

# 59<sup>th</sup> Annual Texas Chapter of The Wildlife Society Meeting



*Achieving Landscape-level Management in a Private  
Land State*

**February 22-24, 2023**

Houston, Texas

# **2022-2023 Executive Board**

<b>Executive Director</b>	<b>Don Steinbach</b>
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<b>Treasurer</b>	<b>Jon Purvis</b>
<b>Board Member at Large</b>	<b>Matt Reidy</b>

## **Program**

Adam Terry, Chris Farrell, and Sara Weaver

## **Local Arrangements**

Hope Zubek and Mary Pearl Meuth

## **Student Activities & Posters**

Heather Mathewson

## Wednesday, February 22, 2023

<b>Time</b>	<b>Event</b>	<b>Location</b>
8:00 am - 5:00 pm	Registration	
8:00 am - 5:00 pm	Teer Leadership	Apollo Board Room
8:00 am - 5:00 pm	Exhibitors	Constellation Ballroom
8:00 am - 4:00 pm	Student Poster Set-up	Constellation Ballroom
8:00 am - 9:30 am	Turning Sound into Discovery Workshop	Montrose
8:00 am - 12:00 pm	Media Training Workshop	Midtown
8:00 am - 12:00 pm	R and R Studio for Beginners Workshop	Museum Park
8:30 am - 10:00 am	1-D-1 Tax Valuation Workshop	River Oaks
8:30 am - 11:30 am	Student Internship Workshop	Greenway B
9:00 am - 11:00 am	Cottam Awards Practice	
9:00 am - 12:00 pm	Ecosystem Goods & Services Workshop	Timber Grove
9:30 am - 12:00 pm	Wild Game Butchery Workshop	Heights
10:00 am - 11:30 am	Using Ultrasonic Bat Recorders Workshop	Montrose
10:00 am - 12:00 pm	TCTWS Executive Board Meeting	Westbury
12:00 pm	Lunch (On Your Own)	
12:00 pm - 5:00 pm	Photography & Art Submissions	Mezzanine
1:00 pm - 2:30 pm	Student Plant ID Competition	Greenway A
1:30 pm - 3:30 pm	TCTWS Business Meeting	Westbury
3:00 pm - 5:00 pm	Quiz Bowl	Post Oak Ballroom
5:00 pm - 6:00 pm	Student Poster Session	Constellation Ballroom
5:00 pm - 6:00 pm	Student Poster Session Judging	Constellation Ballroom
5:00 pm - 7:00 pm	BRI Reception	Timber Grove
6:00 pm - 7:00 pm	Equitable Access to the Outdoors Panel	Post Oak Ballroom
	Presented by the Caesar Kleberg Wildlife Research Institute	
7:00 pm - 10:00 pm	President's Reception	Constellation Ballroom
7:00 pm	Texas Tech Reception	Westbury

### Platinum Sponsors



## Thursday, February 23, 2023

Time	Event	Location
7:00 am - 8:00 am	Student Breakfast	The Landing
7:00 am - 8:00 am	Light Breakfast	Constellation Prefunction
8:00 am - 5:00 pm	Teer Leadership	Apollo Board Room
8:00 am - 5:00 pm	Exhibitors	Constellation Ballroom
8:00 am - 9:30 am	Women of Wildlife	Westbury
8:00 am - 10:00 am	Cottam Award Presentations	Post Oak Ballroom
8:00 am - 11:00 am	Photography & Art Set Up	Mezzanine
8:00 am - 12:00 pm	Professional Plant ID Competition	GreenwayA
10:00 am - 10:30 am	Break	Constellation Prefunction
10:30 am - 12:30 pm	Plenary	Post Oak Ballroom
12:00 pm - 1:00 pm	Student Poster Removal and Professional Poster Set-up	Constellation Ballroom
12:30 pm - 2:00 pm	Lunch	Food Trucks
12:30 pm - 2:00 pm	Past Presidents Lunch	Midtown
12:30 pm - 2:00 pm	Student Chapter Leadership Lunch	The Landing
1:00 pm - 5:00 pm	Professional Poster Session	Constellation Ballroom
1:00 pm - 5:00 pm	Photography & Art Competition Voting	Mezzanine
1:30 pm - 5:00 pm	Conservation Affairs Committee Meeting	Westbury
2:00 pm - 3:30 pm	Conservation & Ecology of Mammals 1	Greenway A
2:00 pm - 3:30 pm	Conservation & Ecology of Birds 1	Greenway B
2:00 pm - 3:30 pm	Conservation & Ecology of Birds & Bats	Museum Park
2:00 pm - 3:30 pm	Human Dimensions	River Oaks
3:30 pm - 3:45 pm	Break	Constellation Prefunction
3:45 pm - 5:15 pm	Conservation & Ecology of Birds 2	Greenway A
3:45 pm - 5:15 pm	Conservation & Ecology of Mammals 2	Greenway B
3:45 pm - 5:15 pm	Conservation & Ecology of Natural Resources & Habitats	Museum Park
3:45 pm - 5:15 pm	Conservation & Ecology of Reptiles & Amphibians 1	River Oaks
5:00 pm - 6:30 pm	Pre Awards Social-Auction & Raffle	Constellation Ballroom
5:30 pm - 7:00 pm	East Foundation Reception	Timber Grove
6:30 pm - 10:00 pm	Awards Ceremony & Reception	Post Oak Ballroom

### Gold Sponsors



## Friday, February 24, 2023

Time	Event	Location
7:00 am - 7:30 am	Fellowship of Christian Conservationists	Westbury
7:30 am - 9:00 am	Light Breakfast	Constellation Prefunction
8:00 am - 12:00 pm	Teer Leadership	Apollo Board Room
8:00 am - 11:00 am	Exhibitors	Constellation Ballroom
9:00 am - 10:30 am	Conservation & Ecology of Mammals 3	Greenway A
9:00 am - 10:30 am	Conservation & Ecology of Reptiles and Amphibians 2	Greenway B
9:00 am - 10:30 am	Tools & Technology	Museum Park
9:00 am - 10:30 am	Conservation & Ecology of Birds 3	River Oaks
9:00 am - 11:00 am	TCTWS Executive Board Meeting	Westbury
12:00 pm	Professional Poster Removal	Constellation Ballroom

### Silver Sponsors



### Bronze Sponsors



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CAYETANO



Thank You to the Webster Family!

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# **Plenary - Achieving Landscape Level Management in a Private Land State**

**Post Oak Ballroom, 10:30 am, Thursday February 23, 2023**

**Moderator**

**Ed Roberson**



Founder, Mountain & Prairie Media

Ed Roberson is a Colorado-based conservationist and creator of Mountain & Prairie, a top-ranked podcast featuring long-form interviews with innovators of the American West.

Since its first episode in early 2016, Mountain & Prairie has gone on to be recognized by the Aspen Institute, Patagonia, Apple Podcasts, MeatEater, The Nature Conservancy, Arthur M. Blank Family Foundation, High Country News, Colorado Parks and Wildlife, the Montana Governor's Office, and more. Thanks to the podcast's popularity, Ed is now a sought-after speaker and moderator at events throughout the United States. He also produces and hosts live podcast shows at venues around the West.

Ed's career has focused on land, water, and conservation for nearly two decades, primarily in the American West. He served as Conservation Director at Palmer Land Conservancy for four years, leading the organization's cutting-edge water conservation efforts in southeastern Colorado. Prior to Palmer, he was a ranch broker and worked extensively throughout Colorado, Wyoming, Montana, and Idaho. He has also served on boards and committees for a wide range of conservation organizations in Colorado.

Ed holds a BA in economics and an MBA with a concentration in finance, both from Wake Forest University. He is also a proud graduate of the National Outdoor Leadership School (NOLS). Away from work, Ed is a committed husband, father of two, voracious reader, comically slow ultrarunner, and devotee of the Strenuous Life.

## **Roel Lopez**



Dr. Roel Lopez is Director of the Texas A&M Natural Resources Institute and Department Head for the Department of Rangeland, Wildlife, and Fisheries Management at Texas A&M University. He has over 25 years of natural resource and land management experience with academia, federal and state agencies, and private industry. His research focuses on endangered and fragmented wildlife populations, sustainability of military lands, and rural land trends and demographics.

## **Chad Ellis**



Chad Ellis is the Chief Executive Officer for Texas Agricultural Land Trust (TALT), Chad Ellis brings a wealth of land conservation experience, most recently in his work for the Noble Research Institute, the largest nonprofit agricultural research organization in the U.S. Mr. Ellis has over 25 years of experience working directly with producers and land managers implementing stewardship focused management. Ellis not only promotes and advocates land stewardship principles, he also implements it within his own family operation in Lohn, Texas. Mr. Ellis is passionate about helping empower the producer to be better tomorrow than they are today. Ellis brings deep connections and experience with USDA's Natural Resources Conservation Service, where he served in increasingly responsible roles for a decade.

