



2024

# Conservation Biology Research Report



CONSERVING THE LAST FRONTIER

## OUR MISSION:

# Conserving the natural resources of the Chihuahuan Desert Borderlands through research, education, and outreach.

Since 2007, the Borderlands Research Institute has encouraged effective land stewardship of the ruggedly beautiful terrain of the Chihuahuan Desert. By providing land managers with the most current scientific information, the Borderlands Research Institute is helping to conserve one of the most biologically diverse regions of the world.

Housed at Sul Ross State University, the Borderlands Research Institute builds on a long-lasting partnership with private landowners, the university's natural resource program, cooperating state, federal, and non-governmental organizations, and other stakeholders. Faculty scientists and the graduate students they mentor are conducting groundbreaking research on every aspect of the desert landscape and the wildlife it supports.

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When most people think of deserts, they envision barren landscapes, blowing sand, and a dearth of wildlife.

But the Chihuahuan Desert Borderlands boasts a species list that is staggering. You would be hard-pressed to find a corner of the globe that supports over 500 species of birds, over 170 species of reptiles and amphibians, and over 120 species of mammals. The Conservation Biology

Program is tasked with helping us better understand the life history and management of these diverse species, including our flagship programs focusing on bird conservation and carnivore research.

In a private land state, we rely on landowners and conservation organizations and agencies to help us identify research questions, provide access, and help fund our research programs. We are proud to partner with each of them to help meet our mission of “Conserving the Last Frontier.”

**Louis A. Harveson, Ph.D.**

*Dan Allen Hughes, Jr., Endowed Director*



At the end of a recent group discussion, a colleague from another university said something very meaningful to me. We had been discussing rangelands, wildlife, habitat restoration, and how we help landowners meet their goals, and the discussion was pragmatic, thoughtful, and scientific.

But at the end my colleague said to me, “Congratulations on your position. You get to study things that are beautiful.”

We are a research institute, and science is the foundation of our work. But it is not the only driver of what we do. Economics, human dimensions, political limitations, and more must be considered in natural resource management decisions. And maybe, at the end of the day, we can step back and admire the delicate streaking of a small sparrow as it picks tiny grama seeds from among bands of grasses. To our funders, partners, and supporters – thank you for allowing us to study things that are beautiful.

**Maureen G. Frank, Ph.D.**

*James A. “Buddy” Davidson Charitable Foundation Endowed Chair and Associate Professor of Conservation Biology*

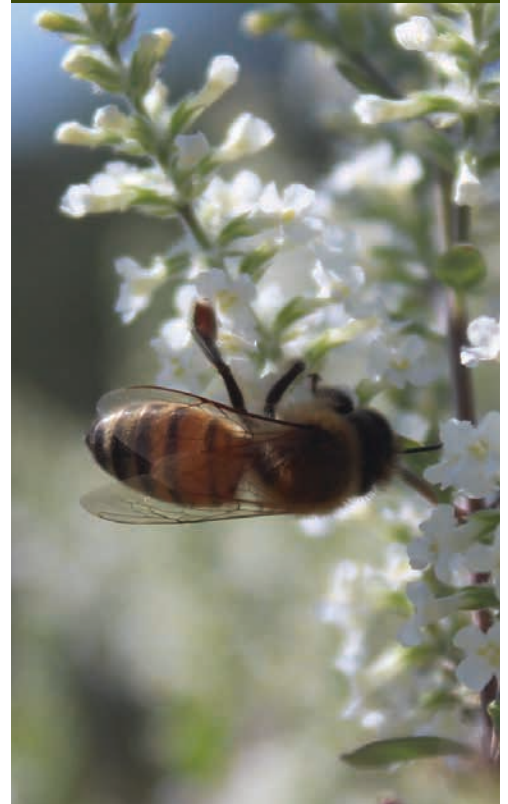
**BORDERLANDS**  
RESEARCH ♦ INSTITUTE

CONSERVING THE LAST FRONTIER

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# GRASSLAND BIRDS:

