding in North America began in the early 1900's in an effort to gain understanding of migration, annual production, and basic life history of the continent's bird species. These efforts continue today across the continent and globe.

For the bird hunter, whether waterfowl or upland, harvesting a banded bird is the ultimate trophy. Banded birds give the hunter rare glimpse into the life of that bird – How old is it? Where did it originate? Where has it travelled? – and ultimately a deeper connection to it. In essence, bands serve the same purpose for researchers.

Although widespread banding of wild quails is rare, almost all research projects that require the capture and handling of quail also band any captured birds. At RPQRR, we trap intensively using standard walk-in, wire funnel traps at 296 locations on the property to band and radio-collar both Northern Bobwhites and Scaled Quail (a.k.a. Blue Quail; Figure 2). We use what is known as a No. 7 aluminum butt-end leg band from the National Band and Tag Company in Newport, Kentucky (Figure 3). Each band is stamped with a unique numeric identifier, the words "quail research," and our headquarters phone number.



Figure 1. Drs. Eric Grahmann and Fidel Hernandez with a banded Northern Bobwhite harvested at RPQRR.

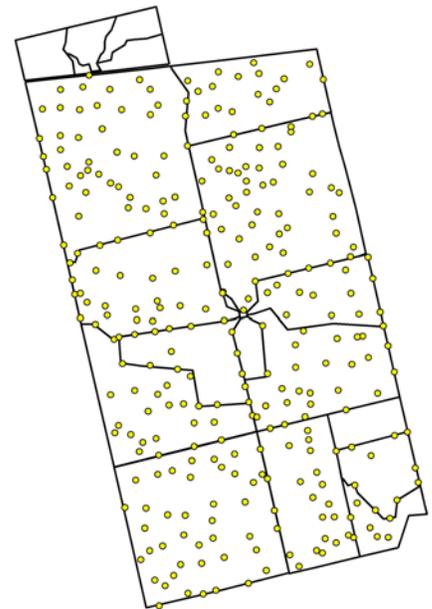
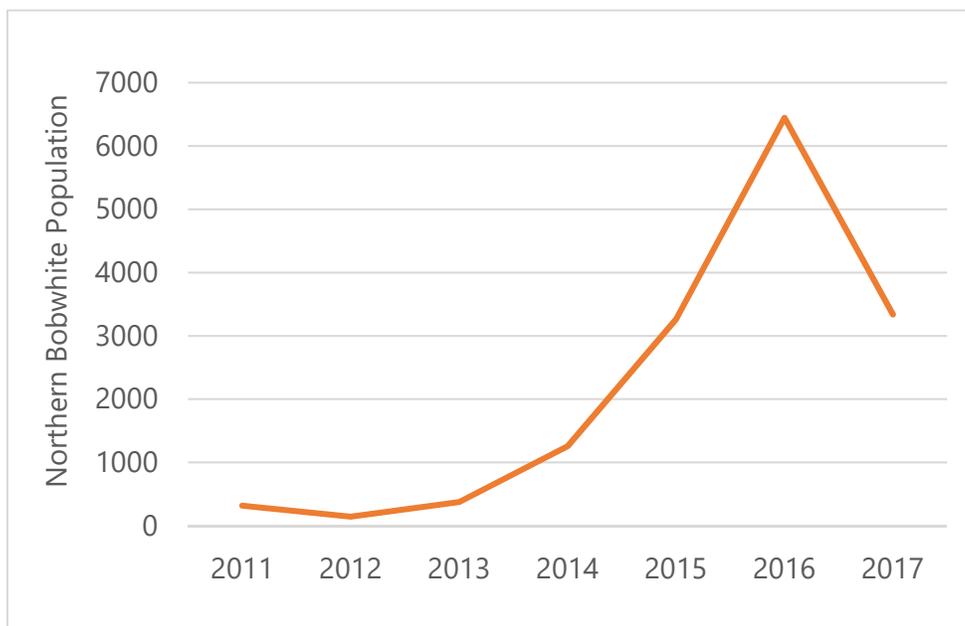


Figure 2. Trapping locations for capturing and banding quail at RPQRR.

