

# CAESAR KLEBERG Tracks

===== *A Publication of the Caesar Kleberg Wildlife Research Institute* =====



# CAESAR KLEBERG *Tracks*

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## Learn More About CKWRI

*The Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville is a Master's and Ph.D. Program and is the leading wildlife research organization in Texas and one of the finest in the nation. Established in 1981 by a grant from the Caesar Kleberg Foundation for Wildlife Conservation, its mission is to provide science-based information for enhancing the conservation and management of wildlife in South Texas and related environment.*



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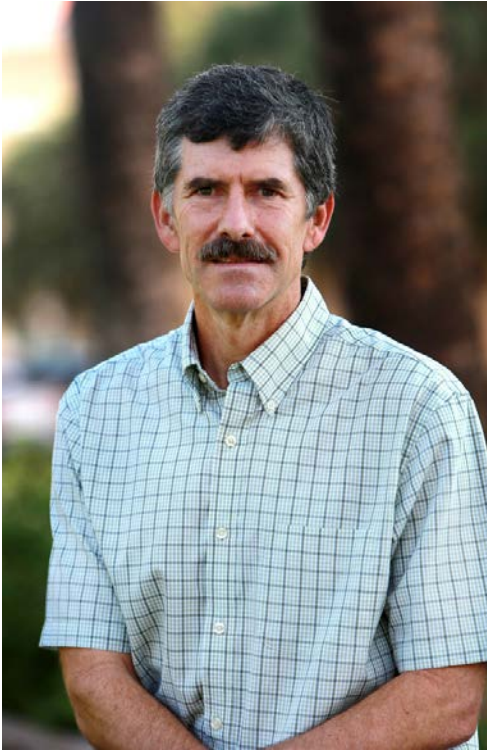
Cover Photo by Bart Ballard



# From the Director

by Dr. David Hewitt- Leroy G. Denman, Jr. Endowed Director of Wildlife Research

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**D**ear Friends of CKWRI,

Another summer is gone and autumn is sliding by. We are thankful for the cooler temperatures and to be beyond the reach of the summer heat which forces people and wildlife into the coolest place they can find. Hot temperatures not only keep us from spending more time afield, but even when we do venture forth, wildlife is less visible. However, failing to notice wildlife during summer does not mean that summer is unimportant. To the contrary, behind the curtain of heat waves, the bounty of our autumn harvest is being produced. Quail and turkeys are raising chicks. Deer are having their fawns and growing antlers. Rabbits, squirrels, doves, and all other wildlife are raising the next generation that will ensure their populations continue into the future.

Just as the pastures have been busy on our behalf, students and scientists at the Caesar Kleberg Wildlife Research Institute have also been busy producing a bounty of knowledge to help you appreciate and better manage our state's wildlife resources. This issue of Caesar Kleberg Tracks describes research on scaled quail and turkeys. It explores the importance

of animal movements, whether of nilgai in southern Texas, mule deer in the Panhandle, or geese throughout the continent. These movement data show that many of our wildlife species use areas larger than a single property and emphasize the importance of thinking beyond property boundaries when managing wildlife.

Just as rain during spring and summer makes our pastures and wildlife populations more productive, the support you provide the CKWRI increases the productivity of our students and scientists. We appreciate all you do for the Institute and look forward to turning your support into knowledge for years to come.

I wish you the best this autumn and encourage you to get out and enjoy the fabulous wildlife resources produced during the long, hot days of summer.

All the best,

A handwritten signature in dark ink, appearing to read "D. Hewitt".

David Hewitt  
Leroy G Denman, Jr. Endowed Director of Wildlife Research



# Advanced Tracking Devices Aid White-fronted Goose Research

by Jay VonBank and Dr. Bart Ballard

**T**he greater white-fronted goose, commonly referred to by hunters as the “Specklebelly” goose, is well known by Texas waterfowl hunters and birders alike. The greater white-fronted goose is an arctic-breeding goose species, nesting from central and northern Alaska, eastward across the arctic tundra of Canada to James Bay. These geese make an annual transcontinental migration through prairie Canada, and down the Mississippi and Central flyways to wintering grounds in the southern United States and Mexico. Historically, Texas has been one of the primary destinations for wintering white-fronts, annually hosting up to one-third of the entire continental population. While the continental population has grown in recent decades, white-fronts wintering in Texas, especially along the Gulf Coast, have greatly declined according to annual winter population estimates. White-fronts traditionally used the rice-prairies and coastal marshes of Texas and Louisiana, however ongoing large-scale landscape changes, such as decreased rice production, throughout coastal Texas have likely contributed to the distributional shift of wintering white-fronts to the northeast into Louisiana, Arkansas, Mississippi, and Missouri, thus creating concerns for the future of available wintering habitat and white-front abundance in Texas.