## Changes in wintering grassland bird density following shrub cover reduction

Alejandro Chávez Treviño, Mieke Titulaer, Carlos E. Gonzalez, Louis A. Harveson and Russell Martin (TPWD)



*Leg bands like the one on this Baird's sparrow enables monitoring of individual birds over time to study population dynamics. This research aids in understanding habitat preferences, migration patterns, and survival rates. Insights gained contribute to effective conservation strategies for the species.*

Grasslands in the Chihuahuan Desert are threatened by shrub encroachment, primarily due to unsustainable grazing practices, fire suppression, and climate change. The resulting change in vegetation structure can impact the survival of many grassland species, such as grassland-obligate birds, which rely on open grasslands with low brush density and cannot use other habitat types. Brush encroachment of grasslands is an issue across North America, and the populations of most of our grassland birds have been decreasing since monitoring efforts began in the 1960s. Species of grassland birds that spend the winter in the Chihuahuan Desert have been declining at a faster rate than species that overwinter elsewhere.

The vegetation conditions that limit the success of grassland birds, such as barren soils and high shrub cover, also limit the capacity of a livestock operation. In other words, grassland bird conservation goes hand in hand with successful cattle ranching.

Grassland restoration seeks to return the landscape to a condition that benefits wildlife and people. We collaborated with private ranches in West Texas to set the baseline of a long-term project that monitors wintering grassland birds at a restoration site. The project included spraying 4,000 acres with Sendero, an herbicide that specifically targets species of shrubs such as honey mesquite but leaves grasses intact. For this two-year study, we systematically identified and counted birds before and after shrub treatment. We also monitored birds in shrubby control areas on the same properties that were not sprayed, and on a property with intact grasslands and very low shrub encroachment. By the end of our field work, most of the treated brush had died but the snags were still standing.

Our results added to existing evidence that many bird species of conservation concern occupy areas where shrub cover is low and grass cover is high. In particular, bird species experiencing high annual rates of decline, such as chestnut-collared longspurs and Sprague's pipits, were more abundant on the intact grasslands. Grasshopper sparrows and Baird's sparrows were also more abundant on that property. Thick-billed longspurs, which are another species of critical conservation concern, were more abundant near and at prairie dog towns, highlighting the importance of prairie dogs in the grassland ecosystem. Interestingly, many shrubland bird species declined after shrub treatments, but grassland birds did not increase in those areas. Mechanical removal of snags may be necessary to fully restore these areas for use by grassland birds, and this will be investigated in future research.



*A chestnut-collared longspur blends into the grass, showcasing its excellent camouflage. Understanding this species' preferred habitats in the Chihuahuan Desert during winter is crucial due to their unique wintering behavior in grasslands, where they forage for seeds and insects. These long-distance migrants play a vital role in maintaining grassland ecosystems and are indicators of habitat quality.*

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*Sprague's pipits are uncommon and experiencing steep annual declines. This grassland-obligate species is an indicator of the health of Chihuahuan Desert grasslands. Monitoring populations of Sprague's pipits gives insight into the impacts of habitat improvements and helps inform conservation efforts in this fragile ecosystem.*

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# GRASSLAND BIRDS:

## Comparing two survey methods to sample non-breeding grassland bird communities in the Chihuahuan Desert: Line-transect sampling and mist-net surveys

Emily Card, Mieke Titulaer, Carlos E. Gonzalez, Louis A. Harveson and Russell Martin (TPWD)



*Shown here on the Mimms Unit in Presidio County, mist-netting is one method of conducting grassland bird surveys. We found that mist-netting is effective at detecting secretive, ground-foraging songbirds but not at detecting the full diversity of birds on the landscape.*

a line of mist-nets, which are fine nets attached to tall poles erected in the grasslands. Birds are flushed toward the nets, captured, and then removed for identification. Both survey techniques were conducted on the Dixon Water Foundation's Mimms Unit during the winter of 2020.

We found that line-transect samples detected more species overall, including more rare species, than systematic mist-net surveys. However, systematic mist-netting was more effective at detecting secretive, ground-foraging, grassland-obligate songbirds. Thus, we recommend that researchers should clearly define their goals before choosing a monitoring program. Because systematic mist-netting addresses the biases associated with line-transect surveys, and vice versa, it may be advantageous to use both survey methods in the Chihuahuan Desert.

