2024 Ashe Juniper Symposium

May 8-9, 2024
Austin, Texas

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The goal of the 2024 Ashe Juniper Symposium is to advance our collective understanding of the science of Ashe juniper and facilitate applications of this understanding into management and conservation of sustainable, resilient, and ecologically-appropriate ecosystems. The symposium was designed to bring together scientists, land stewards, conservation practitioners, private landowners and others, to provide an opportunity to hear about and discuss historical perspectives, recent research, and current initiatives pertaining to Ashe juniper ecology and ecosystem management, the social science of land stewardship, as well as land management programs and projects in central Texas.

The planning committee would like to thank the sponsors and supporters for their contributions to the symposium. The 2024 Ashe Juniper Symposium sponsors include Biodiversity Works, Austin Water/Wildland Conservation Division, Shield Ranch, Bandera Corridor Conservation Bank, Hill Country Conservancy, The Meadows Center for Water and the Environment, The Nature Conservancy in Texas, Plateau Land & Wildlife Management, Texas A&M Forest Service, and Texas A&M Natural Resources Institute. We would also like to thank Travis County Natural Resources for providing a cost share for the expense of the venue. This symposium was also supported by a grant from the Chiltepin Charitable Fund.

Symposium Planning Committee Members

David Wolfe (Planning Committee Chair) – Principal and Senior Consultant, Bonamia, LLC

Patty Ramirez (Event Coordinator) – Executive Director, Biodiversity Works; *pramirez@biodiversityworks.org*

David Diamond – Senior Ecologist, Missouri Resource Assessment Project

Craig Farquhar – Lecturer, Texas State University Department of Biology

Rachael Lindsey – Director of Science and Stewardship, Hill Country Conservancy; Founder, Juniper Wildlife

Elizabeth McGreevy – Founding Executive Director, Project Bedrock

Steve Nelle – Private Lands Consultant

Todd Nightingale – Project Manager, Texas A&M Natural Resources Institute

Lisa O'Donnell – Senior Biologist, Austin Water, Wildland Conservation Division, Balcones Canyonlands Preserve

2024 Ashe Juniper Symposium Agenda

Wednesday, May 8th	
8:00 AM	Check-in, Coffee, and Light Refreshments (8 AM – 9 AM) – *Commons Conference Center Atrium*
9:00 AM	**Symposium Welcome** David Wolfe (Bonamia, LLC)
9:05 AM	**Thinking About Cedar** Steve Nelle (Private Natural Resource Consultant)
9:25 AM	**Edwards Plateau Vegetation Patterns** David Diamond (Missouri Resource Assessment Partnership) and Duane German (Texas Parks and Wildlife Department)
9:55 AM	**Historical Ecology of the Texas Hill Country** Lisa O'Donnell (Austin Water, Wildland Conservation Division, Balcones Canyonlands Preserve)
10:25 AM	Break (30 minutes)
10:55 AM	**Rare and Endemic Plants Associated to Ashe's Juniper Plant Communities in Central Texas** Jason Singhurst (Texas Parks and Wildlife Department)
11:15 AM	**Ashe Juniper – It isn't Just for Warblers** Rich Kostecke (Hill Country Conservancy)
11:35 AM	**Ecosystem Benefits of Ashe Juniper Pioneer Thickets and Old-Growth Cover** Elizabeth McGreevy (Project Bedrock)
12:05 PM	Lunch (12:05 PM – 1:15 PM) – *Commons Conference Center Atrium*
1:15 PM	**Soils, Roots, and Symbioses: A Belowground Perspective on Juniper-oak Woodlands** Brian Pickles (University of Reading) and Monika Gorzelak (Agriculture and Agri-Food Canada)
1:35 PM	**Mutualist Matters: Effects of Inoculum Source on Mycorrhization and Drought Resilience in *Quercus buckleyi* Seedlings** Silas Jenkins (Texas State University, Department of Biology)
1:55 PM	**Juniper's Effects on Soil and Weathered Bedrock Water Dynamics in Sonora, TX** Pedro Leite (Texas A&M University, Department of Ecology and Conservation Biology)
2:15 PM	**Understanding Water Use by *Juniperus ashei* at the Individual Tree Level in Response to the Climate Gradient Across the Edwards Plateau and Forest Scale Response to Property-specific Clearing** Ashley Matheny (University of Texas at Austin, Department of Earth and Planetary Sciences)
2:35 PM	Break (30 minutes)
3:05 PM	**Long-term Effects of Crown-fires on Oak-juniper Woodlands: Loss of Ashe Juniper and Successful Oak Recruitment** Charlotte Reemts (The Nature Conservancy in Texas)
3:25 PM	**Long-term Effects of Prescribed Thinning + Fire and White-tailed Deer Exclusion on Woody Species Composition in a Central Texas Woodland** Rebecca Carden (University of Texas at Austin, Department of Integrated Biology)
3:45 PM	**Woody Cover Response to Thinning and Prescribed Burning in Central Texas Savannas** Devin Grobert (Austin Water, Wildland Conservation Division, Water Quality Protection Lands)
4:05 PM	**Cultivating Clarity: Decoding Wildfire Narratives and Debunking Juniper Myths** Justice Jones (Austin Fire Department Wildfire Division)
4:30 PM	Happy Hour Mixer (4:30 PM – 6 PM) – *Commons Conference Center Atrium*

Thursday, May 9th	
8:00 AM	Check-in, Coffee, and Light Refreshments (8 AM – 9 AM) – *Commons Conference Center Atrium*
9:00 AM	**Symposium Welcome** C. Craig Farquhar (Texas State University, Department of Biology)
9:05 AM	**Private Land Stewardship for a Sustainable and Resilient Hill Country** Rachael Lindsey (Hill Country Conservancy)
9:35 AM	**Informing Collaborative Endangered Species Conservation in Texas: A Human Dimensions of Wildlife Case Study from the Post-Oak Savannah** Jared Messick and Chris Serenari (Texas State University, Department of Biology)
9:55 AM	**Connecting the Dots – Working at a Landscape Scale, One Ranch at a Time** Rebecca Neill (The Nature Conservancy in Texas)
10:15 AM	Break (30 Minutes)
10:45 AM	**A Conservation Conversation – Ashe Juniper and NRCS** Charles Kneuper (USDA-Natural Resources Conservation Service)
11:05 AM	**Documenting Texas' Landscapes, The Ecological Mapping Systems and Engaging the Public with the TEAM Tool** Amie Treuer-Kuehn (Texas Parks and Wildlife Department)
11:25 AM	**Ecological Site Descriptions: What Are They and How They Are Used** Bryan Christensen (USDA-Natural Resources Conservation Service, Soil and Plant Sciences Division)
11:45 AM	**Working with Ashe Juniper – Wildlife Tax Valuations and Habitat Management** Shane Kiefer (Plateau Land & Wildlife Management)
12:05 PM	Lunch (12:05 PM – 1:15 PM) – *Commons Conference Center Atrium*
1:15 PM	**Promoting Diversity in Juniper-Oak Woodlands** Jim O'Donnell (Austin Water, Wildland Conservation Division, Balcones Canyonlands Preserve)
1:35 PM	**A Practitioner's Perspective - Bandera Corridor Conservation Bank** Jesse McLean (Bandera Corridor Conservation Bank)
1:55 PM	**Multifactor Management of Mountain Cedar: Lessons Learned from the Frio River Canyon** Kevin Wessels (H. E. Butt Foundation)
2:15 PM	**Stewarding the Steward: Shaping Wise Woodland Management Decisions in the Edward's Plateau** Karl Flocke (Texas A&M Forest Service)
2:35 PM	Break (15 Minutes)
2:50 PM	**Panel Discussion - Land Management in Ashe Juniper Ecosystems: Integrating Science with Landowner and Stewardship Goals** (60 Minutes) Elizabeth McGreevy (Project Bedrock), Jared Messick (Texas State University, Department of Biology), Blake Murden (Shield Ranch), and Daniel Oppenheimer (Hill Country Alliance)

