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A PICTURESQUE BEGINNING TO LARGE MAMMAL RESEARCH IN THE *Texas Hill Country*

by Miranda Hopper, Bailey Kleeberg, Levi Heffelfinger, and Michael Cherry

Every year, thousands of people flock to the Texas Hill Country to enjoy its picturesque beauty. From rolling hills, open grasslands, starry skies, and crystal-clear waters lined by magnificent cypress trees, the Hill Country is a popular destination for all kinds of outdoor recreationists. For those who call the Hill Country home, however, it is more than just a quiet escape where cell phone service is spotty.

The Hill Country is unique compared to the rest of Texas because of its oak and juniper savannas, deep canyons, towering limestone bluffs, and meandering rivers. The scenic region, though, is not without its challenges. This fragile ecosystem also has thin, rocky soils and rugged terrain that is highly susceptible to erosion, along with a variable climate prone to drought. Additionally, this region is facing many difficulties, such as development, fragmentation, and ecosystem disruption caused by invasive plants and animals. Texans in the Hill Country see and appreciate the beauty and uniqueness of this landscape and want to see it protected.

This past year, generosity and dedication from private landowners allowed the Caesar Kleberg Wildlife Research Institute to develop and launch the Henry Hamman Program for Hill Country Conservation and Management. This research program is dedicated to understanding the ecology of the Hill Country, and using the knowledge acquired to conserve the region's natural resources, including water, soils, vegetation, and wildlife. One of our first projects under this program aims to establish a long-term large mammal monitoring effort using game cameras. Our primary goal is to investigate the relative population size and distribution of various large mammal species across the Hill Country. With the establishment of these long-term sites spread out across the Hill Country, we can track changes in species distribution and abundance over time. This effort will become increasingly important as invasive species, such as aoudad and wild pigs, or predators, such as mountain lions and black bears, expand their range throughout the region. Not only will we be able to assess these long-term changes in large mammal communities, but we can also use this data to connect information about these populations to landscape characteristics, such as juniper management, elevation, and human recreation.

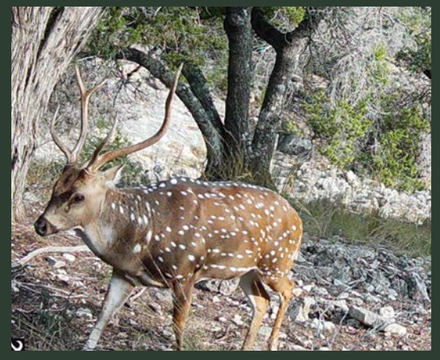


CKWRI graduate student, Miranda Hopper, deploying a game camera on one of sixteen properties collaborating with the large mammal monitoring project within the Henry Hamman Program for Hill Country Conservation and Management. Photo Credit: James Harrington.



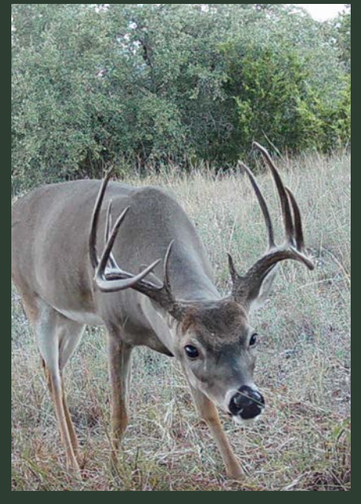




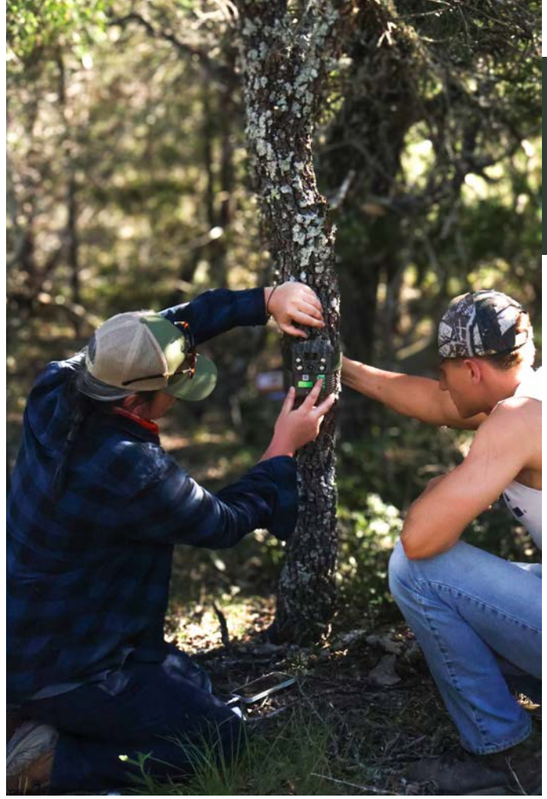


Game cameras captured photos of a variety of animals including red deer, gray foxes, aoudad, axis deer, ringtails, white-tailed deer and coyotes (and more not pictured here).