Wildlife monitoring programs allow researchers to track demographic trends and develop management strategies. The North American Breeding Bird Survey has been the primary source of large-scale population data for over 400 species of breeding birds since the program's initiation in 1966. Data from the North American Breeding Bird Survey and other long-term studies indicate that 57% of bird species in North America are declining. Grassland birds have experienced greater population losses than any other group, with researchers estimating that nearly 720 million breeding grassland birds have disappeared since 1970.

Grassland birds that spend the winter in the Chihuahuan Desert are declining twice as fast as other grassland bird species in North America. The implementation of a winter monitoring program in the Chihuahuan Desert is essential to understanding and mitigating the loss of nonbreeding grassland birds in this ecoregion.

We compared monitoring data from two common methods to evaluate the benefits and shortcomings of each method. Line-transect samples are conducted by an observer who walks a pre-defined path and records every bird detected. Systematic mist-net surveys use a crew of 12-30 people who fan out around the border of a designated zone, then simultaneously walk toward

# MAMMALS OF BIG BEND NATIONAL PARK:

## Mammal diversity within Big Bend National Park

Caitlin Camp, Amanda Veals Dutt, Patricia Moody Harveson, and Louis A. Harveson



Figure 1. Two male Carmen Mountains white-tailed deer squaring off in Big Bend National Park.

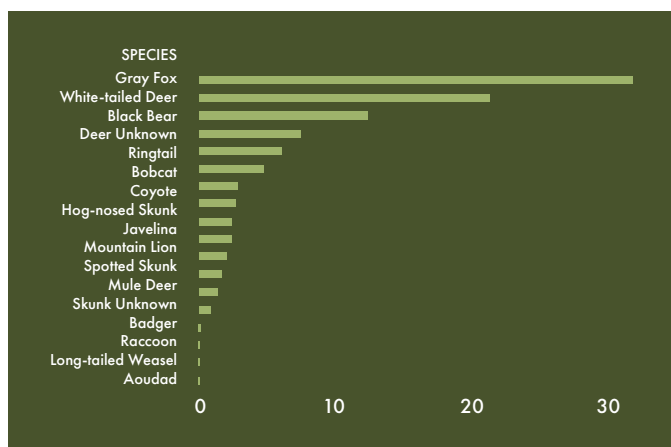


Figure 2. Percent of the total number of photographs (n= 12,449) for each target species in Big Bend National Park between 1 Feb 2014 to 19 June 2019.

Ecosystems are healthiest when the biological community is intact with a large variety of species. We sought to understand the biological community within a protected area, Big Bend National Park, to help park biologists develop and improve conservation strategies.

Our team placed 58 cameras (Figure 1) within and surrounding the Chisos Basin between 2014–2019, focusing on habitat use and co-occurrence patterns of mammals. We surveyed specifically for carnivores and ungulates due to a higher detection rate of large-bodied animals as well as their importance to ecosystem functions and human interests.

We documented a variety of mammals in Big Bend National Park (12 carnivores and 4 ungulates; Figure 2). All carnivores overlapped with at least one other carnivore except raccoons and long-tailed weasels. Mountain lions, bobcats, gray foxes, hooded skunks, striped skunks, and hog-nosed skunks appeared in all habitat types. Javelina were the only ungulate to occur in all habitat types but had a limited number of detections. We found that gray foxes and black bears had the widest distribution and a high number of detections compared to all carnivores in this study. Mountain lions also had a wide distribution but had limited detections. Of the ungulates, the Carmen Mountains white-tailed deer had the widest distribution and showed some overlap with mule deer, but generally occurred in higher elevations. There are still many questions to be answered about the mammal community of Big Bend, especially about those species with limited detections, but this can provide park biologists with a baseline for monitoring as the climate changes and visitation increases within the park.

The park is one of the most biologically diverse areas in Texas; by understanding species interactions and occurrence patterns this vital ecosystem can be protected for future generations of Texans to experience and enjoy.