Presentations – Wednesday, May 8th

Wednesday, May 8th, 9:00 AM

Symposium Welcome

David Wolfe – Bonamia, LLC

David Wolfe is a consultant with Defenders of Wildlife and the Knobloch Family Foundation. He received a master's degree in ecology from the University of Georgia in 1992 and then worked for 28 years in the non-profit conservation sector, first with The Nature Conservancy and then with Environmental Defense Fund. David has vast experience working with public and private landowners, scientists, and diverse stakeholders to design and implement programs to restore, conserve, manage and monitor habitats for at-risk species and he has worked extensively with regulatory assurance, financial incentive, and market-based programs for species recovery. Email: dwolfe-consultant@defenders.org.

Wednesday, May 8th, 9:05 AM

Thinking about Cedar

Steve Nelle - Private Natural Resource Consultant

By whatever name you call it, Ashe juniper is the subject of deeply held sentiments in the Hill Country. Some hate it, some revere it, and some just tolerate it, but nearly everyone has an opinion about cedar, often strong opinion. Regardless of your own personal sentiments, we hope that during this symposium you might temporarily lay aside the strong opinion and listen with an open mind.

We invite you to *think about cedar* with a clear, fresh, logical mind. Ruminate on what you hear. Just as a cow chews and re-chews her cud to get the most nutritional benefit, think about what you hear; give it a fair hearing and see if it makes sense.

This symposium will not provide all of the final answers about cedar. It was designed to shed some new light on our growing understanding of this species, its ecological roles and how best to manage it. The speakers and topics were selected to illuminate some of the newer and less well known aspects of cedar. Some of this new information is different from our traditional understanding of cedar.

The questions below will help engage your mind in what you will be hearing over the next two days. Each of these questions stems directly from common beliefs about cedar or some of the new information that has been discovered:

- Was the Hill Country once vast grassland; was it vast woodland?
- Was cedar historically restricted to the steepest crags, headers and canyons?
- Can we restore the Hill Country to its former ecological condition?
- What was the historic fire regime in the Hill Country?
- Is fire the answer to our cedar problems?
- Does cedar create an extreme fire hazard?

- Is cedar good or bad? Is it detrimental or beneficial? Is it an asset or a problem?
- Does the removal of cedar enhance or degrade the landscape?
- Is cedar a sign of sick, degraded land; Is it nature's way to help heal the land?
- Is a cedar brake a sterile, unproductive environment? Is cedar allelopathic?

- Does cedar cause erosion or does it help rebuild soil?
- How much water does cedar use? How much rainfall does it intercept?
- Does cedar desiccate or help hydrate the land?
- Does cedar help or hinder groundwater recharge?
- Will control of cedar enhance aquifer recharge and cause dormant springs to flow?
- Does cedar sequester carbon?

- Is the golden-cheeked warbler or the ESA reason enough to maintain cedar woodlands?
- Does cedar need to be removed, reduced, maintained, or allowed to increase?
- Was grandpa right or wrong to cut all the cedar off his place?
- Does cedar cutting equate to good land stewardship?
- What is good land stewardship?

Steve Nelle is 6th-generation descendent of some of the earliest Hill Country German settlers. He has enjoyed a 48-year career working with private landowners, large and small, trying to gain a practical understanding of the complexities of this region and how to be a responsible custodian of the land. Email: nellesteve01@gmail.com.

Wednesday, May 8th, 9:25 AM

Edwards Plateau Vegetation Patterns

David Diamond - Missouri Resource Assessment Partnership
Duane German - Texas Parks and Wildlife Department

We will show how the vegetation of the Edwards Plateau ecoregion relates to other parts of the Great Plains and how the ecoregion is geographically sub-divided based on controlling geophysical factors, primarily precipitation and geology. We will illustrate how local patterns of current vegetation in the Balcones Canyonlands ecoregion are strongly influenced by geology, landform, and soils. Existing ecological systems of the Balcones Canyonlands will be briefly discussed, with brief consideration of pre-European vegetation patterns. Old and new datasets useful for vegetation mapping and management will be presented, with an eye toward potential improvements in spatial data that will better inform both mapping and management.

Dr. David D. Diamond began his career as a Heritage Program ecologist for Texas, where he wrote the first modern classification of the vegetation of that state. He began mapping ecological systems in the early 1990's and has led state-specific teams in mapping Texas, Oklahoma, Kansas, Nebraska, Missouri, and Arkansas. He has published more than a dozen scientific papers on the ecology of the Edwards Plateau, beginning in the late 1980's. He is currently a senior ecologist and past Director for the Missouri Resource Assessment Partnership (MoRAP), University of Missouri. Email: diamondd@missouri.edu; Duane.German@tpwd.texas.gov.

Wednesday, May 8th, 9:55 AM

Historical Ecology of the Texas Hill Country

Lisa O'Donnell - Austin Water, Wildland Conservation Division, Balcones Canyonlands Preserve

We often hear about how the entire central Texas landscape was a shifting mosaic of woodland and grassland. Accounts of early explorers riding through extensive prairie are cited as evidence that Ashe juniper has “invaded” or "encroached" on what used to be mostly grass. In some parts of Texas this may be true, but not in all. Eyewitness accounts spanning the time period from the early 1700s (prior to European settlement) through the early 1900s depict predominant vegetation communities of the Texas Hill Country, including areas of “cedar” and oak forests. These historical documents, compiled from more than 30 years of research, also include photographs, maps, and field survey notes from original land grants, which are used to cross-reference and corroborate the written accounts. These documents will be presented within the context of major historical events, ecoregions, and the Balcones Escarpment, a geologic fault zone that separates the Blackland Prairie from the Hill Country ecoregions in central Texas. Land use changes that began during the mid to latter part of the 1800s, as documented by these eyewitness accounts, provide insight regarding how our perceptions of the Texas Hill Country have changed over the past 300 years. This research underscores the importance of historical ecology in managing and restoring habitat for endangered species and ecosystems.