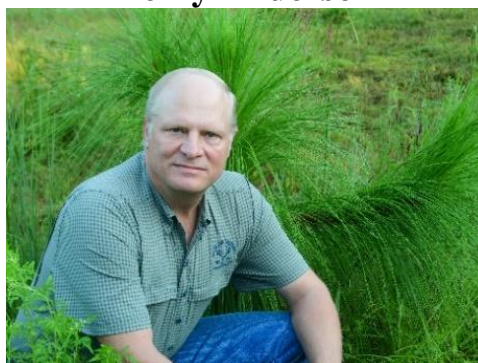


### **Billy Tarrant**



Billy Tarrant is the Associate Director of Stewardship Services at Borderlands Research Institute where his main responsibility is managing the Center for Land Stewardship and Stakeholder which provides technical resources for landowners, energy developers, community members, and conservation partners. After receiving his BS and MS in Wildlife Science at New Mexico State University, Billy worked for the Arizona Game and Fish Department before joining Texas Parks and Wildlife Department (TPWD) in 1996. He served as a District Wildlife Biologist for several years before moving to West Texas to accept a leadership position in 2005. Before retiring from TPWD in 2019, Billy served as a Regional Director where he oversaw operations of the Trans-Pecos and Panhandle Wildlife Teams. Throughout his career, he has worked effectively with partners to achieve meaningful conservation, as demonstrated by his efforts with the Trans-Pecos Pronghorn Working Group, the formation of the Texas Playa Conservation Initiative, and managing the local outreach and coordination efforts of the Respect Big Bend Initiative.

### **Terry Anderson**



Terry Anderson is a biologist, a forester, and a conservation entrepreneur, who received a Bachelor of Science in Forestry with an emphasis in Wildlife Management from Stephen F. Austin State University in 1991 and has spent the last 32 years successfully operating in a broad range of eco-system markets. His latest efforts have focused on developing Conservation Equity Management, a Texas based, natural resource, private equity firm, created in 2021. The firm has a unique perspective that centers around financial investment in rural lands. Anderson is also co-founder and CEO of Conservation Equity Partners, LLC, a company specializing in working with land, water, and wildlife resources through traditional approaches and creative enterprises,

formed in 2018. In addition, he is co-owner of Wildlife Systems, Inc., an outdoor enterprise that offers recreational experiences on over 900,000 acres of private lands in Texas. Additionally, Anderson occasionally serves as an adjunct faculty advisor at Stephen F. Austin State University's Arthur Temple College of Forestry, assisting with habitat management and wetland ecology courses. He acts as a Board Trustee for the Texas Wildlife Association Foundation and is philanthropically involved with the Texas Wildlife Association and the Texas Forestry Association

## **Discussion Panel on Equitable Access to the Outdoors**

**Post Oak Ballroom, 6:00 pm, Wednesday February 22, 2023**

**Jaime Gonzalez**



Jaime González, M.Ed. Healthy Communities Director, The Nature Conservancy in Texas Jaime González is an award-winning conservationist, educator, communicator, and network who works with community partners to co-create healthier, more climate ready, more equitable, and wildlife-rich places using nature-based solutions.

Mr. González earned a M.Ed. in Curriculum & Instruction-Science Education and a B.S. in Biology from the University of Houston.

**Immanuel Salas**



While completing a Masters in Recreation Administration at Texas State University, Immanuel worked for TPWD's Texas Outdoor Family Program; outfitting and teaching families and community partner organizations to camp and recreate in parks. Immanuel became the North Texas Community Archery Specialist, spending two years training and certifying community, school and parks & recreation leaders as USA Archery and National Archery in Schools Program

instructors before becoming TPWD's first R3 Coordinator for Hunting and Shooting Sports. In this role he supports and expands the efforts to recruit, retain and reactivate participants in these activities. Regardless of the position, Immanuel's purpose is to help connect all people to their community, natural resources, and themselves through meaningful pursuits in the outdoors.

### **Sarah Coles**



Sarah Coles is the Executive Director of the Texas Children in Nature Network. Sarah has been working within the informal education and nature fields for the last seventeen years. Sarah's career has taken her from being in the classroom to moving to informal education and working at various institutions across the country. While working at an institution focusing on EcoHistory (the study of how humans have adapted and influenced their environment), she found her passion for seeing students, children and families spend time in nature. She has worked in Texas in both the museum and nature center environments, starting her work with TCiNN as a regional leader in the Coastal Bend area and has been the Executive Director of the organization since 2019.

Sarah also serves on the board of the Informal Science Education Association of Texas.

### **Neal Wilkins**



Neal Wilkins is President and CEO of the East Foundation, where he is responsible for leading its mission of promoting land stewardship through ranching, science, and education.

Headquartered in San Antonio, the East Foundation owns and operates about 217,000 acres of

South Texas ranchland where scientists and managers work together for integrating rangeland management, wildlife conservation, and livestock production systems.

Neal has over 30 years of experience in research and conservation across the private lands of Texas, Tennessee, Florida, Washington, New Zealand, and Oregon. His primary focus has been habitat management and conservation of land, water, and wildlife resources on native rangelands and commercial forestland. His work integrates science, management, policy, and economics.

Before joining the East Foundation in 2012, Neal was a Professor and Director of the Texas A&M Institute of Renewable Natural Resources and Texas Water Resources Institute. In these roles he led more than 45 scientists and professional staff. Prior to 2006, Neal was statewide Program Leader for Wildlife and Fisheries at Texas A&M AgriLife Extension. Before becoming Texas A&M faculty in 1998, he directed wildlife and fisheries programs for Port Blakely, a 150,000-acre family-owned forestry company headquartered in the U.S. Pacific Northwest.

Neal has a Ph.D. in Wildlife Ecology from University of Florida, M.S. in Wildlife & Fisheries Sciences from Texas A&M University, and B.S. in Forestry from Stephen F. Austin State University. He is a director and former Vice-President of Texas Wildlife Association. He is on the Board of Texan-by-Nature, South Texas Property Rights Association, and the Management Council for the King Ranch® Institute for Ranch Management. He is also a Professional Member of the Boone & Crockett Club. He and his wife Sandra have two grown children, Ashley and Matt.

### **Joseph B.C. Fitzsimons**



Joseph B.C. Fitzsimons is a rancher, conservationist, and natural resource lawyer. His interest in conservation began as a young man working on his family's San Pedro Ranch. At the age of seventeen he joined Texas Parks and Wildlife as a wildlife intern at Black Gap Wildlife Management Area. Mr. Fitzsimons attended college in Oregon at Lewis and Clark, where he continued his outdoor interests. After working on ranches in the American West and South

America, he returned to Texas for law school at the University of Texas graduating in 1985. Joseph and his wife Blair have dedicated their professional and private lives to land and wildlife conservation. Blair and Joseph raised their three children on the family's San Pedro Ranch. Blair was the founding CEO of the Texas Agricultural Land Trust, now the largest land trust by acreage in Texas. Her work has conserved hundreds of thousands of acres of open space working lands that will be perpetually protected for agriculture and wildlife. In 2009 the Fitzsimons and Howard family families dedicated a perpetual conservation easement on the San Pedro Ranch to the Texas Agricultural Land Trust.

Joseph continued his wildlife conservation work as a Texas Parks and Wildlife Commissioner and later Chairman of the Commission. He is the co-founder of the Texas Coalition for State Parks which lobbied successfully for the constitutional dedication of sporting goods tax revenue to the support of the Texas State Parks. Fitzsimons is the co-founder of the law firm Uhl Fitzsimons, where he represents land and mineral owners in the areas of energy, water and conservation law.

Blair and Joseph and their family ranch have received several conservation awards for their work over the past 25 years. Blair currently serves on the nationwide Land Trust Alliance board of directors. Joseph currently serves on the Partnership of Rangeland Trusts board of directors and as chairman of the Texas Agricultural Land Trust Foundation. Blair and Joseph live on the San Pedro Ranch in Dimmit and Maverick Counties Texas. They have three grown children all involved in conservation, and three grandchildren (soon to be four!) who will be the fifth generation on the San Pedro.



## **Thursday, February 23, 2023**

### **Clarence Cottam Award Presentations**

Post Oak Ballroom, February 23, 2023

Moderator: Rachel Fern

- 8:00 **From eradication to conservation: Identifying areas for restoration and management of shinnery oak in a changing climate**  
Katie Pennartz; Evan Tanner; J. Matthew Carrol; R. Dwayne Elmore; Craig Davis; Sam Fuhlendorf
- 8:20 **Quantifying population trends and habitat for the chestnut-bellied scaled quail in South Texas rangelands**  
Dakota Moberg; Lori Massey; Humberto Perotto; Evan Tanner; Leonard Brennan; Jesús Franco
- 8:40 **Effectiveness of camera traps and infrared trip wire position in capturing herpetofauna and small mammals**  
Madison Nadler; Kevin Ryer; John Young; Richard Kline
- 9:00 **Assessment of non-breeding bird community responses to semi-arid grassland restoration efforts in Trans-Pecos, Texas**  
Emily Card; Mieke Titulaer; Lalo Gonzalez; Justin French; Louis Harveson
- 9:20 **White-tailed deer and cattle grazing – nutritional consequences for deer population performance**  
Bryan Spencer; Miranda Hopper; Randy DeYoung; Aaron Foley; David Hewitt; J. Alfonso Ortega; Landon Schofield; Tyler Campbell; Michael Cherry
- 9:40 **Strategic communication to increase willingness to engage in ESC**  
Jared Messick; Christopher Serenari; Floyd Weckerly; Kristy Daniel; Paul Crump; Elena Rubino