Since 2008, we have banded 15,512 individual quail at RPQRR! These data are used to estimate annual population size and seasonal survival, as well as to answer research questions regarding changes in habitat use over time, effects of radio-collaring on survival, and the accuracy of popular abundance indexing techniques to name a few. Birds harvested or recovered off site give us important data points on dispersal and survival off-property. In the 2016-17 hunting season following a the record boom year, we had multiple reports of quail being harvested off site. The farthest dispersers were harvested in Kent and Jones counties, 28 miles away as the quail flies (or runs more likely). Similar to hunters, researchers also get excited when they can lay their hands on a particularly old bird. Our oldest bird on record at RPQRR was actually a translocated scaled quail. The bird was initially captured at Angelo State University as an adult in March 2014 then released at RPQRR later that spring. The fact that it was captured as an adult means that it was hatched in the spring/summer of 2012 at the latest because quail retain their primary coverts (age identifying feathers) for 15-17 months. We recaptured it in December 2017 making it at least 5.5 years old!

If you should happen to harvest one of these birds, please report it to us – we'll send you a certificate with bird's information in return!



Northern Bobwhite population size estimated using mark-recapture of banded quail at RPQRR.

Gun

Decreasing Wounding Loss

Lloyd Lacoste

Wounding loss (i.e., birds hit but not retrieved) often comprise up to 20% of the hunter's daily bag. At RPQRR we implement several restrictions to reduce wounding loss of quail while hunting. One implementation is only allowing over-under or side-by-side shotguns. When using high capacity guns, such as semi-automatic and pump shotguns, it is often tempting to take a shot that is too far to permit a clean kill. It is also easier for those hunting with you to be sure that your gun is safe if it is broken open and cannot fire. For this reason, many corporate hunting leases in South Texas only allow over-under or side-by-side shotguns. Smaller gauge shotguns (e.g., 28-gauges and .410s) are increasingly popular. They're adequate in an expert's hands, but many of today's wingshooters would probably wound fewer birds with a 20-gauge.

Only harvesting 2 to 3 birds on a covey rise is another method that can reduce wounding loss. If you are focusing on the rest of the covey so that you can chase singles instead of focusing on the bird you are attempting to shoot, you may wound that bird, or kill it and not mark the location well enough to recover the bird. If you really want to increase the odds of locating a shot bird try playing "quail snooker" by only shooting cock birds. By focusing on a single bird enough to identify its sex (i.e., focusing on its head) you will improve your shooting success and be able to locate your downed bird much easier than trying for doubles on every covey rise. The best way to decrease wounding losses is to focus on one bird while shooting, go directly to the bird to recover it, and then proceed to the next covey. Of course hunting with good dogs, especially good retrievers, is equally as important as shooting well.



Lunch Topics

Restoring Wild Quail: Translocation Efforts of RPQRF

Becky Ruzicka

The gradual decline of the two most abundant quail species in Texas, Northern Bobwhites and Scaled Quail, is well documented over the previous decades. This range wide decline 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. Beginning in 2013 the Rolling Plains Quail Research Foundation (RPQRF) began researching the utility of translocating wild bobwhites from healthy populations in western Texas to reestablish populations in areas where suitable habitat still remains (or has been restored) and the probability of natural recolonization is low. Since that time we have conducted three scaled quail and three bobwhite translocations. **The goal of the RPQRF is to improve the effectiveness of translocation as a tool to reestablish wild quail populations in Texas.**

Table 1. Translocations conducted by RPQRF since 2013.

Year	County	Species	Objective
2013-14	Shackelford	Bobwhite	Test feasibility; compare survival and nesting success of translocated hens to published estimates from non-translocated hens; evaluate relative abundance
2014-15	Fisher	Scaled	Test feasibility; compare survival and nesting success of translocated hens to published estimates from non-translocated hens; evaluate relative abundance
2015	Cottle	Scaled	Test hard vs. soft release strategies
2015	Palo Pinto	Bobwhite	Test hard vs. soft release strategies
2015	Stephens	Bobwhite	Test hard vs. soft release strategies
2016-17	Knox	Scaled	Test length of time for soft release and effect of source population

Table 2. Summary of RPQRF's translocation efforts.