Lisa O’Donnell has lived in Austin, Texas, most of her life and embarked on a career as an endangered species biologist in 1987. She began working for the U.S. Fish and Wildlife Service in 1991, soon after the listing of the Golden-cheeked Warbler. Hearing frequent claims that the Hill Country was originally dominated by grasslands, Lisa began researching this issue and has been compiling historic accounts and other documents ever since. This presentation is the product of over 30 years of research. Today, as Senior Biologist for the City of Austin's Balcones Canyonlands Preserve, Lisa is a proponent of combining historical research and ecology to making informed land management decisions, including protection of the Golden-cheeked Warbler, Black-capped Vireo, karst invertebrates, aquatic salamanders, and rare plants that occur within the preserve. Email: lisa.odonnell@austintexas.gov.

Wednesday, May 8th, 10:55 AM

Rare and Endemic Plants Associated to Ashe’s Juniper Plant Communities in Central Texas

Jason Singhurst - Texas Parks and Wildlife Department

This presentation will examine many of the described Ashe’s juniper (*Juniperus ashei*) related plant community association types described in the U.S. National Vegetation Classification System across the Edwards Plateau Ecoregion of Central Texas. An association is defined as “a plant community of definite floristic composition, uniform habitat conditions, and uniform physiognomy.” This talk will emphasize high plant endemism (plants found nowhere else but Texas) that are restricted to one or more Ashe’s juniper association type(s). The landscape position that influences sunlight, temperature, precipitation, and humidity, as well as topography, soil depth, underlying geology, and aspect influences Ashe’s juniper plant community associations. We will review several Ashe’s juniper community ecological features that make them distinct and add to the overall plant diversity of the Edwards Plateau.

Jason Singhurst received a BS and an MS in Agricultural Science from Stephen F. Austin State University and has served as a botanist/plant ecologist in Texas for 29 years for Texas Parks and Wildlife Department. He has a research affiliation with the Baylor University and University of Texas Herbarium and Botanical Research Institute of Texas, and he utilizes his GIS and Remote Sensing skills to map, survey, and document rare habitats on conservation-friendly private lands state-wide; these data are used to preserve many rare and declining plant and animal species as important conservation values of intact private landowner landscapes.

Jason is involved in many regional conservation partnerships with state and federal agencies and many land trusts, and he supports ecological data collection for Farm and Ranch Land conservation easement projects. Additionally, he oversees university research projects funded through state and federal grant programs for the 226 rare plant communities tracked in the Texas Conservation Action Plan.

Jason has described six plant species new to science that are endemic to Texas, and he is an authority on tallgrass prairie flora and ecology regions of Texas, driven from his youth spent exploring the prairies of the southern Flint Hills of Kansas with his grandfather. He has published over 130 scientific publications on the flora and plant ecology of Texas, co-authored a book on Rare Plants of Texas (2008; Texas A&M Press), and contributed a chapter on Eastern Texas Prairie Landscapes for a book on Southeastern Grasslands (2018; University Alabama Press). He recently signed a contract with three other co-authors with Texas A&M Press to produce a book on Rare Plant Communities of Texas to be published in 2026.
Email: jason.singhurst@tpwd.texas.gov.

Wednesday, May 8th, 11:15 AM

Ashe Juniper – It Isn't Just for Warblers

Rich Kostecke - Hill Country Conservancy

Love it or hate it, Ashe Juniper is a common tree that plays a significant role as wildlife habitat across the Edwards Plateau and Central Texas. For some species it is a critical, obligate component of their habitat and life history. Some species use it facultatively. Yet other species can be negatively impacted by its local dominance. I will provide examples for each of these groups. I also will discuss how juniper is perceived as wildlife habitat, as well as review what is actually known about juniper as wildlife habitat and where data gaps exist. Finally, I will discuss the role that juniper can play as wildlife habitat at both local and landscape levels.

Rich has a BS in Biology from the University of Kansas, an MS in Zoology from North Dakota State University, and a PhD in Wildlife Science from Texas Tech University. Over the last several decades, mostly in the non-profit sector, Rich's work has focused on the conservation, ecology, and management of birds and their habitats in Texas (with a big focus on the Hill Country); land protection; and planning. Currently, Rich works for Hill Country Conservancy as Conservation and Science Specialist.
Email: rich@hillcountryconservancy.org.

Wednesday, May 8th, 11:35 AM

Ecosystem Benefits of Ashe Juniper Pioneer Thickets and Old-Growth Cover

Elizabeth McGreevy - Project Bedrock

For almost 100 years, we've treated all Ashe Juniper cover as something that harms the limestone karst country lands of central Texas. New research is now teaching us we were wrong. We now know there is a deep connection between junipers and other woody cover and the shallow limestone bedrock. Instead of causing harm, pioneer thickets are acting as ecosystem engineers to help regenerate degraded karst country, and old-growth forests sustain groundwaters, healthy soils, deep carbon storage, and biodiversity, while reducing fire risk.

Elizabeth McGreevy is a nonprofit and private sector professional with more than 25 years of expertise in Hill Country ecological analysis, planning, and long-term management, education and outreach, and best development practices. She is the author of the well-researched book, Wanted! Mountain Cedars, Dead and Alive, *and founding executive director of Project Bedrock, which promotes using mountain cedars and other nature-based solutions to regenerate degraded limestone Texas karst country. She is also the owner of Land Steward, a Hill Country-based land management consulting and planning business. A sixth-generation Texan, she received a Master of Landscape Architecture in Environmental Planning from Texas A&M University, an undergraduate degree in biology from Randolph College, and is a certified permaculture planner. Email: elizabeth@projectbedrocktx.org; elizabeth@landsteward.net.*

Wednesday, May 8th, 1:15 PM

Soils, Roots, and Symbioses: A Belowground Perspective on Juniper-oak Woodlands

Brian Pickles - University of Reading
Monika Gorzelak – Agriculture and Agri-Food Canada

Fungi play important roles in forest and woodland ecosystems with key processes driven by mycorrhizal, saprotrophic, and pathogenic fungi. Our understanding of the mycorrhizal ecology of many woody plants is complicated by the practical difficulties of observing belowground interactions in soils between plant roots, fungi, and other organisms.

Here we used Illumina MiSeq DNA sequencing to examine the fungal biodiversity associated with oak and Ashe juniper in several locations around the Balcones Canyonlands Preserve on the Eastern Edward's Plateau. Samples were collected from the roots of seedlings and mature trees, associated soils, and caves below the surface.

Colonisation of oak seedlings by ectomycorrhizal fungi increased with basal area of mature oak and Ashe juniper trees, and fungal pathogens declined as ectomycorrhizal density and abundance increased. Rather unexpectedly we found that Ashe juniper roots may associate with ectomycorrhizal fungi. This supports a similar observation from alligator juniper in Mexican woodlands and suggests that Ashe juniper may play some role in supporting key oak symbionts in juniper-oak woodlands.

Dr. Brian Pickles is an Associate Professor of Ecology at the University of Reading in the UK. His diverse interests span plant-fungal symbioses, forest dynamics, reptile conservation, and palaeoecology. Dr. Monika Gorzelak is a Research Scientist at Agriculture and Agri-Food Canada. Her work examines soil

microbial ecology in rangeland and crop systems with a focus on mycorrhizal fungi and regenerative agriculture. Email: b.j.pickles@reading.ac.uk.