### **Plenary: Achieving Landscape-level Management in a Private Land State**

Post Oak Ballroom, Thursday February 23, 2023

- 10:30 Ed Roberson (Moderator), Billy Tarrant, Chad Ellis, Roel Lopez, Terry Anderson

### **Conservation & Ecology of Birds 1**

Greenway B, February 23, 2023

Moderator: Cody Dunagan

- 2:00 **Evaluating the Viability of Translocating Northern Bobwhite as a means of Population Restoration**  
Jared Schlottman; Roel Lopez; Jim Cathey
- 2:15 **Population and Habitat Assessment of the California, Mountain, and Gambel's Quail in California's Changing Landscape**  
Sarah Jacobson; Leonard Brennan; Humberto Perotto; Evan Tanner; Katherine Miller

- 2:30 **Influence of Rainfall and Vegetation Color on Northern Bobwhite Reproduction**  
Lindsey Howard; Fidel Hernandez; Clayton Hilton; David Hewitt; David Wester
- 2:45 **Distributional Responses of Northern Bobwhites to Hunting Pressure in South Texas**  
Abe Woodard; Leonard Brennan; Fidel Hernandez; Humberto Perotto; Neal Wilkins; Andrea Montalvo
- 3:00 **Habitat Selection of Scaled Quail Across a Gradient of Oil and Gas Development in the Permian Basin, Texas**  
Brooke Bowman; Ryan Luna; Lalo Gonzalez; Evan Tanner
- 3:15 **The Cost of Fragmentation: An Assessment of Habitat Connectivity for Northern Bobwhite in Texas**  
Kristyn Stewart; Fidel Hernandez; Sabrina Szeto; Alejandra Olivera-Mendez; Jon Horne; Angela Guerrero; John McLaughlin

## **Conservation & Ecology of Mammals 1**

Greenway A, February 23, 2023

Moderator: John Herscherger

- 2:00 **Influence of Traffic on use of Wildlife Crossing Structures by Bobcats and Coyotes in Southern Texas**  
Anna Mehner; John Young; Richard Kline
- 2:15 **Strategic grassland conservation for swift foxes in multi-use landscapes**  
Ty Werdel; Colleen Piper; Andrew Ricketts; Matthew Peek; Dan Sullins; Adam Ahlers
- 2:30 **Quantifying Degradation Rates of Environmental DNA (eDNA) of Ringtails (*Bassariscus astutus*) in Naturally Occurring Waters**  
Tiffany Nash; Jeff Brady; Devin Erxleben; Doreen Mata; Heather Mathewson; Thomas Schwertner
- 2:45 **Coyote Population Estimation in the Mojave Desert Region Using Noninvasive Genetic Sampling**  
Danielle Deming; Warren Conway; Brian Henen; Robert Bradley; Emily Wright; Courtney Ramsey
- 3:00 **A Novel Approach to Assessing Texas Kangaroo Rat Habitat Use**  
Derek Malone; Clint Boal; Russell Martin; Richard Stevens; Carlos Villalobos
- 3:15 **Behavior of wild pigs towards conspecific carcasses: Implications for disease transmission in a hot, semi-arid climate.**  
Samantha Leivers; Tyler Campbell; Michael Bodenchuk; John Tomecek

## **Conservation & Ecology of Birds and Bats**

Museum Park, February 23, 2023

Moderator: Addison Singleton

- 2:00 **Correlation Between Demographic Rates and the Influence of Catastrophic Weather Events on Montezuma Quail in the Trans-Pecos of Texas**  
Maya Ressler; Justin French; Fidel Hernandez; Ryan Luna

- 2:15 **One Size Does Not Fit All: Species Composition of Wind Turbine Fatalities Varies by Region and with the Spread of White-nose Syndrome for Three Sensitive Bat Species**  
Amanda Hale; Victoria Zero; Michael True; Quintana Hayden; Rhett Good; Catherine Read; Chris Murray
- 2:30 **Sex Ratios of Mexican Free-tailed Bat Fatalities at Wind Energy Facilities for Local and Long-Range Migratory Populations**  
Sarah LiCari; Sara Weaver; Sarah Fritts; Amanda Hale; Todd Katzner; David Nelson; Dean Williams
- 2:45 **Influence of Drought Conditions on Black-Capped Vireo (*Vireo atricapilla*) Nesting**  
Brendan Mulhall; James Giocomo; Clay Green
- 3:00 **The Rise and Fall of the Inca Dove in Texas**  
Cade Coldren

### **Human Dimensions**

River Oaks, February 23, 2023  
Moderator: Tatiana Suarez Joaqui

- 2:15 **The Impacts of Bird City Texas on the Nature Engagement and Nature Relatedness of Community Members**  
Rebecca Nishida; Jennifer Smith
- 2:30 **Mapping the soundscape of an exurban nature preserve**  
Hayden Deppe; Samuel Stone; Noah Powell; Matthew McGinnis; Allison White; William Quinn; Darren Proppe
- 2:45 **Coyote Attacks Toddler - Now What?**  
Sam Kieschnick
- 3:00 **Stewardship ideology influences hunters' acceptability of changes to alligator hunting seasons**  
Christopher Serenari; Elizabeth Pratt; Abby Meeks; Kristy Daniel
- 3:15 **Lessons Learned from the First 10 Years of the Oaks and Prairies Joint Venture's Grassland Restoration Incentive Program (GRIP)**  
Derek Wiley; James Giocomo; Robert Perez; Kenneth Gee; Steve Riley; Anna Matthews; Ty Higginbotham; Amanda Haverland; Thomas Janke; Amber Brown; Kati Biggs; Mitchell Riggs; Taylor Daily; Charlotte Wilson; Cole Fagen; Will Newman; Jon Hayes; Leah Lowe

### **Conservation & Ecology of Birds 2**

Greenway A, February 23, 2023  
Moderator: Tara Rodkey

- 3:45 **Alterations to Avian and Plant Community Structure in Response to Habitat Restoration of Pinyon-Juniper Woodlands in Eastern New Mexico**  
Ariana Rivera; Lucas Schilder; Jane Rogosch; Cade Coldren; Clint Boal

- 4:00 **A luxury commodity crop drives habitat selection of a migratory grassland shorebird in the Texas Coastal Plain**  
Tara Rodkey; Richard Lanctot; Lee Tibbitts; Bart Ballard
- 4:15 **Habitat Variables Associated with Scaled Quail Relative Abundance Across a Large Spatiotemporal Scale**  
Benjamin Hoose; Roel Lopez; Brian Pierce
- 4:30 **An Assessment of Prescribed Grazing for Lesser Prairie-Chicken Habitat on Beef Herd Health and Productivity**  
Lily Evans; Michael Whitson; Carlos Villalobos; Darren Hudson; Christian Hagen; Randy Howard; Blake Grisham
- 4:45 **A Temporal Comparison of the Avian Community Dynamics Within a Riparian Deciduous Forest Along the Aransas River Corridor**  
Alejandra Martinez; Jessica Glasscock; Reuber Lana Antoniazzi Jr; Brian Oswald; Christopher Schalk; Selma Glasscock
- 5:00 **Examination of habitat use by Laughing Gulls (*Leucophaeus atricilla*) in both developed and undeveloped areas of the Lower Galveston Bay Watershed**  
Amanda Hackney

## **Conservation & Ecology of Mammals 2**

Greenway B, February 23, 2023

Moderator: Jeff Gunnels

- 3:45 **Modeling Pronghorn Behavior and Space Use: Habitat Selection of Translocated and Resident Pronghorn in the Edwards Plateau**  
Erin O'Connell; Justin French; Lalo Gonzalez; Shawn Gray; Louis Harveson
- 4:00 **Examining Seasonal Movement Behavior of Pronghorn in the Texas Panhandle**  
Marlin Dart; Evan Tanner; Timothy Fulbright; Anthony Opatz; Levi Heffelfinger; David Hewitt; Randy DeYoung; Shawn Gray; Michael Cherry
- 4:15 **Temporal Resource Partitioning of Desert Bighorn Sheep, Aoudad, and Mule Deer in the Trans-Pecos Region, Texas.**  
Olivia Gray; Justin French; Lalo Gonzalez; Louis Harveson; Froylan Hernandez; Shawn Gray
- 4:30 **Livestock Grazing Effects on Pronghorn Preferred Forbs During the Winter in the Trans-Pecos, Texas**  
Leanna Morin; Lalo Gonzalez; Justin French; Louis Harveson; Shawn Gray; Ty Goodwin
- 4:45 **Modeling Pronghorn Behavior and Space Use: Fence Behavior of Translocated and Resident Pronghorn in the Edwards Plateau**  
Erin O'Connell; Justin French; Lalo Gonzalez; Louis Harveson; Shawn Gray
- 5:00 **Molecular evolution of the prion protein gene (PRNP) in pronghorn (*Antilocapra americana*)**  
Angela Grogan; Matthew Buchholz; Courtney Ramsey; Matthew Johnson; Warren Conway