# BEARS:

## Home ranges and movements of black bears in Trans Pecos, Texas

*Matthew Hewitt, Nicole Dickan, Amanda Veals Dutt, Justin T. French, and Louis A. Harveson*



*A young adult black bear spotted in the Trans-Pecos in typical Chihuahuan Desert habitat. This bear was found during field work foraging for roots, prickly pear fruit, and ants.*

The black bears of western Texas are amazing in their ability to not just persist, but thrive in the mountains and lowlands of the Chihuahuan Desert. We have trapped and collared 22 individual black bears to date (6 females, 16 males), and through observing their movements over the past year, have gained some fascinating insights into their lives and the general ecology of the population.

The most striking discovery has been the scale at which these animals live. The average area used by collared individuals varied dramatically by season and by sex, with male bears using 46,046 acres and females using 3,615 acres (95% Brownian Bridge Movement Model) annually. Bears generally used more land during late spring and summer as they traveled in search of resources and mates, with one male bear using over 77 miles during that time in 2023 (Figure 1)!

While bears making such movements and using areas of this size is not unheard of, it seems to be more common in desert environments. To really understand why bears behave the way they do, we must understand what drives them. And what drives bears is food! In an environment like the Chihuahuan Desert, food resources for bears are scarce. Unlike ruminants—animals like deer or cows—who have multi-chambered stomachs to help them break down the abundant but low-quality shrubs and grasses, bears, just like humans, are monogastrics. This means we only have one chamber to our stomach, and are forced to eat higher quality foods in order to meet our caloric needs. Bears in the Trans-Pecos must move large distances to meet their caloric needs. Foods such as prickly pear tunas, Texas persimmons, acorns, and mesquite beans are very high in calories but tend to be seasonal and highly dependent on rainfall. Therefore, bears are likely having to travel large distances to stay in areas with sufficient resources.

The geography of the Trans-Pecos has been described as a “basin and range,” which depicts high elevation mountain ranges surrounded by flat, low elevation grasslands or desert scrublands. High mountain ranges in the region include the Chisos Mountains of Big Bend National Park, the Davis Mountains in Jeff Davis County, and the Chinati Mountains in southern Presidio County, to name a few. These ranges function as ecological ‘sky islands’ that sustain a cooler and wetter ecosystem that often harbor a higher diversity of plants and animals compared to the surrounding lowlands. Sky islands provide wonderful resources to bears. They serve as thermal refuges during the summer heat and as food banks during times of drought. Since bears are capable of traversing the distances between these islands, they are able to overcome the variable weather patterns and prolonged periods of drought common in this region. For example, in the early 2000s, researchers observed 13 of 15 collared bears move over 50 miles from the Chisos Mountains to the Sierra del Carmen Mountains in northern Coahuila, Mexico, during a bad drought year.

Black bears are a remarkable species. They have found ways of adapting to the extreme environments of the rainforests of the Pacific Northwest to the Chihuahuan Desert of West Texas.