Wednesday, May 8th, 1:35 PM

Mutualist Matters: Effects of Inoculum Source on Mycorrhization and Drought Resilience in *Quercus buckleyi* Seedlings

Silas Jenkins - Texas State University, Department of Biology

Suzanne Schwinning - Texas State University; Lisa Markovchick Handforth - National Park Service; Catherine Gehring - Northern Arizona University; Zsuzsi Kovacs - Northern Arizona University; Jason Martina - Texas State University

Texas red oaks (*Quercus buckleyi*) are endemic from southcentral Texas to northcentral Oklahoma and live in association with Ashe juniper (*Juniperus ashei*) throughout most of their range. Seedling nutrition and drought survival are enhanced under juniper-oak canopy, and it has been hypothesized that microbial symbionts, particularly mycorrhizae, contribute to seedling fitness through improving access to nutrients and water. We undertook a factorial, randomized split block greenhouse experiment to test the general hypothesis that patterns of mycorrhization influence seedling growth and drought response. We used four inoculant sources (in order of increasing ecological distance): a home soil collected in mixed juniper-oak stands beneath elder conspecifics (O), a home soil collected under elder junipers and more distant from oaks (J); an away soil collected from small shady mottes including juniper and oak (S), and an away soil taken from an exposed clearing (C). These four inoculation levels were crossed with two watering levels (well-watered and severely droughted) and each combination was replicated 52 times (N = 432). Inocula were introduced as seedlings were transplanted into 1-L pots. After 54 days of acclimation under well-watered conditions, half of the population was droughted for 64 days. During the dry-down period, leaves were periodically inspected to document growth or wilting, and leaf gas exchange data were collected on 9 occasions. Afterwards, plants were harvested; roots were frozen, and above-ground biomass was dried and weighed. Subsamples of the roots were microscopically analyzed to count the mycorrhization rate of root tips and the frequency of morphotypes. Preliminary results: Roots had > 80% colonization rates by ectomycorrhizae with similar morphotype composition regardless of inoculant; arbuscular mycorrhizae were absent. On one occasion, C-inoculated seedlings and on another, J-inoculated seedlings had higher rates of photosynthesis relative to others. Leaf dry mass did not differ between treatments but stem dry mass was significantly greater in C compared with O or S. Analysis of time to leaf senescence indicates more plants in the J-inoculated group maintain viable leaves further into the drought whereas C-inoculated seedlings' leaves desiccate quickest. More analysis is required, but we can tentatively conclude that for *Quercus buckleyi* seedlings arbuscular mycorrhizal connections are rare and inoculation by soil of varying ecological distances from home promoted similar colonization rates and compositions of ectomycorrhizae, so any differences in seedling performance cannot be attributed to mycorrhization.

Silas took a circuitous route to graduate school after years of agricultural labor interspersed with bouts of peripatetics. Residing in a subsistence-oriented agrarian Maine community, they learned to sync up with seasonal rhythms and to work with plants as food and medicine. Several years ago, impelled by intuition and an abiding reverence towards their natal land, Silas chose to return to the burgeoning metropolitan corridor along the Balcones Fault, where they are now completing graduate studies at Texas State University. Their thesis focuses on effects of inocula provenance on seedling mycorrhizal partnerships and resilience to drought. Email: ecj38@txstate.edu.

Wednesday, May 8th, 1:55 PM

Juniper's Effects on Soil and Weathered Bedrock Water Dynamics in Sonora, TX

Pedro Leite - Texas A&M University, Department of Ecology and Conservation Biology

In this presentation, I will delve into the research conducted during my doctoral studies at the Texas A&M research station in Sonora, Texas. Our investigation primarily focuses on the pivotal role of Juniper in enhancing the hydrological dynamics of Texas rangelands. Initially, I will elucidate on Juniper's capacity to augment infiltration rates and intercept a significant portion of surface runoff generated during storm events. Subsequently, I will demonstrate how woody plants, specifically Junipers and Oaks, contribute to the weathering of bedrock, thereby increasing the permeability of limestone substrates. Finally, I will present compelling evidence indicating that rock moisture storage beneath Juniper-covered areas significantly surpasses that in open spaces. Overall, our findings compellingly illustrate Juniper's transformative impact on the water cycle of Texas rangelands over the last century. Contrary to prevailing assumptions, our research reveals that juniper encroachment may have yielded some beneficial outcomes, challenging long-standing perceptions and inviting a reevaluation of its ecohydrological role.

Pedro Leite is a postdoctoral researcher at the Department of Ecology and Conservation Biology at Texas A&M University, working under the supervision of Brad Wilcox. He received a bachelor's degree in Biology from the University of Sao Paulo, a master's in Ecosystem Science and Management, and a PhD in Ecology and Conservation Biology from Texas A&M University. He is interested in how different land uses, vegetation covers, and soil ecosystem engineers affect the ecohydrology of drylands. His dissertation work focused on the effects of woody plant encroachment on infiltration, runoff, and regolith moisture dynamics in the Edwards Plateau. Email: pedroleite@tamu.edu.

Wednesday, May 8th, 2:15 PM

Understanding Water Use by *Juniperus ashei* at the Individual Tree Level in Response to the Climate Gradient Across the Edwards Plateau and Forest Scale Response to Property-specific Clearing

Ashley Matheny - University of Texas at Austin, Department of Earth and Planetary Sciences

Throughout central and west Texas trees are faced with a dual challenge: coping with low soil water supply while also facing high atmospheric vapor pressure deficit (VPD). A recent body of work has raised the question of which stress, VPD or soil moisture, is most limiting to transpiration and when. Here, we present an analysis of oak-juniper woodlands across central Texas as observed over a three-year period during which we observed plant-water relations in response to well-watered conditions, months of summer heat and drought, and a partial clearing experiment. We use micrometeorological, soil moisture, and water table depth measurements in conjunction with sap flow, stem water content, and leaf water potential data from *Juniperus ashei* and *Quercus spp.* to compare water use patterns among species under varying environmental conditions across the Edwards Plateau.

Dr. Matheny is an associate professor in the Department of Earth and Planetary Sciences at UT Austin. Her research centers on measurement and modeling of the interactions and hydrologic feedbacks

between the subsurface, the biosphere, and the atmosphere with a specific emphasis on the ways vegetation influences these fluxes. She studies the physical and mechanistic processes that govern water movement along the soil-plant-atmosphere continuum through a combination of sensor development, field measurement campaigns, and cutting-edge model development from individual plants to landscape scale models of biosphere-atmosphere exchange. Email: ashley.matheny@jsg.utexas.edu.