To date, there has been relatively little information gathered regarding autumn migration routes of white-fronts or their fidelity to flyways, states, or wintering regions. Because white-fronts migrate and winter across many political boundaries where harvest regulations and season lengths vary, it is important to identify areas important to white-fronts during these periods. Additionally, an unknown proportion of white-fronts migrate into Mexico where little is known about their ecology. Spring migration and the body stores accumulated during migration are important drivers of productivity, and our ability to link migration decisions to breeding success may aid in predicting recruitment and population trends.





We are working collaboratively with Texas Parks and Wildlife Department to examine several aspects of white-front ecology to address questions about the future of white-fronted geese in Texas and throughout their annual cycle. Currently, we have deployed 47 solar powered GSM/GPS satellite tracking devices on adult white-fronted geese and will mark an additional 16 geese with devices this winter. We have captured white-fronts from several regions in Texas, including

the Texas Coast, South Texas Brushlands, and Rolling Plains regions. The tracking devices use the cellular phone network to transmit GPS locations, which are otherwise typically transmitted via satellites. The transmitters are programmed to record locations every 30 minutes, every day, for the entire year. Examining habitat use and selection throughout Texas will enable us to investigate causes of distribution shifts, and improve habitat planning by improving population



# Student Highlight

CKWRI Graduate student Jay VonBank is a Doctoral candidate under Dr. Bart Ballard. Jay grew up in a small town in southern Minnesota. He graduated from Bemidji State University with a bachelors in aquatic biology, then attended and received his masters degree from Western Illinois University in biological sciences. Jay joined CKWRI in 2016 and is studying movement, migration, and winter ecology of Midcontinent Greater White-fronted Geese.



estimates, habitat objectives, and energetic carrying capacity models used by regional resource managers. Other major goals of this research are to determine breeding ground affiliations of geese wintering in Texas, investigate various characteristics of autumn migration, link decisions made during spring migration to individual migration strategy and breeding status, assess timing and duration of spring migration, identify critical stopover areas, and determine landscape characteristics driving stopover site use by white-fronted geese.

We have already collected over 100,000 locations over the last year from our marked sample of white-fronted geese. Individuals we have captured in Texas during winter have made movements to or returned to wintering areas in Texas, Louisiana, Arkansas, Mississippi, and Tamaulipas and Jalisco, Mexico. These geese have also used breeding areas across a relatively large expanse, from the boreal forest region of central Alaska, and across the tundra from northern Alaska to the Queen Maud Gulf Bird Sanctuary in Nunavut, Canada. The information we gather from this research will help inform management efforts for white-fronted geese across the midcontinent region. More locally, habitat use and selection information on Texas wintering areas will aid in ensuring that we understand what type of habitat is important, and where on the landscape would be most beneficial to provide adequate habitat for wintering white-fronted geese in Texas.