CKWRI graduate students, Miranda Hopper and Kevin Lovasik, deploying a game camera on one of sixteen properties collaborating with the large mammal monitoring project within the Henry Hamman Program for Hill Country Conservation and Management. Photo Credit: Dakota Moberg.

We hope that this study will allow us to provide critical, science-based information about large mammals to landowners, so that they can make decisions about how to best manage their property to meet their specific needs.

With these objectives in mind, we set out to deploy game cameras across the Hill Country. We began in September 2024 with 56 cameras and the support of landowners across ten different properties, based primarily in Leakey but with properties stretching from as far west as Brackettville and as far east as Austin. Of the properties included, some were behind high fences, while some were low-fenced properties. In our first week of camera deployments, we made sure to meet with the landowners to explore their property with them, learn what made their property special, and hear what issues were most important to them. Nearly two months later, we anxiously returned to check our cameras for the very first time. Anyone who has used game cameras knows that checking the first batch of photos is as daunting as it is exciting. We had no shortage of photos to scroll through, but every singular detection of an animal made the hundreds of pictures of simply grass blowing in the wind worth it. After the first check, we had just over 10,000 photos of wildlife. Of those, approximately 50% were white-tailed deer. The next most commonly detected species was feral hogs at 18.6%. Other species that made appearances were aoudad (5.3%), elk (2.7%), axis deer (2.1%), and red deer (1.4%). Additionally, our cameras allowed us to capture a host of smaller mammals, including coyotes (1.8%), gray foxes (1.3%), raccoons (1.1%), porcupines (0.1%), and bobcats (0.1%). Perhaps one of the more exciting finds was our detection of ringtails (0.6%), who were frequent night-time visitors in front of our cameras. Lastly, though they appeared to be few and far in between, we were also thrilled to capture photos of javelina, a native species that has anecdotally been declining in the region.

This early stage of the project is just the beginning. Today, we have 134 cameras deployed across 16 properties with more expansion underway. We are curious to see what other elusive critters our cameras will find, and we are looking forward to sharing all of our findings over the next few years with the landowners who made this work possible. Perhaps just as exciting as photographing a new species for the region, is the opportunity to continue to explore the Hill Country and meet the wonderful people who call it home. Over the past few months, we have been enthusiastically welcomed by all our partnering landowners, from morning cups of coffee to afternoon rides on the UTV. Every person has shared a piece of their home with us. With each visit, we understand a little more why people come from all over to visit this very place, and we become even more dedicated to the conservation of the unrivaled Texas Hill Country.



Figure 1. An open understory stand of Ashe juniper that has been managed to promote herbaceous growth. Photo credit: Dakota Moberg

BRANCHING OUT

THE CHANGING LANDSCAPE OF THE TEXAS HILL COUNTRY

by Dakota R. Moberg, Ashley M. Tanner, Evan P. Tanner, Sandra Rideout-Hanzak, Fidel Hernandez, and Anthony D. Falk

What comes to mind when you think of the Texas Hill Country? Maybe it's the limestone bluffs, winding rivers, or the explosion of bluebonnets each spring. The land is rugged yet resilient, shaped by droughts, floods, and the quiet persistence of time. And whether you see it as a nuisance or staple of the landscape, one thing is certain – Ashe juniper has become a part of the identity of this region.

The Texas Hill Country is part of the Edwards Plateau ecoregion, a fragile ecosystem that is undergoing significant ecological and land use changes. Anthropogenic activity such as urban expansion has profoundly altered the region's landscape. As large ranches and open spaces are increasingly subdivided for residential and commercial development, wildlife corridors are disrupted, hydrological processes altered, and ecosystem resiliency weakened. Changes in land use and management have also played a major role in reshaping the landscape of the Texas Hill Country. Additionally, the suppression of natural fire regimes, coupled with overgrazing and soil disturbance, has created conditions that favor Ashe juniper.