Year	County	Species	Release Site Acreage	Total Number Translocated	Release Strategy	Breeding Season Survival
2013-2014	Shackelford	Bobwhite	7,300	409	Hard	32-38%
2014	Fisher	Scaled	4,700	93	Soft	62%
2015	Cottle	Scaled	28,000	88	Hard vs. Soft	Hard: 1-3 % ^a Soft: 10 -33% ^a
2015	Palo Pinto	Bobwhite		83	Hard vs. Soft	0% ^a
2015	Stephens	Bobwhite	22,000	99	Hard vs. Soft	Hard: 36% Soft: 40%
2016-2017	Knox	Scaled	100,000	888	Soft	2016: 58% 2017: 30%

^a apparent survival; combines survival and site fidelity



Releasing scaled quail at Matador WMA in 2015.

Lunch Topics

Eyeworm Update

Dr. Dale Rollins and Jennifer Newkirk

Since 2009 we have studied the incidence and prevalence of the eyeworm (*Oxyspirura petrowi*) in quails here in West Texas. The initial effort on RPQRR (2009-10) was ramped up with the inception of Operation Idiopathic Decline in 2011 when quail were collected across 35 counties in West Texas and western Oklahoma. The parasite work from 2009-12 was completed in collaboration with Dr. Alan Fedynich at the Caesar Kleberg Wildlife Research Institute. Since 2012, RPQRR has worked with Dr. Ron Kendall at the Wildlife Toxicology Lab (WTL) at Texas Tech University to assess eyeworm impacts on quail. In addition, the WTL has expanded surveillance of cecal worm (*Aulonocephalus pennula*) presence and impacts on quail in the Rolling Plains.

What We Know

Eyeworms:

- Very common throughout the Rolling Plains with 50-70% of birds infected (up to 100% in some areas)
- Epizootic event in 2013 demonstrated the potential for rapid spread of infection
- Rolling Plains is the hot spot for infection; often 8X more prevalent in bobwhite from Rolling Plains vs South Texas Plains
- 107 worms found in a single bird
- Feed on tissues and glands within the eyes and nasal sinuses
- Cause scarring of the cornea as well as damage to other eye tissues; thus providing a mechanism for reduced vision and/or fitness and explains reports of quail flying into stationary objects
- Several potential intermediate hosts including cockroaches, field crickets, and several species of grasshoppers
- 96% related at the DNA level to the *Loa loa*, a central African human eyeworm known to cause blindness
- New molecular techniques are available to allow for on-site, non-lethal sampling of quail to detect eyeworm infection

Cecal worms:

- Very common throughout the Rolling Plains with 80-90% of birds infected (up to 100% in some areas)
- Over 1,700 worms have been found in a single bird
- Has been associated with gross pathology, distension of the ceca, and lack of digesta; thus providing a mechanism for reduced fitness, including weight loss
- 90% related at the DNA level to the Ascarid, or roundworm, of dogs and cats which if left untreated can cause weight loss, malnutrition, and eventual death
- 13 different species of grasshoppers have been identified as potential intermediate hosts
- New molecular techniques are available to allow for on-site, non-lethal sampling of quail to detect cecal worm infection

What We Think

- Eyeworms reduce vision and likely predispose quail to predators, flying into objects (e.g., barns, fences, trees), and difficulty finding food.
- Cecal worms deplete nutrients and may lead to malnutrition, energy loss, reduced breeding potential, and impair ability to evade predators
- Parasitic infection suppresses the immune system which may leave quail susceptible to secondary infections
- Because parasites are long-lived, over time an infection may increase until it is eventually fatal, ultimately reducing populations
- Even low infections may tip the scales against quail in an already challenging environment, e.g. predation by Cooper's Hawk
- Implementation of a medicated feed ("Quail Guard") twice annually (Spring and Late Summer) will reduce parasitic infection in wild quail populations
- Based on the "weight of the evidence" as well as field and laboratory data, we believe that quail are impaired by parasitic infection and their reproduction and survival are reduced

What We Don't Know (at this point)

- How many parasites can a quail harbor before they are impaired? Is it a linear relationship or is it dependent on the bird like people and alcohol consumption?
- What level of infection represents an "action threshold" which would justify treatment?
- How does availability of infected intermediate hosts vary from one year to the next?