Wednesday, May 8th, 3:05 PM

Long-term Effects of Crown-fires on Oak-juniper Woodlands: Loss of Ashe Juniper and Successful Oak Recruitment

Charlotte Reemts - The Nature Conservancy in Texas

Fire plays an important role in structuring ecosystems all around the world. In central Texas woodlands, fire has very different effects on Ashe juniper compared to almost all other woody species because Ashe juniper does not resprout after being top-killed. Woodlands experience different kinds of fire, ranging from low-intensity surface fires during prescribed burns to high-intensity crown fires during extreme weather conditions. We studied the effects of two overlapping crown fires at Fort Cavazos (Bell and Coryell Counties). We found that most plants recovered quickly after one or two wildfires and that the number of stems in the woodlands met or exceeded those in unburned areas within a decade or two. While other parts of central Texas face difficulties with hardwood regeneration due to high deer densities, deer populations at Fort Cavazos are relatively low and did not hinder resprouting oaks or other species. Ashe juniper, however, was still essentially absent from burn woodlands for 24 years after fire and appeared to be recovering even more slowly after the second wildfire. Juniper does not seem to disperse well for long distances and faces very strong competition from resprouting oaks. Our results show that oak-juniper woodlands can only exist in areas with very long intervals between crown fires and that protecting golden-cheeked warbler habitat from crown fire is crucial.

Charlotte Reemts is an ecologist and science project director with The Nature Conservancy's Texas Chapter where she has studied ecosystems across Texas for 19 years. She works in natural areas and working lands to evaluate whether land management is achieving its goals, test new management techniques, document the ecological health of sites, and monitor populations of rare, threatened, and endangered species. Email: creemts@tnc.org.

Wednesday, May 8th, 3:25 PM

Long-term Effects of Prescribed Thinning + Fire and White-tailed Deer Exclusion on Woody Species Composition in a Central Texas Woodland

Rebecca E. Carden - Department of Integrative Biology, University of Texas at Austin

Christina M. Andruk, Biology Department, Iona University; Lee Kaplan, College of Natural Sciences, University of Texas at Austin; Carl Schwope, Balcones Canyonlands National Wildlife Refuge, U.S. Fish & Wildlife Service; James M. Mueller, Balcones Canyonlands National Wildlife Refuge, U.S. Fish & Wildlife Service; Scott Rowin, Balcones Canyonlands National Wildlife Refuge, U.S. Fish & Wildlife Service; Norma L. Fowler, Department of Integrative Biology, University of Texas at Austin

Oak species are failing to regenerate across much of the United States, including in central Texas. This failure is characterized by a shortage of mid-sized oaks where mature oaks are common, and has been ascribed to (1) widespread fire suppression, which favors more fire-sensitive competitors over oaks, and (2) browsing by over-abundant white-tailed deer. Little is known about which of these two factors is more important, and how their effects may interact.

In central Texas, fire-tolerant Texas red oak saplings are rare, while fire-sensitive Ashe juniper saplings are common. White-tailed deer commonly browse Texas red oaks but rarely browse juniper. Oak regeneration failure is of particular conservation concern in this region because the endangered golden-cheeked warbler requires mature oaks in its habitat.

We compared the long-term effects of two treatments on woodland species composition in these woodlands: selective thinning of Ashe juniper saplings followed by prescribed burning (the 'burn' treatment), imposed factorially with deer exclusion (the 'fence' treatment). We monitored the plots 11 years after treatment implementation. In unburned plots, mature Texas red oak trees that died had been replaced in the canopy by Ashe juniper. In burned plots, Ashe juniper sapling density remained low 11 years after thinning and few had been recruited to the canopy. In the burned-unfenced plots (with deer), hardwood saplings were also rare, presumably due to deer browsing. In contrast, Texas red oak saplings, apparently recruited from acorns, were present and most abundant in the burned-fenced plots (no deer) compared to all other treatments. Saplings of possumhaw, an understory shrub, were also highly abundant in the burned-fenced plots.

We conclude that in the absence of fire, woodland canopies became more dominated by mature Ashe juniper. Within the burned plots, however, deer access determined woodland trajectories. In particular, recruitment of Texas red oak and other hardwoods may require protection from deer in addition to thinning and/or fire. We also note that the combined treatments had the joint side effect of encouraging hardwoods other than oak species, which may compete with oaks. Our results can be used to guide sustainable management of central Texas oak-Ashe juniper woodlands for golden-cheeked warbler habitat.

Becca is a PhD Candidate in Dr. Norma Fowler's lab at UT Austin, where she is studying prescribed fire effects and wildfire risk in central Texas woodlands. She enjoys hiking and exploring central Texas in her spare time. Email: rebeccacarden@utexas.edu.

Wednesday, May 8th, 3:45 PM

Woody Cover Response to Thinning and Prescribed Burning in Central Texas Savannas

Devin Grobert - Austin Water, Wildland Conservation Division, Water Quality Protection Lands

Study of woody cover species and functional group response to 15-year savanna management regime. Data set includes before-and-after observations from 45 prescribed burns, 34 thinning treatments, and 45 rest periods, with monitoring intervals of approximately 2 years. Woody cover increased on some monitoring sites and decreased on others, and initial and final woody plant composition from the 15-year study period are similar. These results indicate that the management regime was successful at halting but not reversing woody encroachment.

Devin Grobert is Biologist Senior for the Water Quality Protection Lands, which are owned by Austin Water. He is a PhD candidate in Plant Ecology at UT-Austin, co-advised by Norma Fowler and Caroline Farrior, and also has an MS in Rangeland Ecosystem Science from Colorado State University. Email: devin.grobert@austintexas.gov.

Wednesday, May 8th, 4:05 PM

Cultivating Clarity: Decoding Wildfire Narratives and Debunking Juniper Myths

Justice Jones - Austin Fire Department Wildfire Division

This presentation, "Cultivating Clarity: Decoding Wildfire Narratives and Debunking Juniper Myths," aims to unravel the complexities surrounding the perceptions around Ashe Juniper and offer insights into fostering compatibility with our fire landscapes.

Through a comprehensive exploration of wildfire narratives and prevalent juniper myths, this session endeavors to dispel misconceptions and foster a deeper understanding of the role of Ashe Juniper within our ecosystems and communities. By dissecting common perceptions and cultural biases, we seek to empower attendees with evidence and culture-based knowledge to navigate coexistence with Ashe Juniper in fire-prone regions.

Justice Jones is on a mission to realign human culture with the fire environments we live in and are inextricably connected to. With over two decades of experience in wildfire adaptation, he divides his time equally between burning things and trying to keep other things from burning.

In his current role, Justice serves as the Wildfire Mitigation Officer for the Austin Fire Department's Wildfire Division, where he has helped lead Austin and the surrounding area to embrace wildfire preparedness and become rapidly fire-adapted. Most recently, Austin became the largest municipality in the country to adopt the ICC Wildland Urban Interface Code, ensuring sustainable wildfire resilience is built into Austin's future.

Prior to joining AFD, Justice served as the Texas A&M Forest Service's State Wildland Urban Interface and Prevention Coordinator, where he assisted communities across the state of Texas in enhancing their resilience to wildfire.

In addition to his work locally, he also serves on multiple committees including the International Association of Fire Chiefs Wildland Fire Policy Committee and the National Fire Protection Association's Technical Committee 1140, is a member of the Fire Adapted Communities Learning Network, and is a Technical Specialist with the US Fish and Wildlife Service. Email: justice.jones@austintexas.gov.