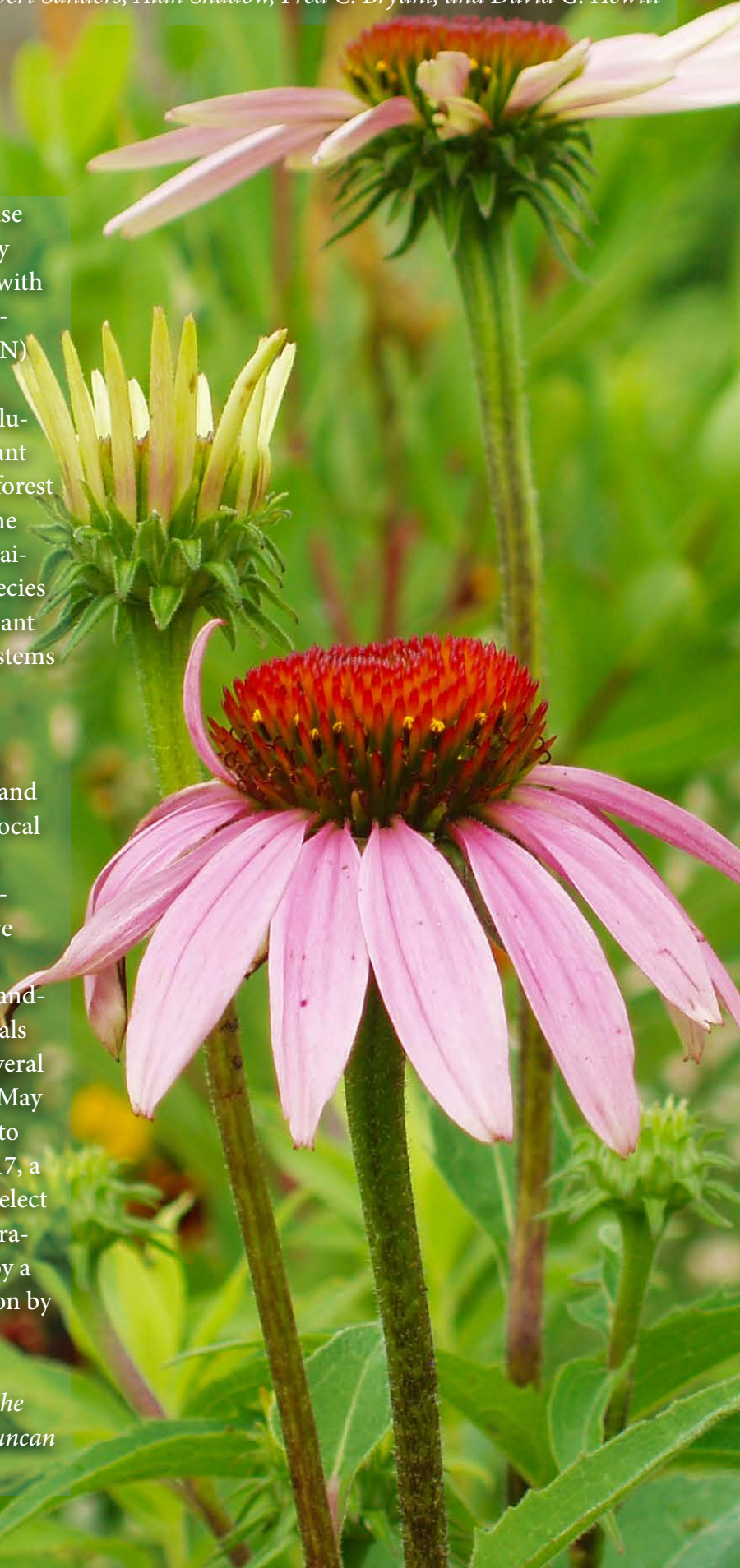
# Introducing the East Texas Natives Project

*by Forrest S. Smith, Robert Sanders, Alan Shadow, Fred C. Bryant, and David G. Hewitt*

Commercial supplies of ecotypic native seed for use in East Texas restoration projects are not currently available to consumers. We have begun working with private landowners, interested partners, and funding agencies to develop an East Texas Natives (ETN) Project as part of the Texas Native Seed Program. Efforts in East Texas will center on collection, evaluation, increase, and commercialization of important native plant species for grassland, savannah, and forest understory restoration. Ecoregions included in the project will include the Pineywoods, blackland prairies, and oak woods and prairies. Native plant species for use in restoration of herbaceous understory plant communities in longleaf and shortleaf pine ecosystems will be one priority of the ETN.

Other large scale restoration needs, including for seed sources of native plants suitable for pipeline and highway right of way revegetation needs, will be focal areas. Other needs in East Texas include ecotypic seed sources and methodology for converting bermudagrass and other non-native pastures to native prairies. Important cooperators in the East Texas Natives project include many supportive private landowners, the USDA NRCS East Texas Plant Materials Center, Boggy Slough Conservation Area, and several non-government conservation organizations. In May 2017, an initial project scoping meeting was held to plan for and scope the project, and in autumn 2017, a project technical committee will be convened to select species for collection. We hope to begin field operations of the East Texas Natives Project, and employ a regional project coordinator stationed in the region by January 2018.

*Cooperative funding provide by Ellen Temple and the National Christian Foundation-Joan and Rufus Duncan Memorial Fund.*







# Nilgai Antelope in South Texas: Direct and Indirect Impacts on Cattle and White-tailed Deer

*by Aaron Foley, Tim Fulbright, Alfonso Ortega-S., David Hewitt, Stacy Hines-Adams, and Alfonso Ortega-S., Jr*

*Photo by Mick Hellickson*

**N**ilgai, a large antelope native to the Indian subcontinent, were introduced into South Texas in the 1920's and 1930's. Nilgai readily responded to the warm climate and have become established mainly in the triangle between Corpus Christi, Brownsville, and Laredo. Nilgai also are known to cross the Rio Grande river between the US and Mexico border. Since the treatise written by Sheffield in the 1970's, not many studies have focused on nilgai despite being a part of the landscape for nearly a century. Because the South Texas ecosystem contains culturally and economically important native wildlife and cattle, there is a need to better understand the position of the nilgai in the ecological network. CKWRI and collaborators have been studying nilgai for several years to answer questions as it relates to cattle-nilgai interactions and cattle fever ticks (CFT).