## **Conservation & Ecology of Natural Resources and Habitats**

Museum Park, February 23, 2023

Moderator: Tori Haynes

- 3:45 **Effects of Grazing by Bison on Arthropod and Vegetation Communities**  
Ty Cospers; Heather Mathewson; Adam Mitchell; Molly Koeck; Donald Beard
- 4:00 **Comparing terrestrial wildlife diversity between native and non-native grassland ecosystems.**  
Mycha Van Allen
- 4:15 **Mapping Prairie Quality at a Landscape Scale**  
Amie Treuer-Kuehn; Wendy Anderson; Duane German
- 4:30 **Grassland Effectiveness Monitoring: Results from Pilot Tests of a Tiered and Integrated Approach for Habitat Treatment Assessment Across Programs**  
Anna Matthews; Rebekah Rylander; Daniel Bunting; Michael C. Duniway; James Giocomo; Anna Knight; Adriana Leiva; Robert Perez; Kourtney Stonehouse; Derek Wiley; Don Wilhelm
- 4:45 **Assessing Ground-Dwelling Arthropod Biodiversity in Rangelands Under Differing Grazing Strategies in Erath County**  
Adam Mitchell; Lark Holland Trainer
- 5:00 **Effect of juniper removal on ground-dwelling arthropod biodiversity**  
Josef Leachman; Darrel Murray; Heather Mathewson; Adam Mitchell

## **Conservation & Ecology of Reptiles and Amphibians 1**

River Oaks, February 23, 2023

Moderator: Luke Micek

- 3:45 **Movement, home range size, and habitat use of Eastern Black-tailed Rattlesnakes (*Crotalus ornatus*) in the northern Chihuahuan Desert**  
James Emerson; Dominic DeSantis; Vicente Mata-Silva; Amy Wagler; Jerry Johnson
- 4:00 **Habitat Conservation Forecasting for the Western Massasauga**  
Wade Ryberg; Danielle Walkup; Michelle Lawing; Corey Fielder; Brandon Bowers; Toby Hibbitts
- 4:15 **Demography of reintroduced Louisiana Pinesnakes**  
Christopher Schalk; David Stewart; Josh Pierce; Emlyn Smith
- 4:30 **Modeling breeding pond habitat for amphibians of conservation concern**  
Wendy Anderson; Amie Treuer-Kuehn; Duane German
- 4:45 **Survival of Repatriated Alligator Snapping Turtles in Native Texas Waters**  
Connor Adams; Jessica Glasscock; Christopher Schalk; Paul Crump
- 5:00 **Reestablishment and Increase of Spot-Tailed Earless Lizard Home Range Following Aggressive Radiotracking Efforts**  
Evan Rangel; Jacob Reyes; Scott Henke; Cord Eversole

## **Friday, February 24, 2023**

### **Conservation & Ecology of Birds 3**

River Oaks, February 24, 2023

Moderator Jacob White

- 9:00 **Range expansion of Crested Caracaras over a 55-year period in three distinct populations**  
Jennifer Smith; Amanda Lamberson
- 9:15 **The Impact of Microclimate on Nest Site Selection and Reproductive Success in the Black-Crested Titmouse**  
Jamie Liang; Troy Murphy
- 9:30 **No Presentation - Cancellation**
- 9:45 **Vocal behavior and urban avoidance in golden-cheeked warblers inhabiting exurban preserves**  
Darren Proppe; Lisa O'Donnell; Christopher Warren; Alexandra Yost; Dania Marín
- 10:00 **Pugilistic Doves: Is Wing Morphology Associated with an Odd Form of Aggression in Texas Doves?**  
Maia Dykstra; Troy Murphy
- 10:15 **Parental Attentiveness of a Songbird across Varying Temperature Gradients**  
Lindsey Chiesl; Heather Mathewson; Gabrielle Names; Britt Heidinger

### **Conservation & Ecology of Mammals 3**

Greenway A, February 24, 2023

Moderator: Lee Williamson

- 9:00 **Implementing novel trail camera-based techniques for estimating demographic parameters of unmarked white-tailed deer in forests**  
Molly Koeck; Colter Chitwood; Anna Moeller
- 9:15 **Temperature drives habitat selection and tolerance of predation risk in a climate generalist**  
Breanna Green; Evan Tanner; Richard Chandler; Heather Abernathy; L. Mike Conner; Elina Garrison; David Shindle; Karl Miller; Michael Cherry
- 9:30 **No Presentation-Cancellation**
- 9:45 **Early-life conditions: a roadmap to larger antlered white-tailed deer**  
Joseph Hediger; Matthew Moore; Cole Anderson; Charles DeYoung; David Hewitt; Stuart Stedman; Randy DeYoung; Michael Cherry
- 10:00 **Temporal variation in resources influences offspring quality of white-tailed deer in a semi-arid environment**  
Miranda Hopper; Bryan Spencer; Randy DeYoung; Aaron Foley; J. Alfonso Ortega; Landon Schofield; Tyler Campbell; Michael Cherry
- 10:15 **Estimating Breeding Values and the Heritability of Antler Traits in White-tailed Deer**



Cole Anderson; Randy DeYoung; Michael Cherry; David Hewitt; Joseph Hediger;  
Charles DeYoung; Stuart Stedman; Matthew Moore

## **Conservation & Ecology of Reptiles and Amphibians 2**

Greenway B, February 24, 2023

Moderator: Gage Grantham

- 9:00 **The Thermal Ecology of Reintroduced and Native Texas Horned Lizards**  
Patrick Ryan
- 9:15 **Use of Environmental DNA in Wetland Habitats for Detecting Cryptic Species: A Case Study on the Western Chicken Turtle (*Deirochelys reticularia miaria*)**  
Mandi Gordon; Jason Nagro; Danielle DeChellis; Louisa Collins; Hannah Nelson;  
Joseph Apodaca; Jenny Oakley; George Guillen
- 9:30 **Three-toed Box Turtle (*Terrapene carolina*) Spatial Ecology at Multiple Scales in North Texas**  
Sara Joseph; Andrew Gregory; Jaime Jimenez
- 9:45 **Validation of an Environmental DNA Protocol to Detect Red-eared Slider Turtles (*Trachemys scripta elegans*)**  
Doreen Mata; Tiffany Nash; Heather Mathewson; Jeff Brady; Devin Erxleben
- 10:00 **Comparative Calling Phenology of Anurans Across Geographic Gradients**  
Veda Allen; Christopher Schalk; Daniel Saenz; Tatiana Suarez-Joaqui

## **Tools & Technology**

Museum Park, February 24, 2023

Moderator: Brittney Oliver

- 9:00 **Seed-Spec: A Native Seed Blend Development Tool**  
Brian Hays; George Peacock
- 9:15 **White-tailed Deer Surveys with Thermal Drones and Distance Sampling**  
Lori Massey; Aaron Foley; Jeremy Baumgardt; Randy DeYoung; Zachary Pearson;  
Humberto Perotto
- 9:30 **No Presentation - Cancellation**
- 9:45 **Using 3D models of forage cover structure to monitor cattle grazed upland gamebird habitat**  
Silverio Avila; Humberto Perotto; Kye Johnston; Lori Massey; J. Alfonso Ortega;  
Leonard Brennan; Fidel Hernandez

# **Posters**

## **Student Poster Session**

Constellation Ballroom, 5:00-6:00 pm Wednesday, February 22, 2023

- 1. Using Accelerometer Data to Remotely Categorize Wild Animal Behavior**  
Georgina Eccles; Matti Bradshaw; Jay VonBank; Bart Ballard
- 2. Avian Community Responds Positively to Prairie and Emergent Wetland Restoration at Riverby Ranch Mitigation Area in North Texas**  
Tessa Boucher; James Bednarz; Andrew Gregory
- 3. Foraging Behavior of American Kestrels (*Falco sparverius*) is Influenced by the Time of Day and External Temperature in North Texas**  
Brooke Poplin; James Bednarz; Kelsey Biles
- 4. Connecting the Dots: Documenting the Full Annual Period Movement Patterns of Migrant American Kestrels**  
Madeleine Kaleta; Kelsey Biles; James Bednarz; Andrew Gregory
- 5. Anuran Communities and their Calling Phenologies: Using Acoustic Data to Establish Species Presence**  
Teresa Kenny
- 6. Influence of traffic volume on the variation in the mammal community composition within the road effect zone**  
Thomas Yamashita; David Wester; Zachary Wardle; Daniel Scognamillo; Landon Schofield; John Young; Jason Lombardi
- 7. An Evaluation of Small Mammal Diversity, Population Demography, Occupancy, And Damage Among Three Row Crop Irrigation Systems on The Southern High Plains**  
Annie Braack; Blake Grisham
- 8. Fire and Mice: The Effects of Prescribed Fire on Rodent Communities**  
Margaret Sinner
- 9. Potential Effects of Coprophagous Behavior in Texas Tortoises**  
Saren Perales; Christin Moeller; Scott Henke; Sandra Rideout-Hanzak; David Wester; Cord Eversole
- 10. Habitat Preferences of Texas Tortoises in Southern Texas**  
Christin Moeller; Saren Perales; Wraith Rodriguez; Juan Elissetche; Scott Henke; Sandra Rideout-Hanzak; Cord Eversole; Jason Singhurst
- 11. Is Agriculture Harmful to Spot-Tailed Earless Lizards?**  
Preston Richardson; Evan Rangel; Jacob Reyes; Scott Henke; Cord Eversole
- 12. Loggerhead Shrike Predation of Spot-Tailed Earless Lizards**  
Evan Rangel; Jacob Reyes; Scott Henke; Ruby Ayala; Cord Eversole
- 13. Noisescape along Wildlife Road Mortality Mitigation Areas in Southern Texas**  
Anna Mehner; John Young; Richard Kline
- 14. Stopover Habitat Associations of an Imperiled Migratory Bird in The Central Flyway**  
Andres Rosales; Tara Rodkey; Richard Lanctot; Lee Tibbitts; Bart Ballard
- 15. How Does Variance in Natural Factors Alter the Hunting Patterns of Mississippi Kites in Urban Spaces?**