Presentations – Thursday, May 9th

Thursday, May 9th, 9:00 AM

Symposium Welcome

C. Craig Farquhar – Texas State University, Department of Biology

Dr. C. Craig Farquhar is a conservation biologist, raptor ecologist, and illustrator, formerly with the Texas Parks and Wildlife Department (retired 2018), where he managed a federal endangered species grant program (Section 6), conducted original research on Black-capped Vireos, and served as Chair of the Golden-cheeked Warbler Recovery Team. He serves as scientific advisor for both species and as vice chair for the Balcones Canyonlands Conservation Plan's Scientific Advisory Committee. He received an MS in Vertebrate Ecology at the University of Texas at San Antonio, and a PhD in Raptor Ecology and Wildlife Biology at Texas A&M University. He held a Frank M. Chapman postdoctoral fellowship in the Department of Ornithology at the American Museum of Natural History, New York. He has taught many courses in biology and ecology at the University of Texas at Austin and currently teaches Raptor Ecology and Ecology of Rarity at Texas State University. He, along with co-author Dr. Clint Boal, published Raptors of Texas in 2022. Email: c_f220@txstate.edu.

Thursday, May 9th, 9:05 AM

Private Land Stewardship for a Sustainable and Resilient Hill Country

Rachael Lindsey - Hill Country Conservancy

Private landowners in the Texas Hill Country are leading efforts to manage lands to maximize ecological function, primarily for increased rainwater absorption and infiltration with added benefits of flood & drought mitigation, carbon sequestration, biodiversity, and aesthetic beauty. This presentation will share examples of private lands stewardship work from across the Hill Country along with funding sources and includes a discussion of the Texas Hill Country Conservation Network's Land, Water, Sky, and Natural Infrastructure Plan.

Rachael Lindsey is a born researcher and explorer who spent her formative years chasing wildlife in the hills and hollers of Tennessee and Kentucky (often barefoot). Her feral-esque childhood instilled a deep-rooted passion for the outdoors with a special affinity for forests, water, and caves. Eventually, she turned her love of nature into her life's work, pursuing a bachelor's degree in wildlife and fisheries management with a forestry minor from the University of Tennessee, followed by a master's degree in wildlife management from Texas Tech University. Rachael is the Director of Science and Stewardship at Hill Country Conservancy and serves on the Executive and Steering Committees for the Texas Hill Country Conservation Network. Rachael has 20 years of ecological and land protection expertise with research, management, and monitoring on more than 100,000 acres of land including an active role in the creation of more than 40,000 acres of Hill Country conservation easements. Throughout her career, she has prioritized connecting people and communities to nature. Rachael is a poet, naturalist, spiritualist, and Lorax—she speaks for the trees. Email: rachael@hillcountryconservancy.org.

Thursday, May 9th, 9:35 AM

Informing Collaborative Endangered Species Conservation in Texas: A Human Dimensions of Wildlife Case Study from the Post-Oak Savannah

Jared Messick - Texas State University, Department of Biology
Chris Serenari - Texas State University, Department of Biology

In this seminar I will present an overview of a four-year collaborative research effort between Texas Parks and Wildlife Department and the Serenari Lab at Texas State University. Over the course of three distinct data collection efforts, members of the Serenari Lab have engaged with private landowners in East-central Texas to identify determinants of endangered species conservation behavior and used the resultant data to uncover actionable strategies to increase landowner conservation behavior. Our research has provided the Texas Parks and Wildlife Department with both long and short-term strategies that they can implement to improve conservation outcomes for endangered species and private landowners throughout Texas.

Jared Messick earned a dual BS in Agriculture & Natural Resources and Wildlife Conservation & Ecology in 2017. He joined Dr. Christopher Serenari's lab in 2019 and obtained his MS in Wildlife Ecology in 2020 and his PhD in Aquatic Resources and Integrated Biology in 2023. Jared is passionate about conducting research to bridge the gaps between wildlife conservation and public well-being and has studied the interaction between landowners, conservation policies, and the environment in East-central Texas since 2019. Email: jam929@txstate.edu.

Thursday, May 9th, 9:55 AM

Connecting the Dots – Working at a Landscape Scale, One Ranch at a Time

Rebecca Neill - The Nature Conservancy in Texas

It's easy to feel intimidated or overwhelmed when thinking about how management activities on an individual ranch contribute to "landscape" level conservation. One way we have found success within the Bandera Canyonlands, where The Nature Conservancy's Love Creek Preserve is located, is by building and maintaining relationships with local landowners. Just like every ranch is unique, the individuals who own and manage these properties are motivated by their own personal vision for how they want their ranch to look and perform. There are a lot of ways our management goals may differ, but by focusing instead on areas where our interests overlap, **together, we** can really start to move the conservation needle.

Rebecca Neill serves as the Southern Hill Country Project Director for The Nature Conservancy (TNC) in Texas. Her responsibilities include landowner, community, and volunteer outreach on and surrounding TNC's Love Creek Preserve and prescribed fire implementation across the state as part of TNC's fire crew. Additionally, she assists with conservation easement monitoring and the acquisition of new easements within her project area. Rebecca holds a Bachelor of Science in Natural Resources and Environmental Sciences from the University of Illinois at Urbana-Champaign and a Master of Science in Rangeland Ecology and Management from Texas A&M University at College Station. She enjoys spending time in

nature with her husband and son and traveling home to help with harvest on her family's grain and livestock farm in northwest Illinois. Email: Rebecca.neill@tnc.org.

Thursday, May 9th, 10:45 AM

A Conservation Conversation – Ashe Juniper and NRCS

Charles Kneuper – USDA-Natural Resources Conservation Service

Discussion of NRCS conservation technical assistance and approach to brush management in areas invaded by Ashe Juniper.

Charles Kneuper is the State Resource Conservationist for USDA-Natural Resources Conservation Service in Texas. Previously he was the state rangeland management specialist. Charles grew up in Medina, Texas along the Medina River. He earned his bachelor's and master's degree in animal science from Angelo State University. Email: charles.kneuper@usda.gov.

Thursday, May 9th, 11:05 AM

Documenting Texas' Landscapes, The Ecological Mapping Systems and Engaging the Public with the TEAM Tool

Amie Treuer-Kuehn - Texas Parks and Wildlife Department

The 2014 Ecological Mapping Systems of Texas (EMSTX) is a 411, vegetation map that is currently being updated across the state. The map incorporates most current scientific methods in remote-sensing, GIS, modeling, and field ecology to create a high-resolution map of ecological systems. Higher resolution satellite imagery and LIDAR data will drive significant improvements in this current update, including the mapping of canyons, more accuracy in forest vs. shrub landcover and assessing grassland quality on a landscape scale. To deliver the EMSTX data to Texas citizens, Texas Parks and Wildlife Department has developed an online **interactive mapping tool** that assists users in understanding Texas habitats and integrates vegetation data with land management and resource planning of all types, the Texas Ecosystem Analytical Mapper (TEAM).