There is an effort to eradicate CFT from the US because CFT carry a parasite that cause fever in cattle; the fever is often fatal. Nilgai are known to carry CFT; thus, there is an interest to document nilgai movement patterns in order to develop effective management strategies to contain and eradicate CFT. Thirty adult nilgai were captured on the East Foundation's El Sauz Ranch in April 2015 and monitored with satellite GPS radio-collars for 1 year to address 3 general questions: 1) Do cattle fences act as a barrier to nilgai movement? 2) What time of the year do nilgai exhibit high movement rates? and 3) Do nilgai relocate to new areas after being exposed to helicopter activities?

Nilgai did not perceive cattle fences as a barrier except when the cattle fences ran parallel with highways.

Cattle fences running parallel with highways appeared to be a barrier; and, may be useful for formulating CFT management zones. Nilgai had large and variable annual home range sizes but we detected a trend of young females exhibiting large movement during summer (June-August). Understanding high risk periods when nilgai may introduce CFT into new areas will assist with CFT monitoring strategies. Finally, we examined nilgai responses to 5 types of helicopter-based ranch activities: cattle gatherings, large mammal surveys, deer captures, nilgai harvest, and nilgai captures. Typical ranch management activities such as cattle gatherings and large mammal surveys did not result in collared nilgai relocating into new areas; however, capturing nilgai to affix collars produced the

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*Researchers from Caesar Kleberg Wildlife Research Institute and East Foundation tag and collar nilgai and then release them in order to track and study their movements.*





largest average distance moved relative to the other 4 helicopter-based activities. Cumulatively, our research on nilgai movement patterns will be used to develop effective management strategies to combat the spread of CFT in the US.

Previous researchers investigating nilgai diets concluded nilgai consumed a large amount of grass, and nilgai diets overlapped more with cattle than with white-tailed deer. We investigated the diet composition of nilgai, deer, and cattle by analyzing the carbon and nitrogen stable isotope signature of fecal samples on East Foundation lands throughout South Texas. Atoms of carbon and nitrogen in plants consumed by animals are present in feces, the isotopes of these elements in the feces reflect whether the animal's diet is predominantly 1) grasses, 2) forbs or broad-leaved weeds, or 3) browse which is the leaves and twigs of shrubs. We sampled feces of cattle, deer, and nilgai, where present, from 2012 to 2015.

Nilgai were flexible foragers. Nilgai consumed diets similar to deer during drought; diets were composed primarily of forbs and browse. When rainfall was normal or above, nilgai diets were more variable; similar to cattle at some study sites and were composed largely of grass, while remaining similar to deer at other study sites. Prior to our research, the general consensus among land managers was that nilgai do not compete with deer for forage. Our results indicate that during times when forage is limiting, nilgai potentially compete with deer for forage. Managers who are interested in managing habitat primarily for white-tailed deer would benefit from keeping nilgai numbers low.

*Collaborators included East Foundation, USDA-ARS, and Texas Animal Health Commission.*



## Nilgai Fact

Nilgai is the largest antelope that is native to Asia. It can be found all the way from the Himalayas in the north, to the state of Karnataka in the south. Nilgai were introduced to Texas in the first part of the 20th century for recreational purposes.



### ONLINE

Our research partner, The East Foundation, supports wildlife conservation and other public benefits of ranching and private land stewardship. Learn more about them at [www.eastfoundation.net](http://www.eastfoundation.net).



# The Caesar Kleberg Wild Turkey Research Project

*by Brandon S. Mitchell, Darrion Crowley, William P. Kuvlesky, Jr.,  
J. Alfonso Ortega-Santos, Leonard A. Brennan, and Humberto Perotto*