- Audrey Crawford; Conner Green; Billy Huynh; Brent Bibbes; Clint Boal
- 16. Body Weight of Small Vertebrates Across a Gradient of Plant Invasion and Habitat Change**  
Cord Eversole; Mason Helm; Andrew Mullaney; Duston Duffie; Scott Henke
- 17. Whitebrush (*Aloysia gratissima*) Ecology and Control Options for Management**  
Katie Pennartz; Evan Tanner; Megan Clayton; Anthony Falk; Humberto Perotto
- 18. Weather Effects on Herpetofauna Detection on a South Texas Rangeland**  
Duston Duffie; Andrew Mullaney; Cord Eversole; Scott Henke
- 19. Mating mystery: A closer look at the breeding ecology of the Painted Bunting**  
Alejandra Gage; James Bednarz; Andrew Gregory
- 20. Development of an Improved Survey Method for the Texas Kangaroo Rat (*Dipodomys Elator*)**  
Julien Washington; Derek Malone; Clint Boal; Russell Martin
- 21. Assessing the Impacts of Waterfowl Habitat Management in the Western Gulf Coast Region**  
Javier Segovia; Georgina Eccles; Jordan Giese; Daniel Collins; Kevin Kraai; Bart Ballard
- 22. Spatial and temporal variation in mammal communities of a unique forest ecosystem in northeast Texas.**  
Marc Moss; Connor Adams; Jessica Glasscock
- 23. Vegetation Selection and Activity Patterns by South Texas Bats**  
Kylie Perez
- 24. Applying eDNA Analysis to Identify Winter Food Habits of American Kestrels in the South Plains of Texas**  
Sarah Fonville; Clint Boal
- 25. Microclimate Characteristics of White-tailed Hawk Nests in South Texas**  
Madeleine Barham; Danielle Walkup; Clint Boal
- 26. Parental Budgets and Feeding Behavior of Nestling White-tailed Hawks**  
Gavin Moon; Danielle Walkup; Clint Boal; Madeleine Barham
- 27. Tricolored Bats in Texas: Acoustic Monitoring to Inform Conservation in the Era of White-nose Syndrome**  
Ember Bower; Brittney Oliver; Sarah Fritts; Sara Weaver
- 28. Native Grassland Restoration in the Edwards Plateau Ecological Region of Texas**  
Molly O'Brien; Evan Tanner; David Wester; Anthony Falk; Sandra Rideout-Hanzak
- 29. Species-specific Patterns of Consumption of Oral Rabies Vaccine Baits in the South Texas Plains**  
Haley Sloan; John Tomecek; Tyler Campbell
- 30. Composition of the mammalian community at the Stephen F. Austin Experimental Forest prior to timber harvest and shorter fire return interval**  
Ethan Menzel; Jessica Glasscock; Christopher Schalk; Alejandra Martinez; Reuber Lana Antoniazzi Jr; Connor Appel
- 31. Rangewide Genetic Diversity of the Greater Prairie-Chicken (*Tympanuchus cupido*)**  
Katarina Kieleczawa; Andrew Gregory
- 32. Evaluating the Effectiveness of Redesigned Wildlife Exits Along a South Texas Highway**  
Jamie Langbein; Kevin Ryer; John Young; Richard Kline

- 33. A Comparison of Avian Sampling Methodologies: Is Species Richness Accurately Detected?**  
Alejandra Martinez; Jessica Glasscock; Reuber Lana Antoniazzi Jr;  
Brian Oswald; Christopher Schalk; Selma Glasscock
- 34. Forecasting Spatial Abundance of Northern Bobwhite in South Texas Using Roadside Surveys**  
Alejandro Bazaldua; Fidel Hernandez; Andrea Montalvo; Aaron Foley;  
Kristyn Stewart; Sabrina Szeto
- 35. Single-species management and its effect on small mammal biodiversity**  
Thomas Bates; Brittany Slabach
- 36. Comparing Precision and Scale-Transferability of Rangeland Monitoring Methods for Grassland Restoration in the Trans-Pecos, Texas**  
Jason Crosby; Lalo Gonzalez; Justin French; Ty Goodwin; Billy Tarrant;  
Louis Harveson
- 37. Common Forbs of the Trans-Pecos: A Field and Lab Guide**  
Ty Goodwin; Leanna Morin; Jason Crosby; Lalo Gonzalez; Justin French;  
Louis Harveson; Shawn Gray
- 38. Measuring water and nutrients in rangeland grass species: What can we learn from drones?**  
Kimberly Tanguma; Humberto Perotto; Evan Tanner; Anthony Falk; Silverio Avila;  
Lori Massey
- 39. Histological Analysis of Desert Bighorn Sheep, Aoudad, and Mule Deer Diets in the Van Horn Mountains, Texas**  
Eliana Dykehouse; Olivia Gray; Lalo Gonzalez; Justin French; Louis Harveson;  
Shawn Gray; Froylan Hernandez
- 40. Understanding the Diet of an Unmanaged Population of Coyotes in Southern Texas**  
Anna Racey; Tyler Campbell; John Tomecek
- 41. Comparing two detection methods for estimating occupancy of chestnut-bellied scaled quail in South Texas**  
Caleb McKinney; Evan Tanner; Ashley Tanner; Katherine Travis; Leonard Brennan;  
Fidel Hernandez; Humberto Perotto; Ryan Luna; John McLaughlin
- 42. Winter Habitat Selection, Movement and Survival of Scaled Quail in the Trans-Pecos, Texas**  
Caleb Hughes; Ryan Luna; Lalo Gonzalez; Justin French; Louis Harveson
- 43. Ecohydrology Improvements and an Evaluation of the Performance of Native Grasses in the Chihuahuan Desert**  
Aaron Ortega-Gonzalez
- 44. Developing a Large-Scale Virtual Fencing System to Improve Wildlife Habitat**  
Shanna Gleason; Daniel Ramirez; Humberto Perotto; J. Alfonso Ortega;  
Jason Karl; Silverio Avila
- 45. Assessing Amphibian Use of Flooded Wildlife Crossings with eDNA**  
Madison Nadler; Kevin Ryer; John Young; Richard Kline
- 46. Habitat and Spatial Factor Underlying Community Organization of Tadpoles in East Texas**  
Tatiana Suarez Joaqui; Daniel Saenz; Cory Adams; Toby Hibbitts; Kathryn R. Kidd;  
Christopher Schalk

- 47. Methods to Increase Native Vegetation in Areas Invaded by Lehmann's Love Grass**  
Andres Solorio
- 48. Texas Tortoise Response to Prescribed Fire in South Texas Coastal Rangelands**  
Camryn Kiel; Evan Tanner; Ashley Tanner; Sandra Rideout-Hanzak; Michael Morrison; Andrea Montalvo
- 49. How are Herbaceous Plant Relationships Affected by Prescribed Fire?**  
Forrest Fay; Sandra Rideout-Hanzak; Juan Elissetche; David Wester; Meghan Anderson
- 50. Pre-restoration Waterbird Surveys at Natural and Man-made Water Sources**  
Zachary Bellows; Heather Mathewson; Josef Leachman
- 51. PMSG and Timing Effects on the Follicle Stimulation of Axis Deer During Artificial Insemination**  
Sarah Goodman; Phil Urso
- 52. Distribution Models of Texas Tortoise**  
Colin Tucker; Hemanta Kafley; Jacqueline Sanchez; Kayla Brown
- 53. Plant DRIPS—Plant Drought Response and Insect Pollinator Studies: Plant-pollinator interactions across flowering perennials in North-Central Texas**  
Addison Singleton; Adam Mitchell
- 54. Golden-cheeked Warbler Lidar Based Habitat Model Tested With Acoustic Recorders**  
James Peterson; Clara Whiting
- 55. Occupancy of eastern red bats across Texas, a species highly affected by wind energy**  
Brittney Oliver; Ember Bower; Sara Weaver; Sarah Fritts
- 56. Evaluation of South Texas Clay Loma Characteristics**  
Juan Elissetche; Forrest Fay; Sandra Rideout-Hanzak; David Wester; Scott Henke; Humberto Perotto; Evan Tanner; Meghan Anderson; Cord Eversole; Jason Singhurst
- 57. Monitoring the Effects of Wildlife Crossings on Bobcat Range in South Texas**  
Jolie Gonzalez; Jamie Langbein; Caitlin Brett; Victoria Hanley; John Young; Richard Kline
- 58. Examining the Implications of Arbuscular Mycorrhizal Fungi on Plant-Pollinator Interactions Associated with Texas Grasslands**  
Isabella Szebelledy; Adam Mitchell
- 59. Drought Conditions Associated with Available Habitat for Bison at Caprock Canyons State Park, TX**  
Hunter Jacobson; Heather Mathewson; Hemanta Kafley; Donald Beard
- 60. Effects of canopy cover on habitat and space use by coyotes and gray foxes along urban-rural gradients**  
Danielle Gay; Joseph Veech; Darren Proppe; Floyd Weckerly
- 61. Wild Turkey Response to Mega-Wildfire in South Texas**  
Kaylee Lovejoy; Jason Lombardi; William Kuvlesky; Aaron Foley; Humberto Perotto
- 62. Disease and Disturbance: Understanding the relationship between large-scale habitat disturbance and chronic wasting disease**  
Ian O'Hartigan; Brittany Slabach