Amie Treuer-Kuehn is an ecologist with Texas Parks and Wildlife and the first scientist to be awarded the Outstanding Women in Texas Government Award. Her work includes the Ecological Mapping Systems of Texas, Texas Conservation Opportunity Areas Map, habitat modeling for several species of greatest conservation need, and Mapping Texas' Grasslands. She traveled to 235 of Texas's 254 counties collecting over 20,000 field data points to help develop over 350 Ecological Mapping Systems. Email: amie.treuer-kuehn@tpwd.texas.gov.

Thursday, May 9th, 11:25 AM

Ecological Site Descriptions: What Are They and How They Are Used

Bryan Christensen – USDA-Natural Resources Conservation Service - Soil and Plant Sciences Division

A brief history of Ecological Site Descriptions (ESDs) followed by what goes into writing the descriptions and how they are used by NRCS and partners.

Bryan Christensen is a Senior Regional Ecological Site Specialist for the USDA-Natural Resources Conservation Service – Soil and Plant Sciences Division, South Central Region, in Temple, TX. Bryan began his career in Wyoming in 2004 after receiving a BS in Rangeland Ecology and Watershed Management from the University of Wyoming. He worked in conservation planning at the field, area, and state office level in Wyoming and Utah before transferring to the soils division in 2011, working across the west to write and update ESDs in Wyoming, Utah, Colorado, Idaho, and Montana. Bryan came to Texas as the Senior Regional Ecological Site Specialist in 2021 and is responsible for quality assurance of ESDs in Texas, Oklahoma, Arkansas, Louisiana, New Mexico, and Kansas. Email: bryan.christensen@usda.gov.

Thursday, May 9th, 11:45 AM

Working with Ashe Juniper – Wildlife Tax Valuations and Habitat Management

Shane Kiefer - Plateau Land & Wildlife Management

Brush management is a common habitat control activity in 1-d-1 Wildlife Management Tax Valuation plans, and in the Edwards Plateau, the target is most often Ashe Juniper. Just as your brush management strategy should be thoughtfully executed to meet your land management goals, how you leverage it as one of the minimum three qualifying activities for your tax valuation is an important consideration as well. The timing, extent, treatment technique, and prioritization of treatment areas can all influence how much bang you get for your buck, not only in habitat improvement, but also in property tax benefits. This discussion will cover common techniques and use cases for managing Ashe juniper under a wildlife tax valuation and how to maximize the benefits to your taxes and the land.

Shane Kiefer is the Chief Executive Officer of Plateau Land & Wildlife Management, a company that specializes in helping rural landowners protect and enhance their property.

Shane joined Plateau over 19 years ago and has seen the company grow from fledging stages to over 7,000 landowners and 1.4 million acres served. A Senior Property Tax Consultant, Shane has dedicated his career to guiding Texas landowners on implementing wildlife conservation practices and improving native habitat in exchange for property tax savings.

Born and raised in Temple, Texas, Shane is a proud native Texan with deep roots in the Blackland Prairie of East Bell County. Shane holds a Bachelor of Science in Range, Wildlife, and Fisheries Management from Texas Tech University, and Master of Science in Wildlife Ecology from Texas State University. Throughout his career, he has studied or worked in every ecoregion in Texas. He now resides in Buda with his wife and three children. Email: skiefer@plateauwildlife.com.

Promoting Diversity in Juniper-Oak Woodlands

Jim O'Donnell – Austin Water, Wildland Conservation Division, Balcones Canyonlands Preserve

The Balcones Canyonlands ecoregion in Central Texas is a biodiversity hotspot with many endemic and imperiled species, including rare plants, cave and spring invertebrates, aquatic salamanders, and the endangered Golden-cheeked Warbler (*Setophaga chrysoparia*). Within this ecoregion, the Balcones Canyonlands Preserve was established to protect endangered and rare species from habitat loss due to accelerating urban expansion. Land management within the Balcones Canyonlands Preserve focuses on protecting mature Ashe juniper-oak forests, enhancing recovering systems, and restoring degraded sites. We use historic documents, aerial photographs, and reconnaissance to identify these sites. Using regenerative techniques and designs, we are working to repair the degraded sites and promote healthy, resilient ecosystems. Starting from the ground up, we begin with earthworks to stabilize eroding sites, capture water on contour high in the landscape to rehydrate dry hillsides, rebuild the soil "sponge," and increase native plant diversity. Restoration is designed within an adaptive management framework to connect and expand forest patches, promote carbon sequestration, increase groundwater infiltration, provide pollinator habitat, and recycle invasive woody material back into the ecosystem. We recently received an award from the U.S. Environmental Protection Agency with top honors for Low Impact Green Infrastructure Improvement.

For over 30 years, Jim O'Donnell has combined his love of teaching, biology, and environmental stewardship to help protect the Black-capped Vireo and endangered Golden-cheeked Warbler in Central Texas. He taught science and environmental education in Dripping Springs for 28 years. During that time, he was instrumental in setting aside the 214-acre tract of land that is now known as the Vireo Preserve, which once supported the largest concentration of Black-capped Vireos in Travis County. As a result of his efforts and knowledge of the endangered songbirds and their ecosystems, Jim was appointed to the Biological Advisory Team that provided the basis and support for the Balcones Canyonlands Preserve, a system of preserves established under a federal Endangered Species Act permit to protect multiple endangered and rare species in Travis County. After retiring from teaching in 2009, Jim has spent the last 14 years designing and implementing habitat restoration on the City of Austin's Balcones Canyonlands Preserve as a Forest Ecosystem Biologist. His restoration projects are designed within an adaptive management framework to connect and expand forest patches, promote carbon sequestration, increase groundwater infiltration, provide pollinator habitat, and recycle invasive woody material back into the ecosystem. He received an award from the U.S. Environmental Protection Agency with top honors for Low Impact Green Infrastructure Improvement in August 2021. He has given numerous public presentations on restoring degraded sites using regenerative techniques, including at the Global Earth Repair Conference in Port Townsend, Washington, in 2019. In 2023, Jim was invited to Darwin, Australia, where he presented on regenerative restoration techniques at the Society for Ecological Restoration's World Conference. Email: jim.odonnell@austintexas.gov.

A Practitioner's Perspective - Bandera Corridor Conservation Bank

Jesse McLean - Bandera Corridor Conservation Bank

Located in western Bandera County and eastern Real County, the Bandera Corridor Conservation Bank is a multi-property species mitigation bank for the endangered Golden-cheeked Warbler (*Setophaga chrysoparia*, GCWA). In operation since 2012, the conservation bank covers approximately 4,700 acres across six private ranches anchored by the 2,900-acre Lost Maples State Natural Area to the west and the 2,500-acre Love Creek Preserve to the east. Known colloquially as the Bandera Canyonlands, the region is often touted as one of the most biologically diverse segments of the Texas Hill Country, yet it contains a high amount of Ashe juniper. All properties within the conservation bank have been heavily manipulated at one point or another as part of past land use practices.

With a goal of preserving existing GCWA nesting habitat, the bank's management plan relies predominantly on the parameters delineated by the Texas Parks and Wildlife Department's "Management Guidelines for Golden-cheeked Warbler Habitat in Rural Landscapes" (Campbell, 2003), the only USFWS-approved GCWA habitat guidance available. As such, managing a landowner's expectations and interpretation of the guidance (and even those of the easement holder) is an essential facet of ongoing bank management regarding Ashe juniper management in a recovering, non-climax woodland.