*Photo by Larry Ditto*

## WILD TURKEYS

are an important component of the native fauna of South Texas. Not only are wild turkeys an essential part of the ecosystems they occupy, they are also a popular gamebird pursued by thousands of sportsman every year. Three subspecies of wild turkey inhabit Texas. The most abundant is the Rio Grande Wild Turkey, which inhabits the Panhandle south through the Rolling Plains, Cross Timbers, Hill Country and south Texas to the Rio Grande River. The eastern wild turkey is less abundant than the Rio Grande wild turkey and inhabits most counties in the Piney Woods of east Texas. The Merriam's wild turkey is the least abundant subspecies, perhaps numbering in the dozens, and inhabits the higher elevations of Guadalupe National Park in west Texas. Texas has more wild turkeys (more than 1 million birds) than any other State in the U.S. However, in the early 1900s, turkey populations throughout Texas had declined significantly due to unregulated market hunting and widespread habitat destruction. Indeed many counties lost turkeys completely. Fortunately, several far-sighted individuals, like Caesar Kleberg of the King Ranch, recognized the plight of wild turkeys and were instrumental in initiating wild turkey recovery in the first two decades of the 1900s. Over the past century, many Texas Parks & Wildlife Department (TPWD) personnel, together with hundreds of private landowners, worked cooperatively to restore wild turkey populations in Texas, and have largely succeeded for the Rio Grande subspecies and to some extent for the eastern subspecies. Research supported by TPWD and conducted by scientists at several Texas universities made a significant contribution to improving wild turkey populations,

*Turkeys roosting in an artificial roost at dusk.*

## Student Highlight

CKWRI Graduate student Brandon Mitchell is a masters candidate under Dr. Poncho Ortega. He has spent approximately three years researching the seasonal movements and roosting habits of Rio Grande turkeys in South Texas. His work has also included translocating wild turkeys to areas where the population of turkeys has declined.



particularly over the past 40 years. However, wild turkey issues remain in portions of Texas and these issues need to be strategically addressed in the face of future challenges on the horizon.

The Caesar Kleberg Wildlife Research Institute (CKWRI) initiated a South Texas wild turkey project in 2014 in response to a perceived decline in natural turkey roosts due to the severe drought that occurred between 2009 and 2013. CKWRI scientists began hearing from landowners and ranch managers that natural roosts, such as mature live oak and hackberry trees, had succumbed to the drought. Visits to several ranches appeared to confirm these reports. Moreover, it was believed that loss of natural roosts would be a problem that would persist for wild turkeys in South Texas because of global warming. The average temperature of Texas has increased by almost 2 degrees since 1980 and is projected to continue increasing. Droughts are also projected to be more frequent and intense well into the 21st century. Increased temperatures and the frequency and duration of drought could deplete natural wild turkey roosts, which could threaten turkey populations, particularly in semi-arid South Texas. Roosts are critical to wild turkey survival because if the birds cannot roost at night to avoid predators, populations will eventually disappear. Fortunately, we knew that wild turkeys will use man-made structures (powerlines and their transmission towers, windmills, telephone poles, etc.) based on reports from landowners and personal observations. We had also advised a few landowners and their managers, how to construct wild turkey roosts and where to locate them, though we did not know for certain that these man-made structures would attract wild turkeys. Fortunately, some of these constructed roosts did indeed attract wild turkeys and they used them regularly. But some of these roosts were never used.



Therefore, we conducted a research project from 2014-2016 to determine where to best locate constructed wild turkey roosts on the South Texas landscapes to encourage turkeys to use them. We also wanted to determine a roost design that turkeys preferred. Specific attributes of 71 constructed roosts that turkey use and did not use were measured. Habitat attributes immediately around the roosts, vegetation community attributes within a quarter mile of roosts, distance to permanent water, roost height and platform design were some of the attributes measured. Preliminary results indicate that the closer a constructed roost is to permanent water the more likely turkeys will use it. Additionally, the more stable the roosting platform and the more roosting options provided on the platform, the more likely turkeys are to use constructed roosts.

We also were involved in efforts to re-establish wild turkey populations in South Texas, where the birds had disappeared or in areas where turkeys were not abundant, by capturing and translocating wild turkeys to locations where constructed roosts were established or will be established. Between 2014-2016 we released almost 300 wild turkeys to 5 locations in south Texas. Observations made by landowners indicated that at least 4 of these translocations appear to be successful because wild turkeys survived and reproduced. Additional translocations will continue for a site in the Lower Rio Grande Valley and 2 sites on ranches outside of Carrizo Springs.

Wild turkey research will continue in South Texas as a new study begins that will determine how wild turkeys use south Texas landscapes. An important aspect of this graduate project will be to quantify hen movements and habitat use prior to and during the breeding/nesting season. A MS student has been selected for this project and will begin work during the Fall semester 2017.