**63. Using a ground-nesting bird to model variability in scale of effect in heterogeneous landscapes**

Katherine Travis; Evan Tanner; Ashley Tanner; Caleb McKinney; Fidel Hernandez; R. Dwayne Elmore; Kent Andersson; Craig Davis; Sam Fuhlendorf; Rachel Carroll; Bradley Kubecka; Rebekah Ruzicka; Dale Rollins; Ryan Luna; Blake Grisham; C. Brad Dabbert; Sarah Fritts; Scott Carleton

**64. Sand Shinnery Oak Prairie Ecoregion Plant Community Composition Response to Various Spring Prescribe-Fire and Post-Fire Rest Regimes in Eastern New Mexico**

Michael Whitson; Blake Grisham; Warren Conway; David Haukos; Christian Hagen; Carlos Villalobos

**65. Influence of Pesticides on Avian Malaria Prevalence**

Katelyn Sanchez; McKenna Sanchez; Gary Voelker; Sergei V. Drovetski

**66. Prevalence of the Raccoon Roundworm (*Baylisascaris procyonis*) in Panhandle and West Texas Raccoons**

SaraBeth Boggan; Jason Fritzler; Blake Grisham; Ashley Steuer

**67. A novel method on acoustic signal determination for bird conservation using publicly sourced applications.**

Barbara Kalta; Andrew Gregory

**68. The cost of a bun in the oven: using new technology to uncover the role of pregnancy and environmental temperature on heterothermy in white-tailed deer**

Breanna Green; Evan Tanner; Clayton Hilton; Michael Cherry

**Professional Poster Session**

Constellation Ballroom, 1:00-5:00 pm, Thursday, February 23, 2023

**1. Northern Bobwhite Covey Locations on Fed and Unfed Ranches in South Texas**

Catalina Berry; Abe Woodard; Amanda Montemayor; Aidan Tautges; Cameron Bright

**2. Environmental Conditions and the Efficiency of Northern Bobwhite Hunts in South Texas**

Amanda Montemayor; Abe Woodard; Catalina Berry; Aidan Tautges; Cameron Bright

**3. Correlating Density Surface Models with Trapping Success of Northern Bobwhites**

Aidan Tautges; Abe Woodard; Catalina Berry; Amanda Montemayor; Cameron Bright

**4. Monitoring the Prevalence of Eyeworms in South Texas Bobwhites**

Cameron Bright; Abe Woodard; Andrea Montalvo; Catalina Berry; Amanda Montemayor; Aidan Tautges

**5. Prescribed Fire Effects on Northern Bobwhite Nest Site Selection and Survival**

Adam Vonderschmidt; Rebekah Ruzicka; Bradley Kubecka

**6. Herbicide Resources for Wildlife Biologists**

Stephen DeMaso; Megan Clayton; Shannon Barron

**7. Improving detectability of the Tamaulipan Spot-tailed Earless Lizard at Laughlin AFB**

Danielle Walkup; Kathryn Steffen; Teresa Kenny; Toby Hibbitts; Corey Fielder; Mathew Kramm; Roel Lopez; Wade Ryberg



- 8. Effects of Range Management on the Plateau Spot-tailed Earless Lizard, Year 1 Results**  
Kathryn Steffen; Danielle Walkup; Teresa Kenny; Toby Hibbitts; Doug Tolleson; Roel Lopez; Paul Crump; Wade Ryberg
- 9. Texas Statewide Summary of Red Crossbill Location Records by Ecoregion From 2017 to 2021**  
Richard Schaefer; Matthew Young
- 10. Free-ranging Domestic Cat Management on Conservation Lands: A Partnership Opportunity**  
Grant Sizemore
- 11. Unexpected Allies: Woodrats and Rabbits Provide Escape Cover for Quail**  
Clint Boal
- 12. Effectiveness of Using eDNA to Detect Alligator Snapping Turtles**  
Cory Adams; Daniel Saenz; Christopher Schalk; David Rosenbaum; Joseph Apodaca
- 13. Reintroduction of the Louisiana Pinesnake (*Pituophis ruthveni*) in Grant Parish, Louisiana**  
Josh Pierce; Emlyn Smith; Steve Reichling; Christopher Schalk
- 14. Finding a GEM: An Integrated and Tiered Approach to Grassland Habitat Treatment Assessment Using the Grassland Effectiveness Monitoring (GEM) Protocols**  
Rebekah Rylander; Anna Matthews; Daniel Bunting; Michael C. Duniway; James Giocomo; Anna Knight; Adriana Leiva; Robert Perez; Kourtney Stonehouse; Derek Wiley; Don Wilhelm
- 15. Movement and Habitat Selection of Repatriated Alligator Snapping Turtles in Eastern Texas**  
Connor Adams; Jessica Glasscock; Christopher Schalk; Paul Crump
- 16. Behavioral Response of Wild Pigs to Aerial Gunning**  
Bethany Friesenhahn; Randy DeYoung; Michael Cherry; Nathan Snow; Kurt VerCauteren
- 17. Scaled Quail Food Preference in West Texas**  
Dean Wiemers; Bryson Wall; Daniel Tidwell; Robert Zaiglin; Eric Grahmann; Roel Lopez
- 18. Cattle and Quail: An Adaptive Management Strategy for Livestock Grazing as a Quail Habitat Management Tool**  
Callie Swaim; Rebekah Ruzicka; Bradley Kubecka; Jake Bonnell

## **Abstracts: Cottam Awards Competition**

### **8:00 am: From eradication to conservation: Identifying areas for restoration and management of shinnery oak in a changing climate**

**Katie Pennartz**, Texas A&M University – Kingsville, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**J. Matthew Carrol**, Murray State University, Murray, KY, USA

**R. Dwayne Elmore**, Oklahoma State University, Stillwater, OK, USA

**Craig Davis**, Oklahoma State University, Stillwater, OK, USA

**Sam Fuhlendorf**, Oklahoma State University, Stillwater, OK, USA

**Abstract:** By 1985, an estimated 400,000 square kilometers of shinnery oak (*Quercus havardii*) had been eliminated or degraded for agricultural purposes across its historic distribution. More recently, this clonal shrub has received increased conservation attention for its role as a keystone species in the southwestern United States. These trends, combined with challenges in propagation and establishment, indicate a need for targeted conservation and restoration efforts. Future climate models predict the Southern Great Plains will become one of the most climate-impacted ecoregions in North America, highlighting a need to understand the challenges dynamic climate conditions present for restoration efforts. Our objective was to identify areas for shinnery oak management and explore the role of climate in determining these areas when considering topoedaphic relationships. We constructed ecological niche models using MaxEnt to model potential shinnery oak distribution under current climate conditions and temporally transferred our model using global climate model scenarios to identify areas predicted to retain suitability through 2100. The current distribution model informed by environmental and topoedaphic variables performed well (AUC = 0.81) and indicated soil type as the primary influence on distribution. The second distribution model, built excluding topoedaphic variables to serve as the basis for estimating future plant-climate relationships, performed well (AUC = 0.85), and identified increasing precipitation as snow as the leading constraint on environmental suitability. Future projections show stability of a core distribution located in north Texas and southwest Oklahoma. Our findings provide geographical context for implementation of conservation practices mindful of the uncertainty of future climatic conditions.

### **8:20 am: Quantifying population trends and habitat for the chestnut-bellied scaled quail in South Texas rangelands**

**Dakota Moberg**, Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA

**Lori Massey**, CKWRI-TAMUK, Buffalo, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Leonard Brennan**, Kingsville, TX, USA

**Jesús Franco**, McAllen, TX, USA

**Abstract:** Chestnut-bellied scaled quail (*Callipepla squamata castanogastris*; hereafter ‘scaled quail’) is an upland game bird that has experienced declines in abundance across its geographic distribution. Declines in the South Texas Plains were not as strong as in other regions until the

2000's. Proposed hypotheses for the declines of scaled quail suggest rangeland deterioration and changes in land use. Major drivers of land use change in the region are oil/gas, urban development, and brush management practices that has altered vegetation landscape structure and composition. Our goal was to develop the baseline for a framework to identify conservation and management priorities for scaled quail habitat in the South Texas Plains. We first identified and quantified spatial trends in scaled quail abundance through population indices in the region. Our study area was in the South Texas Plains ecoregion with a focus on four counties: Jim Hogg, Starr, Zapata, and Webb. We used the Rangeland Analysis Platform (RAP) to evaluate changes in percent functional cover of vegetation categories between 1986 and 2020. Scaled quail numbers/route have decreased from 16 birds/route in the late 1970s to ~3 birds/route since 2011, an overall decline of over 80%. Data from the RAP shows percent tree cover has increased in all four counties. Field data confirmed that tree cover is linked to honey mesquite (*Prosopis glandulosa*) and the presence of invasive herbaceous species in the understory vegetation community. These factors suggest negative correlates of scaled quail habitat that potentially could decrease habitat connectivity.