Jesse McLean currently serves as manager of Bandera Corridor Conservation Bank. He is a graduate of SUNY College of Environmental Science & Forestry and has practiced as a natural resources consultant in central Texas since 2003. Mr. McLean has consulted on several conservation banking projects for the benefit of the Golden-cheeked Warbler and Black-capped Vireo throughout the Hill Country. Born in Austin, Mr. McLean is a sixth-generation Texan who spent his formative years between Austin and rural Vermont. During that time, he developed an appreciation for natural resources and the juxtaposition between how states such as Texas and Vermont differ in their approach to land ownership and access to natural resources. Email: jmclean@banderacorridor.com.

Multifactor Management of Mountain Cedar: Lessons Learned from the Frio River Canyon

Kevin Wessels - H. E. Butt Foundation

Land management decisions often require trade-offs to maximize benefits among various objectives. Weighing this suite of factors varies with each situation and can have far reaching impacts beyond where the management occurs. This presentation discusses navigating the complexity of wise and balanced Ashe juniper management that seeks to create as much benefit as possible. It will provide examples of factors such as soil retention, water infiltration, and ongoing maintenance that could be considered before initiating juniper management. *Lessons Learned from the Frio River Canyon* will discuss the importance of developing a baseline inventory to guide management, provide examples of identifying the types of factors that can influence decisions, and present an overview of the possible application of management techniques based on these factors.

Kevin Wessels is the Director of Stewardship for the H. E. Butt Foundation where he oversees land and water management along the headwaters of the East Frio River. He received Bachelor of Science degrees in Renewable Natural Resources and Forestry from Texas A&M University and has a Wildlife Management Graduate Certificate from Oregon State University where he is pursuing a professional master's degree in Fisheries and Wildlife Administration. Kevin is a Certified Wildlife Biologist® and Texas Master Naturalist and is an active volunteer in his community – serving on a state-wide panel, a regional non-profit board, and in leadership with a local conservation group. He is passionate about ensuring that future generations of Texans can enjoy the abundant diversity of landscapes, wildlife, and water resources in our state. Email: kwessels@hebfdn.org.

Thursday, May 9th, 2:15 PM

Stewarding the Steward: Shaping Wise Woodland Management Decisions in the Edward's Plateau

Karl Flocke - Texas A&M Forest Service

The majority of land that Ashe juniper occupies is private property, with private landowners having the final say as to what management activities take place on their land. This presentation will provide recommendations on juniper management strategies that marry the landowner's vision of stewardship with the realities of the landscape that they manage. Resource professionals should become familiar with how to read the land and feel comfortable communicating the best available science to inform where and when juniper management may or may not be useful. Discussion will focus on methodology for creating a mosaic of habitats maintaining or enhancing ecosystem functions across all successional stages, with an emphasis on biodiversity, hydrology, erosion control, and wildfire adaptation.

Karl Flocke grew up playing in the woods and creeks of the Texas Hill Country. He has a Bachelor of Science in Renewable Natural Resources from Texas A&M University, and a Master of Science in Forest Resources Conservation from the University of Florida. He has worked over a decade in the conservation field for the US Forest Service, Texas Parks and Wildlife Department, and the Texas A&M Forest Service where he currently serves as a Woodland Ecologist. In this capacity he works on issues involving forest health and stewardship, conservation education, and emergency response in central and west Texas. Email: karl.flocke@tfs.tamu.edu

Panel Discussion

Thursday, May 9th, 2:50 PM

Land Management in Ashe Juniper Ecosystems: Integrating Science with Landowner and Stewardship Goals

Moderator:
Todd Nightingale - Texas A&M Natural Resources Institute

Panel Members:
Elizabeth McGreevy - Project Bedrock and Land Steward
Jared Messick - Texas State University, Department of Biology
Blake Murden - Shield Ranch
Daniel Oppenheimer - Hill Country Alliance

Todd Nightingale is currently a project manager for the Texas A&M Natural Resources Institute following a 24-year career as a professional forester and wildland firefighter for the Texas A&M Forest Service. His passion is on-the-ground implementation of natural resource conservation practices that enhance active land use goals by helping private landowners, communities, industry, and cooperators conserve and protect natural resources.

He attended Texas A&M University receiving a Bachelor of Science Degree in Forestry and has continued numerous professional accreditations and certifications in practice and application of land management treatments. *Email: todd.nightingale@ag.tamu.edu.*

Elizabeth McGreevy is a nonprofit and private sector professional with more than 25 years of expertise in Hill Country ecological analysis, planning, and long-term management, education and outreach, and best development practices. She is the author of the well-researched book, Wanted! Mountain Cedars, Dead and Alive and founding executive director of Project Bedrock that promotes using mountain cedars and other nature-based solutions to regenerate degraded limestone Texas karst country. She is also the owner of Land Steward, a Hill Country-based land management consulting and planning business. A sixth-generation Texan, she received an MLA in environmental planning from Texas A&M, an undergraduate degree in biology from Randolph College, and is a certified permaculture planner. *Email: elizabeth@projectbedrocktx.org.*

Jared Messick earned a dual BS in Agriculture & Natural Resources and Wildlife Conservation & Ecology in 2017. He joined Dr. Christopher Serenari's lab in 2019 and obtained his MS in Wildlife Ecology in 2020 and his PhD in Aquatic Resources and Integrated Biology in 2023. Jared is passionate about conducting research to bridge the gaps between wildlife conservation and public well-being and has studied the interaction between landowners, conservation policies, and the environment in East-central Texas since 2019. *Email: jam929@txstate.edu.*

Blake Murden is responsible for the administration and conservation management of the three Shield-Ayres family ranches comprising 37,000 acres in Central and West Texas. He also supports the mission of the Shield Ranch Foundation through land stewardship, coordination and oversight of capital projects, and operations and management of facilities. Blake has more than 30 years of experience managing, researching, and monitoring land, water, and wildlife resources on private lands in Texas, Washington, Oregon, and New Zealand. He serves on the executive board of the Texas Land Conservancy, the board

of the Texas Wildlife Association, and the Texas Parks and Wildlife Department's Wildlife Diversity Advisory Committee and has been an active member of The Wildlife Society for over 35 years. Blake earned his Bachelor of Science in biological sciences from Tarleton State University and his Masters and Doctorate degrees in wildlife and fisheries sciences from Texas A&M University. *Email: blakemurden@shieldranch.com.*

Daniel Oppenheimer is the Land Program Director of the Hill Country Alliance and Coordinator of the Camp Bullis Sentinel Landscape Partnership. Since 2017, Daniel has worked with private landowners, agency and non-profit partners, and communities across the Texas Hill Country to support private land stewardship and conservation. Prior to joining HCA, Daniel coordinated the Dolores River Restoration Partnership in southwestern Colorado and eastern Utah for six years. He is a fifth-generation Texan. Email: *Daniel@HillCountryAlliance.org.*