- Is there an effect on the immune system of quail? Do high infections leave them more susceptible to other diseases?
- Can the “boom and bust” cycles of quail be reduced by addressing parasite-related concerns?
- What are the consequences of multiple parasite species?

Where We’re Headed

- Dr. Kendall’s WTL has developed a medicated feed which we hope earns FDA approval soon and becomes available in 2019
- WTL is deploying a Mobile Research Laboratory to monitor parasitic infection in quail throughout the Rolling Plains
- WTL is conducting laboratory studies to evaluate how parasites affect vision
- WTL plans to evaluate bobwhite immune response to parasitic infection
- WTL will continue to add to the “weight of the evidence” supporting the hypothesis that parasites are affecting wild quail
- RPQRR plans to evaluate the efficacy of the medicated feed on survival and breeding success upon approval and availability of the medicated feed
- RPQRR received about 1,000 quail heads from across West Texas this past Jan-Feb to ascertain the current status/distribution of eyeworms and evaluate field vs. lab techniques for assessing eyeworm infection

Learn more on YouTube. Search for the following webisode titles or scan the QR code with your smartphone:

“How to Search for Eyeworms in Quail”



“Addressing the Eyeworm Threat in Quail”



“Examining Quail for Eyeworms in the Field”



For more information:

www.quailresearch.org

www.tieh.ttu.edu/rkendall

www.facebook.com/WTLbobwhite

www.facebook.com/RPQRR



Figure 1. Bobwhite hen harvested during 2017-18 season in Stonewall County. PC: Joe Crafton