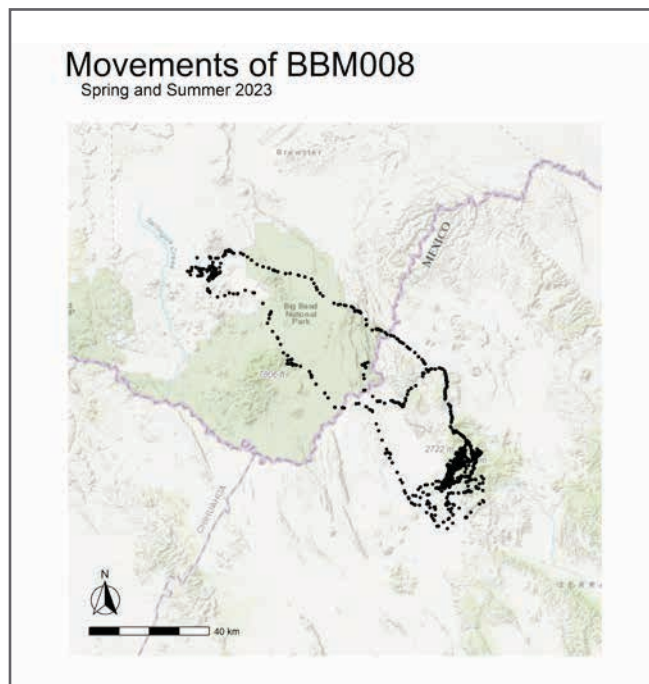


Figure 1. Map depicting seasonal locations of BBM008, a 14-year-old male black bear, during the spring and summer of 2023. Movements exemplify the importance of transboundary habitats for long distance seasonal movements of black bears in the Trans-Pecos region of Texas.



Figure 2. Photo of a collared subadult male bear investigating a trap in southern Brewster County, TX, during the Spring of 2023.

# BEARS:

## Denning ecology of black bears

Nicole Dickan, Matthew Hewitt, Amanda Veals Dutt, Justin T. French, and Louis A. Harveson

YEAR	ENTRANCE DATE	EMERGENCE DATE
Previous Study <sup>1</sup> : 1999-2003	28 Dec $\pm$ 17 days	24 Mar $\pm$ 10 days
Current Study: 2023	27 Jan $\pm$ 16 days	12 Mar $\pm$ 6 days

Table 1: A comparison of historical and current male denning chronology in West Texas. <sup>1</sup>Data from Mitchell et al. (2005), a study done on winter ecology of bears in Big Bend National Park

The hot, arid climate of the Trans-Pecos has unique implications for black bear behavior, particularly during the winter season. In more northern latitudes, all bears enter dens regardless of sex, age, or reproductive status and remain in a period of winter dormancy for up to five months. However, due to mild winter conditions, denning durations in southern latitudes tend to be shorter, and only pregnant females need to den.

Regardless of latitude, den sites are crucial for allowing bears to circumvent food shortages and provide security essential to cub survival. This is especially important for a newly recolonizing population such as the black bears in West Texas.

By conducting post-emergence den surveys and examining GPS data from collared bears, we seek to describe physical characteristics of dens, classify microhabitat characteristics surrounding den sites, identify patterns of denning chronology, and determine age- and sex-class variations in denning ecology.

In 2023, seven of the eight radioed male black bears entered a den and the average male denning durations were shorter than previously reported (Figure 1), with later entrance times and earlier emergence times. Den types consisted of four cave dens, one excavation den, and three ground nests. Most were found on steep slopes, and cavity sizes were highly variable with lengths ranging from 4.2–24.1ft (Figure 2).

The reduced denning durations that we observed could be due to changes in climate, advancements in collar technology allowing finer scale monitoring of movement, or a result of some dens being in lower elevations than previous studies. However, we did see higher rates of male denning behavior than typically reported in southern latitudes. Given the importance of denning for the success of bear populations, these data coupled with data from 2024 will provide important insights for management of this population.

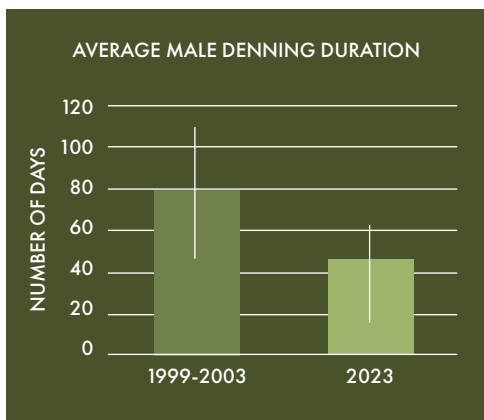


Figure 1: A comparison of the average denning duration of male bears from Mitchell et al. (2005) ( $n=6$ ), to male bears from our study ( $n=7$ ).



Figure 2: (A) Graduate student Nicole Dickan measuring a den with the shortest cavity length; (B) cave den with the largest cavity length overlooking the Rio Grande.

# KIT FOXES AND COYOTES:

## Kit fox and coyote co-occurrence in Trans-Pecos, Texas

Matthew Hewitt, Dana Karelus, Amanda Veals Dutt, Louis A. Harveson, Russell Martin (TPWD), and Patricia Moody Harveson



Figure 1. An adult coyote detected at one of our baited survey sites in the Trans-Pecos ecoregion of West Texas.