Finally, we received funding in November 2016 from the Texas Military Department to initiate a project designed to evaluate survey methods to estimate wild turkey populations. One of the most difficult aspects of wild turkey management is estimating population size because few if any survey techniques have been developed that provide precise results. Therefore, 3 survey methods will be evaluated for a Rio Grande wild turkey population on Fort Wolters near Mineral Wells and for an eastern wild turkey population on Camp Maxie near Paris close to the Red River. Data collection will commence during winter of 2017-2018 and will continue for 2 years. Although these study sites are not in South Texas, we hope that the results of this study will help develop a wild turkey survey method that would be applicable for South Texas.

*Cooperative funding provided by the Las Huellas, Frost National Bank, the Encino Lodge, El Veleno Ranch, Hoffman H30 Ranch and the Texas Military Department.*





# Hot Habitat: Understanding Scaled Quail Use in a Thermally Challenging Environment

*by Eric D. Grahmann, Timothy Fulbright, and Fidel Hernandez*

*Photos by Eric Grahmann*





**SOUTH TEXAS IS A HOT PLACE DURING THE SUMMER. TEMPERATURES ROUTINELY SOAR ABOVE 100° F DURING JUNE–SEPTEMBER. ALTHOUGH UNCOMFORTABLE TO MOST CREATURES INHABITING THIS AREA, HIGH TEMPERATURES AND PROLONGED DRY PERIODS ARE PART OF THE ENVIRONMENTAL CHARACTERISTICS THAT MAKE SOUTH TEXAS SPECIAL. ENVIRONMENTAL VARIABILITY IS ONE OF THE FACTORS THAT DRIVES PLANT SPECIES DIVERSITY IN THE REGION, AND DRYNESS KEEPS MOST PLANT COMMUNITIES RELATIVELY SPARSE. DIVERSE AND SPARSE PLANT COMMUNITIES IN SOUTH TEXAS ARE THE DOMAIN OF THE CHESTNUT-BELLIED SCALED QUAIL.**

Scaled quail are denizens of the southwestern deserts (Chihuahuan Desert and Tamaulipan Biotic Province) where they inhabit sparse grass and shrublands. In South Texas, the chestnut-bellied scaled quail uses more brushy plant communities than subspecies further west and in Mexico. However, regardless of the plant community, scaled quail are tied to woody cover. Without it, they cannot persist. So, what's the link between scaled quail and woody cover? Scaled quail use woody cover to escape from predators, as well as use its fruits for food. However, another major aspect of the importance of woody cover lies in one simple habitat attribute: shade.

Researchers have found that in Arizona, scaled quail select hotter habitat than nearby populations of masked bobwhites. In South Texas, scaled quail use brushier habitat than bobwhites. Despite these differences in site selection, the thermoneutral zone of scaled quail (77° F to 95° F) is similar to bobwhites (86° F to 95° F). Similar to all animals, scaled quail must use environments where they can maintain their body temperature within their livable tolerance, and these environments are at a premium in hotter environments.

In 2009, we began a study to delve into reasons potentially responsible for the scaled quail decline in South Texas. Over the past 30+ years, scaled quail have declined precipitously in South Texas, and their range has contracted south and westward about 50 miles. One aspect of this study was to examine the role tem-

perature plays in site selection and to draw inferences based on predictions of a warming climate. Specifically, we sought to quantify selection of ground surface and black globe temperatures (a measurement of heat actually experienced by quail, taking into account convective and radiant heat transfer) by scaled quail and if scaled quail were selecting attributes of the woody plant community in search of cooler microclimates.

Our study took place on 6 ranches in LaSalle and McMullen Counties. These ranches varied in vegetation community composition, but all included at-least some sparse Tamaulipan thornscrub. Scaled quail were trapped and located via radio-telemetry throughout the warmest months of the year (March–September) and temperature and vegetation were sampled at used and paired random sites.

Over the years of our study, 276 pairs of relocations and random points were sampled. Scaled quail selected locations with ground surface temperatures between 75° F and 109° F. The upper bound of tolerance (109° F) for ground surface temperature may seem high, but temperatures easily surpass 130° F on bare soil in South Texas during the summer. If you don't believe us, place your hand (at your own risk) on bare soil in this region during August. This is the ground that quail use to travel across their habitat! When we analyzed ranges of selection for black globe temperatures, scaled quail selected sites ranging from 73° F to 102° F. Remember, the thermoneutral zone for scaled quail ranges between 77° F to 95° F, so there is greater





*Figure 1. Scaled quail are almost always found within the shade-cast of shrubs in South Texas. These microsites provide lower ground surface and black globe temperatures.*

energetic cost for regulating body temperature and critical chemical processes may be hindered within the body when temperatures are outside of this range. When considering sites that scaled quail use for foraging and loafing, both ground surface and black globe temperatures were important, but this importance varied by time of day. During early morning and late afternoon (times of day with cooler temperatures and long shade-casts), selection for sites with cooler microclimates were not as important. However, during the warmest times of the day, late morning and early afternoon, scaled quail sought cooler locations than were randomly available across their habitat. The probability of use of a given site for foraging or loafing decreased about 10% for every 1% increase in ground surface temperature.