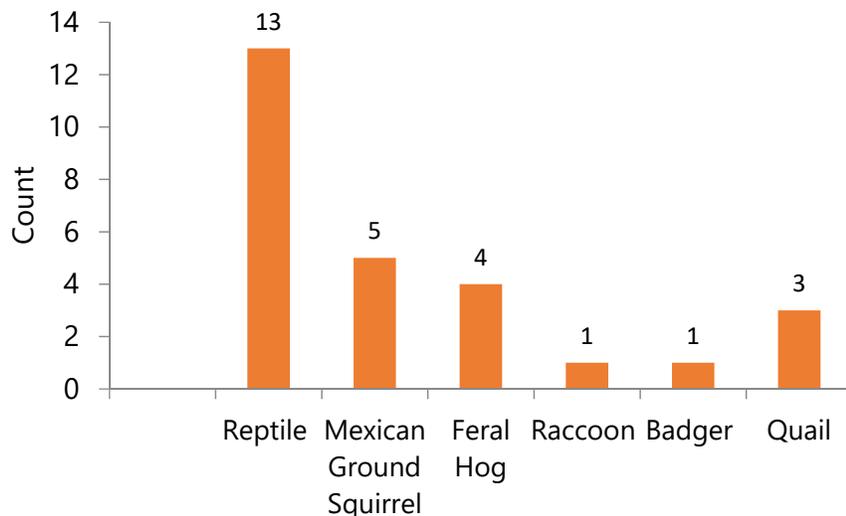
Lunch Topics

Comparative Study of Coyote Diets

Cade Bowlin

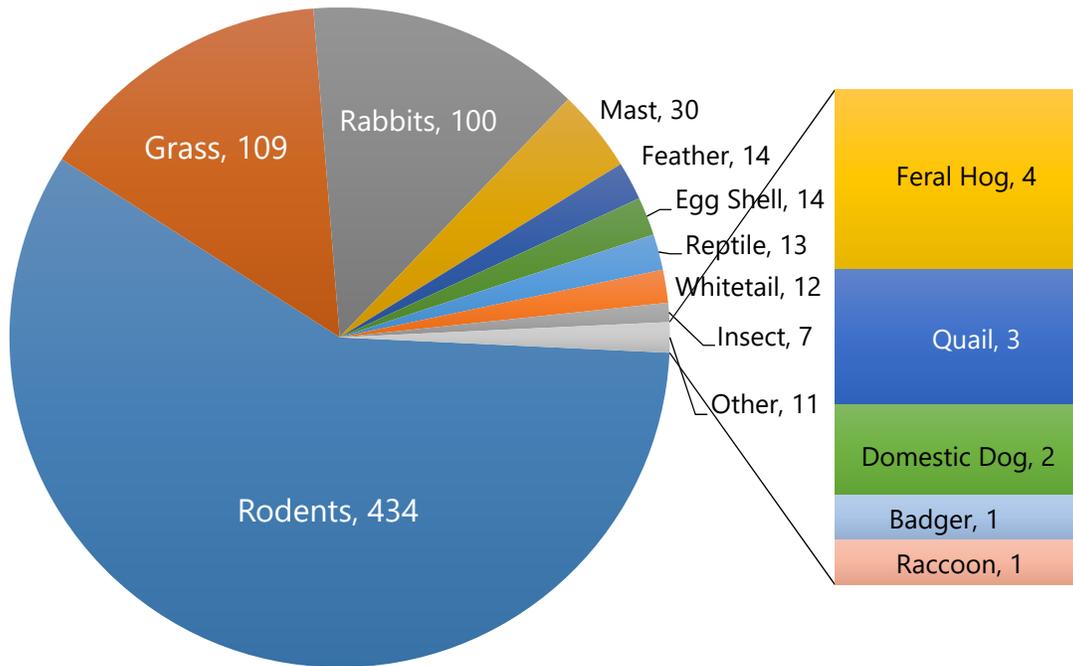
Coyotes are common mesopredators on RPQRR and, as such, warrant investigation as to their influence on quail populations and to determine if coyotes are significant predators of quail and quail nests. Mark Tyson conducted a coyote dietary study on the ranch during the La Niña weather phase of 2009-11. During all three years of the study, precipitation was below 30-year mean with 2011 one of the hottest, driest years in Texas recorded history. Tyson collected 1080 scats along the Texas Quail Index (TQI) of RPQRR and only one scat contained quail remains (0.1%) and eggshells were found in just 2 (0.2%) scats. An El Niño cycle began in the Rolling Plains summer 2015 and RPQRR has seen record precipitation and quail abundance. In an effort to investigate how coyote diets vary during La Niña vs. El Niño cycles, I collected coyote scats monthly along the TQI from November 2015 to February 2017 (n=496). Scats were analyzed using micro- and macroscopic techniques to identify food items present. Remains found in scats were compared to reference collection material for positive identification. The most consumed prey category during the study period was rodents and occurred in 87.5% (434) of scats. The top individual food item of coyotes during the study was the hispid cotton rat (*Sigmodon hispidus*) and occurred in 73% of scats analyzed. Southern plains wood rats

(*Neotoma micropus*) were found in 26.7% of scats. Eastern cottontail (*Sylvilagus floridanus*) and black-tailed jackrabbits (*Lepus californicus*) were the third most consumed prey category (lagomorphs) and were identified in 20% (100) of scats. Bird feathers were confirmed in 14 scats, three of which from quail



Known predators of quail and quail nests compared to quail found in coyote scats (N = 496) collected at RPQRR, October 2015 - February 2017.

(2.8%). Bird eggshells also occurred in 2.8% (14) of scats although it is difficult to confirm species from eggshell remains. Remains of confirmed quail and quail nest predators, badger (*Taxidea taxus*) and Mexican ground squirrels (*Spermophilus mexicanus*), were found in 1 and 5 scats, respectively.



Coyote diets at RPQRR, October 2015 - February 2017.



Rabbit skull recovered from a coyote scat.

Thanks for attending!



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- Subscribe to our monthly *e-Quail* Newsletter
- Check out our website (www.quailresearch.org)

Our Mission:

"To preserve Texas' wild quail hunting heritage for this, and future, generations."