Figure 2. An adult kit fox detected by one of our camera traps in the grasslands of West Texas.

Understanding how competition affects the behavior of co-occurring species is important for management, and has implications for maintaining ecosystem diversity. Kit fox and coyotes are known to engage in intraguild predation, a type of competition, where coyotes function as the dominant predator and kit fox as the subordinate. However, kit foxes are highly adapted for life in the arid southwestern United States, and are superior at utilizing their environment in competition with coyotes. These canids are known to co-occur in the grasslands of far West Texas, and with concern of a declining kit fox population in the area, we sought to understand what effect, if any, coyotes have on kit foxes.

Using camera traps at 732 baited survey sites, distributed across suitable kit fox habitat on public and private lands, we collected detection/non-detection data for both species. Surveys resulted in 313 kit fox detections and 1,430 coyote detections over a 2-year sampling period (March 2018–March 2020). Using conditional models to assess occupancy of the two species, we determined the presence of coyotes has no meaningful effect on the probability of a kit fox occurring in a location, or on our ability to detect a kit fox when present. We determined the two canids are also not separating their use of the landscape temporally and instead are co-existing.

Our results suggest that coyotes do not affect patterns of space use for kit foxes at the spatial and temporal scales used in our surveys. We suspect the drivers behind co-existence cannot be detected from our study design. Little is known about kit fox in Texas, and population declines across their geographic range underscores the need for further research. Our work is some of the first conducted on this Texas population, and is a first look at important interactions with a co-occurring competitor and predator.

# MOUNTAIN LIONS:

## Mountain lion predation in a multi-prey system on private lands

Amanda Veals Dutt, Catherine Dennison, Patricia Moody Harveson, Bert Geary, Ron Thompson, Dana Milani, and Louis A. Harveson



*Mountain lions are one of Texas's last remaining large native carnivore species. Research shows that mountain lions play a vital role in their ecosystem as apex predators. (Photo courtesy of Ben Masters)*

Prey use and diet of large carnivores can have important impacts on food webs, wildlife management, and human conflict. Mountain lions are large, apex predators that are commonly controlled for livestock depredation and ungulate population management strategies. We assessed predatory behavior on privately owned lands in the Davis Mountains using GPS data from 16 collared mountain lions (10 females, 6 males; Figure 1).

We documented 200 confirmed kill sites and four scavenged carcasses. Scavenged carcasses consisted of three feral hogs and a bull elk (all killed by humans). Fourteen species or taxonomic groups of prey were identified at kill sites, including ungulates, mesocarnivores, lagomorphs, and rodents.

Mountain lions used a wide variety of prey and did not rely on one prey species. The top prey species (80% of diet) were deer (white-tailed and mule deer), elk, feral hog, and javelina (Figure 2). While mule deer were the most common species preyed upon (25%), elk made up the largest percent biomass consumed (47%). Male mountain lions were significantly more likely to prey on javelina than females. Importantly, livestock (e.g., domestic cattle and horses) were available in the study area yet were never preyed upon.



Figure 1. Adult mountain lion in the Davis Mountains, Texas.

As a generalist carnivore, we expected mountain lions would have a broad diet, but would primarily predate on ungulates, and our results support this. There were a wide range of species available in the Davis Mountains; however, ungulates made up more than half of animal detections in a concurrent camera trap survey in the study area.