So what were the vegetation attributes of these sites? Well, they basically amounted to dense overhead woody cover with a nearly solid shade cast underneath.

Furthermore, the brush at these sites was taller and more complex (multiple species growing together) than sites available at random. Imagine a relatively tall (8–10 ft) brasil, coma, or knifeleaf condalia with another species or 2 woven within the predominate shrub and a deeply shaded understory, and you visualize optimal thermal cover for scaled quail. This selected complex of plants would be surrounded by a landscape of shorter, less dense-canopied plants.

Bottom line, temperatures during the hottest part of the day in summer is at, or near, the lethal limits for scaled quail. Thus, access to cooler microclimates is absolutely critical to their persistence. Based on our research, we would like to highlight the following points: first, trends of warming temperature are predicted into the foreseeable future. If quail conservation is a goal on your ranch, and if your property currently harbors scaled quail (a species that inhabits a relatively drier and hotter habitat than bobwhites), these birds



should be part of your management priorities as their presence may help sustain ranch-wide densities of quail. Secondly, diverse Tamaulipan thornscrub communities are extremely important to quail in South Texas. If these areas have never been mechanically manipulated, we suggest leaving them that way. Cooler microsites are more common in these areas and their complex structure and diversity renders them priceless to the wildlife manager in South Texas. They cannot be restored to pretreatment condition once destroyed

executing these designs with brush clearing equipment is ill-advised. Although brush may be abundant on a given ranch, sites that are thermally suitable to quail during midday in summer in South Texas are limited. And thus, identifying and protecting these areas and making sure that there are brushy corridors that quail can use to move to and from these locations may be critical for the sustainability of quail on your ranch. If shrubland is to be treated at all, an experienced equipment operator with knowledge of quail habitat and



*Figure 2. Typical scaled quail habitat on saline soil in South Texas. Note the dark green dense canopied shrub in the top right background of this photo. Although plants like this may represent a small percentage of the landscape, these limited sites provide critical thermal microsites during the hottest summer months. Without them, scaled quail may cease to inhabit otherwise suitable landscapes during hot and dry periods.*

by herbicides or mechanical manipulation. Finally, if shrubland must be treated for other reasons such as livestock management, you must understand that you are making a trade-off and the trade-off may be more cattle forage and fewer scaled quail. To ensure that some scaled quail remain it is critical to consider how brush management is executed. Simply designing strip and motte patterns on mapping software, and then

solid plant identification skills is a must. Important thermal microsites cannot be identified solely via aerial photographs. Scaled quail are a unique species that inhabit our sparse shrublands. Giving management consideration to this quail species that inhabit “hot habitat” may buffer the effects of drought and a warming environment for bird enthusiasts and hunters alike.



# Solving the Case of the Disappearing Mule Deer

*by Laura Warner, Jacob Lampman, David Hewitt, Shawn Gray, Tim Fulbright, Louis Harveson, Warren Conway, and Randy DeYoung*



**D**RIVE DOWN THE ROAD DURING A TEXAS PANHANDLE WINTER, AND YOU'RE SURE TO SEE LARGE HERDS OF MULE DEER CROWDING THE WINTER WHEAT FIELDS. DURING THIS TIME, AN OBSERVER CAN EASILY WITNESS THE ENTERTAINING RUTTING BEHAVIOR OF MULE DEER. SOMETIMES HUNDREDS OF BUCKS, DOES, AND FAWNS MINGLE IN THESE FIELDS FOR MONTHS DURING THE WINTER SEASON, BUT WITH THE ARRIVAL OF SPRING, THE DEER SEEM TO VANISH INTO THIN AIR. THE REST OF THE YEAR, SINGLE DEER OR SMALL GROUPS CAN BE SPOTTED AMONG THE MESQUITE AND SAGEBRUSH OF THE RANGELAND, BUT LANDOWNERS ARE ALWAYS LEFT SCRATCHING THEIR HEADS AND WONDERING, "WHERE DID ALL THE DEER GO?"