The rapid spread of woody plants into historically open grasslands has been ongoing for over a century. Fire suppression, overgrazing, and climate change have all contributed to conditions that favor the expansion of trees at the expense of native grasses. While Ashe juniper, sometimes referred to as cedar, is a native species, its historical distribution and abundance remain widely debated and controversial. Many researchers suggest that Ashe juniper was historically confined to riparian areas, canyons, and isolated pockets in the landscape, where natural disturbances kept it in check. Others argue that it was more widespread within this region. Regardless of its past extent, anthropogenic influences have significantly altered its current distribution, allowing it to expand beyond what many consider its historic range.



Figure 2. A closed canopy stand of Ashe juniper with a dense understory. Photo credit: Dakota Moberg

As humans suppressed fire and intensified grazing practices, Ashe juniper was able to spread and form dense thickets. This proliferation presents several challenges: thick cedar stands can reduce herbaceous plant biodiversity, limit forage availability, and alter other key ecosystem functions (such as groundwater recharge). On the other hand, Ashe juniper provides critical habitat for species like the endangered golden-cheeked warbler, demonstrating the complexity of its role within the region. Given these competing ecological and management concerns, a broad approach is needed to consider how land management influences and may support multiple ecosystem functions.

Ecosystem multifunctionality refers to the many functions and services an ecosystem offers simultaneously. Healthy ecosystems provide services such as nutrient cycling, soil fertility, water retention, and biodiversity. However, when management efforts focus too heavily on a single function, other critical processes may be overlooked. For example, widespread removal of Ashe juniper to encourage the growth of other desirable species may lead to unintended consequences, such as increased soil erosion. If not properly managed, Ashe juniper can also quickly return to cleared areas, often more aggressively than before. While removal may benefit some land uses, a singular focus on one aspect can disrupt broader ecosystem functions. A balanced approach that considers multiple ecosystem processes is essential for maintaining long-term health and resilience of this unique ecoregion.

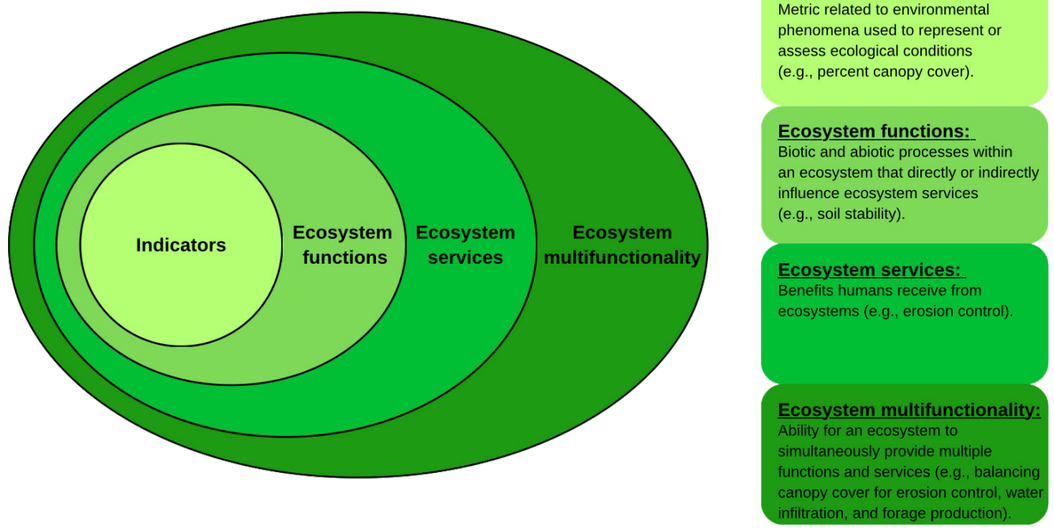


Figure 4.
A conceptual diagram adapted from Garland et al. (2020), illustrating the components that make up ecosystem multifunctionality.



Figure 3. A steep canyon wall typical of the Texas Hill Country, historically considered a natural boundary for Ashe juniper expansion. Photo credit: Dakota Moberg

Understanding the ecological effects of Ashe juniper is only part of the equation. The role of social perceptions and ideas about land management decisions is equally important. Land use and conservation strategies are influenced by our cultural values, economic priorities, and previous land management practices. Our perceptions drive our management actions in ways that don't always align with ecological best practices or anticipated results. Identifying and understanding these influences allows us to develop land management approaches that are both ecologically and socially appropriate.

The goal is not to label Ashe juniper as a villain, but to develop a nuanced understanding of its role in the ecosystem. Through the Henry Hamman Program for Hill Country Conservation and Management, we aim to integrate soil science and plant ecology to bridge the gap between social perceptions of Ashe juniper and conserving ecosystem multifunctionality. By providing essential data to inform land management practices, we hope to ensure the Texas Hill Country remains a resilient and multifunctional landscape for generations to come.

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