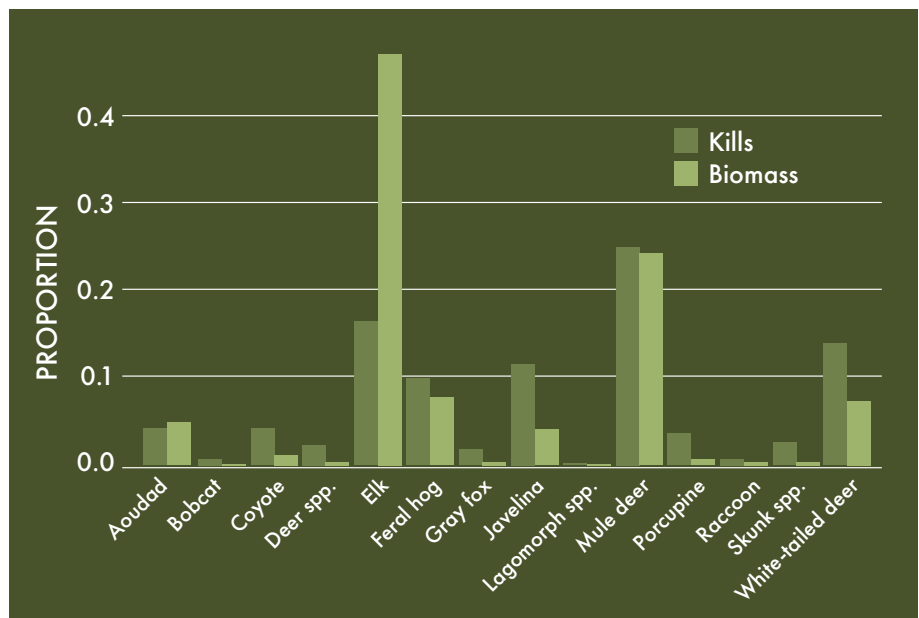
We provide important information on predatory behavior as a first step in understanding predator-prey dynamics in West Texas, which can provide insight for management of ecologically and financially important species for local communities. Mule deer were the most consumed prey species by mountain lions in our study, but only made up 25% of kills and 24.6% biomass consumed. Further, mountain lions in the Davis Mountains used areas larger than most local ranches and tended to move

across the landscape quickly. This indicates that the impact mountain lions might have on deer would not be concentrated to one ranch but would occur over a broader area to not cause localized declines or financial burden for a particular landowner. Deer and other prey species seem to be abundant with stable distributions throughout the Trans Pecos; therefore, while mule deer seem to act as the primary prey they are not likely threatened by mountain lion predation.

We did not observe any livestock kills, although cattle and horses were documented as a potential prey source available within the study site. Predation on livestock likely depends on body size of the species, abundance of livestock, other potential prey species on the landscape, and local ranching practices. It is important to note that we never documented a single instance of livestock depredation or scavenging.

Our results indicate that mountain lions in the Davis Mountains make use of the wide diversity of prey. While probability of predation and diet composition was high for some species, mountain lions are not wholly reliant on any one species. Changes in land use and the abundance and diversity of prey populations can affect predator populations by influencing population size and altering behavior. As landownership and land management patterns in the Trans-Pecos region continue to shift, careful monitoring of both predator and prey populations will be important for a thorough understanding of overall ecosystem health.

Figure 2. Proportion of kills for all mountain lions ( $n = 16$ ) compared to total biomass consumed by prey species in the Davis Mountains from 2011–2015. We aggregated kills of 14 taxonomic groups where we were unable to determine species, including *Lagomorph spp.* (rabbits and hares) and *Skunk spp.* For a few deer we were unable to determine species ( $n = 5$ ) and classified these as *Deer spp.* Proportion of kills and biomass was based on the 200 kills and four scavenged carcasses.



# CURRENT STUDENTS AND ONGOING PROJECTS

## EMILY BLUMENTRITT



Growing up in the heart of one of the largest cities in the US didn't stop Emily from finding her love for nature and wildlife. Through volunteering for wetland restoration projects in urban settings, she discovered a passion for conservation-focused research that benefits people and wildlife. She got her bachelor's degree in

Wildlife Biology from Texas State University and developed a particularly strong interest in birds. She has worked on a variety of research projects focused on conservation and birds, including wetland restoration ecology and nest box monitoring for several species of cavity-nesting birds. She is currently pursuing her M.S. in Range and Wildlife Management at Sul Ross State University.