There are many theories to explain the “disappearing deer phenomenon,” but the most popular one proposes that mule deer are making large seasonal movements to access crops. Winter wheat seems to be the crop of choice, and may be particularly useful to deer during winter when natural forage is scarce and low in nutritional quality. However, preliminary results from an ongoing study on mule deer movements in the Texas Panhandle suggest this explanation may not be true. In an effort to better understand the relationship between crop use and mule deer movement, a collaborative research project began in October 2015. This project is funded by Texas Parks and Wildlife, The Boone and Crockett Club Fellowship in Big Game Research at Texas A&M University-Kingsville, the Mule Deer Foundation, and Sul Ross State University. Using a helicopter and net-gun, 43 adult mule deer and 30 fawns were captured and radio-collared southeast of Turkey, Texas. A year later, 43 adults and 14 fawns were captured at a second study site near Stinnett, Texas. Adult deer were fitted with GPS radio collars, which were programmed to record the location of the deer every 2 hours. While fawn collars did not have a GPS function, both types of collars were programmed to transmit a signal to a receiver to allow detection of the collar.

During the time the deer are collared, their locations and survival statuses are monitored using radio telemetry. Both ground telemetry and aerial telemetry are used to locate collared deer. Telemetry can also be used to locate collars that are emitting a mortality signal, which is triggered when the collar does not move for 4 hours and the animal has likely died. In addition to monitoring the deer, crop type and growth stages are recorded in the study sites throughout the growing season. Paired with the GPS data from the collars, the crop data can give us insight into which crops deer prefer and which growth stages of those crops they use the most.

In October 2017, adult deer from both sites will be recaptured. The deer at the Turkey site will have their collars removed, and GPS data from the collars will be downloaded. The deer at Stinnett will have their collars refitted for another year after the location data from year 1 are downloaded. Currently, we have 1 year of GPS data from the Turkey site that provides us with some insight into the mysterious lives of the Panhandle mule deer.



Just by observation, it does seem like the deer make a sudden disappearance after an obvious and large gathering on winter wheat fields during late fall and winter. However, the GPS data indicate that the deer, while out of sight, have not really moved that far. The average home range size of bucks was 9,500 acres, and that of does was about 2,500 acres. Bucks did have some long-distance movements, but only 4 bucks showed seasonal use of separate areas within their home ranges. Of these bucks, only 3 traveled more than 6 miles to access those areas they used seasonally.

In short, this means that a very small percentage of mule deer are making large seasonal movements when they vanish from the wheat fields in early spring. The

location data show that mule deer prefer wheat during the tillering and stem elongation growth phases, which occurs from late fall through early spring in the Panhandle. Indeed, these results match the observations of deer using wheat fields during the winter. Instead of moving far away to access a different crop or type of habitat during summer, the deer simply disperse onto nearby rangeland. Some deer use cotton fields, especially during the early growth stages after planting, but the deer remain relatively close to the fields that they crowd into during the winter. Some deer remain adjacent to the fields and take cover in surrounding shelter belts. Others roam further into the rangeland, but 87% of the deer showed no evidence of large seasonal movements. In fact, the average distance between





separate core areas of use of all home ranges was a mere 2.25 miles.

While mule deer do not exhibit seasonal use of distant areas, there is certainly a seasonal pattern of resource use, if only in a small area. Mule deer aggregate on wheat fields at predictable times of the year. This knowledge will be useful in designing surveys to estimate mule deer density in the Panhandle or similar regions where wheat is present. Accounting for artificially high density during winter surveys in these areas will yield a more accurate density estimate, which will produce more appropriate and sustainable harvest management practices. For example, the deer harvested in November are likely the deer that will be feeding on winter wheat in that same area during winter and early spring. Addressing the case of the disappearing mule deer will help ensure that this treasured resource will be around for many future generations.



*Mule deer crowding a winter wheat field during January 2017.  
Photo by Laura Warner.*



## Student Highlight

Laura Warner is currently the Boone and Crockett Fellow at CKWRI studying the effect of agriculture on mule deer movements, survival, and productivity in the Texas Panhandle. Laura grew up in rural Michigan and attended Central Michigan University, where she graduated in May 2015 with a Bachelor of Science in Biology.



### DID YOU KNOW

The Boone and Crockett Club is the oldest wildlife conservation organization in North America founded in 1887 by Theodore Roosevelt and George Bird Grinnell.



Caesar Kleberg Wildlife Research Institute  
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MSC 218  
Kingsville, Texas 78363

# SAVE THE DATE

## 2018 DEER ASSOCIATES MEETING

March 2, 2018

10:00 a.m. to 2:00 p.m.

Sunset Station - San Antonio, TX

For more information visit [www.ckwri.tamuk.edu](http://www.ckwri.tamuk.edu) or call (361) 593-4120.



*Photo by Larry Ditto*