#### **8:40 am: Effectiveness of Camera Traps and Infrared Trip Wire Position in Capturing Herpetofauna and Small Mammals**

**Madison Nadler**, University of Texas Rio Grande Valley, Brownsville, TX, USA

**Kevin Ryer**, University of Texas Rio Grande Valley, Brownsville, TX, USA

**John Young**, Texas Department Transportation, Austin, TX, USA

**Richard Kline**, UTRGV, Brownsville, TX, USA

**Abstract:** Wildlife guards (WG) and wildlife crossing structures (WCS) have been installed on State Highway (SH) 100 and farm-to-market (FM) 106 to mitigate ocelot (*Leopardus pardalis*) mortalities in Cameron County, Texas. These structures have been monitored for mesocarnivores using camera traps as a non-invasive form of data collection. Camera traps are traditionally used for capturing medium to large mammals and few studies have assessed their success for monitoring smaller species. Our objective was to determine if a ground level infrared trip wire height at WCS and WG would capture small mammals and herpetofauna that may be missed by the standard infrared trip wire height set for mesocarnivores. We hypothesized that the ground level trip wire position would capture fewer medium-sized species and a greater number of small mammals and herpetofauna compared to the standard trip wire height. Reconyx HyperFire 2 cameras connected to external infrared trip wire systems were installed at two heights (standard and ground) on five WCS on FM 106 and five WG on SH 100. PERMANOVA identified differences in the species assemblages observed based on trip height at WCS ( $P_{WCS} \leq 0.001$ ) but not at WG ( $P_{WG} = 0.321$ ). SIMPER analyses determined that rodents, birds, amphibians, and opossums were leading the dissimilarity between trip heights at WCS. A lower external infrared trip height would be beneficial to managers assessing WCS use by state or federally threatened rodents and herpetofauna, while not sacrificing monitoring efforts of mesocarnivores, such as the ocelot.

## **9:00: Assessment of Non-breeding Bird Community Responses to Semi-arid Grassland Restoration Efforts in Trans-Pecos, Texas**

**Emily Card**, Borderlands Research Institute, Athens, GA, USA

**Mieke Titulaer**, Borderlands Research Institute, Chihuahua, TX, MEX

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Abstract:** Woody plant encroachment in Chihuahuan Desert grasslands degrades and changes suitable habitat into desert shrublands, contributing to the decline of grassland bird populations. We initiated this study to evaluate how non-breeding grassland birds respond to habitat restoration efforts, via herbicide treatments, in the Trans-Pecos region of Texas. We conducted bird and vegetation surveys on 3 ranches during the winters of 2019-2022. One of these properties was partially treated with a foliar herbicide in the fall of 2019 to control intrusive woody plants. We utilized a principal coordinate analysis to visualize patterns in non-breeding bird communities within and among grassland, untreated shrubland, and herbicide-treated shrubland habitats. We also related measured vegetation characteristics to variation within the bird abundance data through this analysis. Additionally, we ran a canonical analysis of principal coordinates to assess the distinctness of bird communities between the 3 habitat types. We found that non-breeding bird communities in the Trans-Pecos are largely shaped by shrub cover and shrub height:  $r = 0.697$ ,  $p < 0.001$  and  $r = 0.611$ ,  $p < 0.001$ , respectively. We also found that bird community composition in treated shrubland habitat was distinct from the communities observed in grassland and untreated shrubland habitats. Herbicide can be a valuable tool for restoring semi-arid grassland habitat for some grassland-obligate species. By identifying the habitat characteristics that primarily influence non-breeding bird community composition, biologists can develop effective management strategies and set achievable conservation goals that benefit grassland bird species of concern.

## **9:20 am: White-tailed Deer and Cattle Grazing – Nutritional Consequences for Deer Population Performance**

**Bryan Spencer**, Caesar Kleberg Wildlife Research Institute - Texas A&M University  
Kingsville, Kingsville, TX, USA

**Miranda Hopper**, TAMUK-CKWRI, Kingsville, TX, USA

**Randy DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Aaron Foley**, CKWRI-TAMUK, Kingsville, TX, USA

**David Hewitt**, Caesar Kleberg Wildlife Research Institute / Texas A&M University Kingsville,  
Kingsville, TX, USA

**J. Alfonso Ortega**, CKWRI-TAMUK, Kingsville, TX, USA

**Landon Schofield**, East Foundation, Kingsville, TX, USA

**Tyler Campbell**, East Foundation, San Antonio, TX, USA

**Michael Cherry**, CKWRI, Kingsville, TX, USA

**Abstract:** Understanding the interactive effects of competition and environmental conditions on white-tailed deer (*Odocoileus virginianus*) nutrition is important for monitoring population

performance. It is suspected the competition between cattle (*Bos taurus*) and deer can reduce nutritional condition of deer, however environmental conditions may mediate this effect. We examined this interaction by linking metrics of nutritional condition (body mass, rump fat, antler scores) and reproduction (lactation status) of 475 male and 609 female white-tailed deer to cattle stocking rates and environmental conditions (percentage of sand in the soil, rainfall, herbaceous biomass, and brush cover). Deer were captured during October–November from 2017–2021 across four South Texas ranches. We fitted generalized linear mixed models to estimate the interactive effects of stocking rates and environmental conditions on white-tailed deer nutritional and reproductive metrics. Cattle stocking rates ranged between 0–0.2352 AU/ha/year. Stocking rates did not influence lactation status or body mass of males or females. Antler size decreased 1.67 cm for every 0.01 AU/ha/year increase in cattle stocking rates ( $\beta = -0.057$ ; 85% CI: -0.111 to -0.001). Male rump fat also decreased with stocking rates, but the effect was influenced by environmental conditions; during dry years and in sandier soils, male deer had little rump fat regardless of stocking rates. These results indicate a sex-specific response in the nutritional consequence of white-tailed deer–cattle competition, as only male white-tailed deer nutritional metrics were negatively affected by cattle stocking rates, while female condition was largely driven by reproductive condition.

#### **9:40am: Strategic Communication to Increase Willingness to Engage in ESC**

**Jared Messick**, Texas State University, San Marcos, TX, USA

**Christopher Serenari**, Texas State University, San Marcos, TX, USA

**Floyd Weckerly**, Texas State University - San Marcos, San Marcos, TX, USA

**Kristy Daniel**, Texas State University, San Marcos, TX, USA

**Paul Crump**, Texas Parks and Wildlife Department, Austin, TX, USA

**Elena Rubino**, University of Arkansas at Monticello, Monticello, AK, USA

**Abstract:** In the United States, landowner support for endangered species conservation (ESC) initiatives, such as Voluntary Incentive Programs (VIPs) determines their effectuality because private landowners own significant proportions of endangered species habitat. Problematically, landowner collaboration with bureaucratically driven ESC can be hindered by insufficient levels of human and social capital. Deficiencies in critical stewardship resources can produce breakdowns in communication between landowners and governing ESC institutions. This communicative gap has yet to be bridged by satisfactory investigations of how to communicate with landowners about ESC on private lands. We addressed this need with a quasi-experiment to uncover the impact of different messages on landowner attitudes and behavioral intention towards VIPs. We conducted a survey of landowners in east-central Texas to elicit their views of a VIP for the endangered Houston toad. Results from 956 landowners indicate that messages aligning with landowners' values were associated with statistically significant and positive changes in ESC intention and attitudes. Moreover, results suggest that regardless of the experimental message received, information about the VIP is associated with positive changes in attitude and intention. These results highlight the need for governing ESC agencies to a.) strategically communicate VIP details and opportunities to landowners, and b.) tailor ESC messages to communicate ideological alignment with landowners to reach them at larger scales. Accomplishing these tasks can improve ESC outcomes at large scales and prove to be an irreplaceable, relational tool for collaborative ESC.

## **Abstracts: General Sessions**

### **Conservation & Ecology of Birds 1**

#### **2:00: Evaluating the Viability of Translocating Northern Bobwhite as a means of Population Restoration**

**Jared Schlottman**, Texas A&M Natural Resource Institute, College Station, TX, USA

**Roel Lopez**, San Antonio, TX, USA

**Jim Cathey**, NRI and RWFM, College Station, TX, USA

**Abstract:** Northern bobwhite (*Colinus virginianus*) have experienced population reductions throughout their historic range over the past half-century according to multiple indices of abundance. This decline is often attributed in part to reductions in contiguous bobwhite habitat. To overcome the barriers of local dispersal caused by habitat fragmentation, managers often use translocation from areas of greater bobwhite abundance. Our purpose was to evaluate the survival, reproductive success, and dispersal patterns of wild translocated bobwhites on Gus Engeling Wildlife Management Area (GEWMA) to determine if re-establishment was possible. In the spring of 2021, a total of 75 bobwhite were translocated from South Texas to GEWMA, 43 of which had radio transmitters. Median spring-summer survival for translocated bobwhite was .77 (n = 43). We discovered 5 nests created by 4 different radio-collared females during the summer of 2021. Three of the nests were destroyed by either wild pigs or snakes, one nest was successfully hatched while the remaining nest was censored at the end of the study period. We also studied spatial covariates that influenced survival based on daily triangulation data. Site-fidelity was moderately high, however, 12 bobwhite were censored from the study due to either collar failure or detection failure caused by distance moved. During the summer of 2022, bobwhite cocks were heard on GEWMA, and coveys were flushed near the release site demonstrating the relative success of re-establishment. Future translocation projects should consider increasing survival of bobwhite during the first few weeks following translocation by utilizing soft-release methods or supplemental nutrition stations.