## CAITLIN CAMP



Caitlin found her love for wildlife and the outdoors through exploring around her Texas home as well as traveling as a child to National Parks all over the US. Caitlin received her B.S. in Environmental Studies from Texas A&M University. After working various environmental jobs at state agencies and consulting firms, she decided she wanted to focus on wildlife, so she

obtained her M.S. in Range and Wildlife Management at Sul Ross State University studying carnivores and other mammals in Big Bend National Park. Caitlin then worked at a consulting firm focused on monitoring threatened species. Her interest and love for carnivores brought her back to Texas to pursue a Ph.D. in black bear ecology.

**Which migrating and wintering birds of the Chihuahuan Desert grasslands utilize livestock tanks, and what characteristics of livestock tanks relate to bird diversity and abundance?**

Emily's project seeks to answer that question by conducting bird surveys, placing acoustic recording units, and measuring environmental characteristics such as brush cover and soil invertebrate density. She is also placing GPS trackers on one particular grassland bird species, the long-billed curlew, to discover how they might be using livestock tanks and to better understand how some individuals overwinter in the Chihuahuan Desert.

**Black bears were considered extirpated from Texas in the 1950s due to unregulated hunting, predator control, and habitat loss.**

Since being listed as "state threatened" on the state endangered list in 1987, black bears have naturally recolonized areas of Texas, dispersing from a Mexico source population to small suitable habitat patches, forming subpopulations in West and South Texas. Using GPS collar data, Caitlin's research will investigate transboundary movements and how black bears might be affected by current border activity and infrastructure along the U.S.-Mexico border, identify current and potential habitat for black bears, and determine population stability of this recolonizing species.

## ELIANA DYKEHOUSE



Growing up in the Coastal Bend of Texas, Eliana loved spending time outside with her family and learning from her grandfather, who was a wildlife professional. Attending Wildlife Conservation Camp and volunteering at the Welder Wildlife Refuge as a teen

solidified her interest in the natural resource management field. She is currently a senior majoring in Conservation Biology at Sul Ross State University, where she is president of the Range and Wildlife Club and a member of the Plant ID team. Her love for the area and desire to continue to challenge herself led her to remain at Sul Ross to pursue a master's degree, which she will begin in the summer of 2024.

## AUDREY TAULLI



Originally from a town north of Dallas, Audrey grew up constantly finding chances to be outside. Camping, hunting, and fishing became childhood staples, further developing her love for exploring the natural world. Earning a B.S. in Wildlife and Fisheries Sciences at Texas A&M also introduced her to the

realm of ornithology after interning off the coast of Maine with National Audubon Society. After graduating, Audrey worked for the Texas A&M Natural Resources Institute, where her crew conducted ecological surveys on military installations to assist in annual environmental compliance standards. She is also a talented artist and has a love for scientific illustrations and nature-based art.

**Though small in size, insect pollinators have an enormous impact on ecosystems worldwide, including arid environments such as ours.**

Higher numbers of pollinator species have been recorded in environments with more heterogeneous plant communities. Year-round mowing has been shown to decrease structural heterogeneity and vegetative diversity. Selective mowing plans, however, can be used to introduce disturbance that benefits plant communities and subsequently increases pollinator diversity. Eliana's study aims to evaluate the responses of plant and insect communities to various mowing regimes at the Fort Davis National Historic Site to draw conclusions about the effects of mowing on local pollinators.

**Grassland habitats in the US are some of the fastest-declining environments in the country.**

The birds that live therein are declining in a similar manner, mostly due to the encroachment of woody invasive plant species that can occur due to overgrazing and changes in climate. The treatment and physical removal of these plant species could help restore historic grasslands and also allow grassland-obligate bird species to return to the area and potentially grow in population. As part of BRI's ongoing grassland birds restoration project, Audrey is monitoring the avian communities' responses to the treatment and removal of woody invasive species.

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*All photos courtesy of BRI unless otherwise noted. Front cover: chestnut-collared longspur (courtesy of Bryan Calk); back cover: black bear (courtesy of Darwin Weigel). BRI staff editors include Julie Rumbelow, Bill Adams and Lydia Saldaña.*

**The Borderlands Research Institute at Sul Ross State University depends on private donations to fund much of our work. We are immensely grateful to our many partners who make our work possible.**

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