#### **2:15: Population and Habitat Assessment of the California, Mountain, and Gambel's Quail in California's Changing Landscape**

**Sarah Jacobson**, Caesar Kleberg Wildlife Research Institute - Texas A&M University - Kingsville, Kingsville, TX, USA

**Leonard Brennan**, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Katherine Miller**, California Department of Fish and Wildlife, West Sacramento, CA, USA

**Abstract:** California has three species of quails: California quail (*Callipepla californica*), mountain quail (*Oreortyx pictus*), and Gambel's quail (*Callipepla gambelii*). The human population in the state increased by more than 97% during the past half-century, leading to potential habitat loss for these species due to urban development, large-scale agriculture, and altered forest and rangeland management. We estimated the long-term population trends for



quail species in California and quantified the effect of changes in land use and land cover to localized subpopulations. We used number of birds per route from the North American Breeding Bird Survey and interpolation in ArcGIS to create five-year rolling average abundance maps. We established random points and extracted number of birds detected from 1970 to 2017. We identified areas within the state that had declining, stable, and increasing quail abundances and compared road density, human population density, land use, and land cover. On the state-wide scale, populations of all 3 quails have remained stable over the past 50 years. Locally, sites where California quail populations declined had 64% higher road densities, 129% higher human population densities, and 93% less bare ground than sites where they were increasing. Where mountain quail were declining, irrigated land cover was higher by 154% but road density was 50% lower than where they were increasing. Increasing Gambel's quail populations had lower human population density, road density, and percent bare ground cover. Our results indicate these species can persist in a human-dominated landscape if sufficient habitat is available.

### **2:30: Influence of Rainfall and Vegetation Color on Northern Bobwhite Reproduction**

**Lindsey Howard**, Texas A&M Kingsville - Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Clayton Hilton**, Texas A&M University-Kingsville, Kingsville, TX, USA

**David Hewitt**, Caesar Kleberg Wildlife Research Institute / Texas A&M University Kingsville, Kingsville, TX, USA

**David Wester**, Kingsville, TX, USA

**Abstract:** Quail populations in semiarid environments experience drastic fluctuations, which are strongly influenced by rainfall. Despite decades of research, the mechanisms driving this relationship are unknown. While past research has focused on the materialized effects of rainfall, we propose that rainfall itself, or closely associated factors, influence population dynamics by serving as reproductive cues. Rainfall events and-or vegetation color may provide supplemental information that stimulates quail reproduction in semiarid environments. Our study evaluates (1) vegetation color and (2) rainfall itself as reproductive cues for northern bobwhite (*Colinus virginianus*) in semiarid rangelands. During April–August 2022, we housed northern bobwhite hens ( $n = 20$  hens) in outdoor aviary cages that were assigned 1 of 4 vegetation color treatments: brown, green, switch, control ( $n = 5$  hens/treatment). We collected blood every 2 weeks to measure changes in reproductive hormones and checked for eggs daily. We also recorded calling rate before and during rainfall to assess bobwhite behavior in response to rainfall. Although egg-laying rate was numerically higher in the green and switch treatment throughout the experiment, egg-laying rate did not differ statistically among treatments ( $P > 0.05$ ). However, calling rate approximately doubled from before rainfall to during rainfall. We will experimentally evaluate the influence of rainfall during April–August 2023.

### **2:45: Distributional Responses of Northern Bobwhites to Hunting Pressure in South Texas**

**Abe Woodard**, East Foundation, Sarita, TX, USA

**Leonard Brennan**, Kingsville, TX, USA

**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Neal Wilkins**, East Foundation, San Antonio, TX, USA  
**Andrea Montalvo**, East Foundation, Hebbronville, TX, USA

**Abstract:** Habitat selection and the localized distributions of northern bobwhites (*Colinus virginianus*) are heavily influenced by the availability of usable space. However, the influence of harvest and associated hunting pressures on the selection of usable space is unknown. We analyzed the relationships between spatial aspects of bobwhite hunting variables among the changes in bobwhite distributions at 16-ha resolution during the hunting seasons in 2018-2019, 2019-2020, and 2020-2021. We calculated changes in bobwhite distributions using multi-temporal density surface models from line transect distance sampling surveys and collected spatial attributes of hunting variables (i.e., harvest, hunts, gunshots) using GPS units on dogs and hunting vehicles. The annual harvest was 20% of the November bobwhite density estimate, with total gun hours ranging from 5.3-gun hours/100-ha to 8.3-gun hours/100-ha. We found that changes in bobwhite densities across hunting seasons were primarily influenced by year, indicating that bobwhite hunting pressures at low intensities have minimal influence on changes in bobwhite densities and distributions during the course of a hunting season. Coincidentally, we found a significant negative relationship ( $r$ ) between localized bobwhite density and each hunting parameter during the peak hunting period (i.e., mid-December to late January). We assume this relationship indicates that hunting pressure and harvest parameters at higher intensities will have a stronger influence on bobwhite distributional response.

### **3:00: Habitat Selection of Scaled Quail Across a Gradient of Oil and Gas Development in the Permian Basin, Texas**

**Brooke Bowman**, Borderlands Research Institute/Graduate Research Assistant/Texas Chapter, Alpine, TX, USA  
**Ryan Luna**, Sul Ross State University, Alpine, TX, USA  
**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA  
**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Abstract:** The Permian Basin region of Texas supports a large portion of the oil and gas industry in the United States and is expected to expand in the future. The Permian Basin region is also home to a variety of wildlife, including the scaled quail (*Callipepla squamata*), whose distribution encompasses the entire basin. West Texas scaled quail populations have been in decline since the early 1960's due to a combination of factors, including land use change, woody brush encroachment, overgrazing, and frequent drought conditions. Our goal was to determine if oil and gas development affects habitat selection and movement behavior of scaled quail in this region. We deployed global positioning system (GPS) transmitters recording GPS points every four hours on scaled quail across two ranches managed by ConocoPhillips in Upton County, Texas during the 2021 breeding season and 2021-2022 covey season. Scaled quail were captured on the Quail Ranch LLC, which acted as our control site and the Cross-L Ranch LLC, which acted as our developed site. An integrated step selection function was used to analyze our scaled quail location data. Environmental covariates included in our model were distance to well pads, distance to roads, distance to quail feeders, Landsat Modified Soil Adjusted Vegetation Index (MSAVI), slope, and aspect. By providing information on where scaled quail habitat selection

and movement ecology on an oil and gas developed landscape, oil companies can implement strategies that mitigate the impacts of development on scaled quail populations.

### **3:15: The Cost of Fragmentation: An Assessment of Habitat Connectivity for Northern Bobwhite in Texas**

**Kristyn Stewart**, CKWRI-TAMUK, Sinton, TX, USA

**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Sabrina Szeto**, Sabrina Szeto Consulting, Isen, GER

**Alejandra Olivera-Mendez**, Colegio de Postgraduados, San Luis Potosi, Salinas de Hidalgo, San Luis Potosi, MEX

**Jon Horne**, Idaho Department of Fish and Game, Boise, USA

**Angela Guerrero**, Queensland University of Technology, Brisbane, AUS

**John McLaughlin**, Lubbock, TX, USA

**Abstract:** Habitat loss and fragmentation are considered primary causes of species endangerment world-wide. For northern bobwhite (*Colinus virginianus*), habitat loss and fragmentation are considered ultimate factors influencing the species' decline. Although bobwhite habitat needs are well known, life history knowledge is more relevant for management at a local scale but less so for addressing ultimate factors of the species' decline, given that habitat loss and fragmentation operate at broad spatial scales. Effectively addressing the bobwhite decline therefore requires knowledge of bobwhite habitat amount and connectivity at large scales. In Texas, population abundance of bobwhites differs between northern and southern Texas, and it is hypothesized that differences in habitat connectivity between regions may be a reason. The objective of our study was to evaluate this hypothesis and quantify and compare bobwhite habitat amount, configuration, and connectivity between northern and southern Texas. We used 2019 National Land Cover Data (NLCD) imagery to develop a map of bobwhite habitat. Additionally, the NLCD imagery was used to create a cost raster for calculating the least-cost path of bobwhite movement. We used Program Conefor to estimate habitat connectivity with the least-cost paths using the equivalent connected area (EC). Here we report on metrics of bobwhite habitat configuration (e.g., percent of habitat, largest patch index, and mean patch area) and connectivity (EC) between southern and northern Texas in the context of contrasting bobwhite population trajectories. The findings from this study will provide a better understanding of the degree of fragmentation in bobwhite habitat in

## **Conservation & Ecology of Mammals 1**

### **2:00: Influence of Traffic on use of Wildlife Crossing Structures by Bobcats and Coyotes in Southern Texas**

**Anna Mehner**, University of Texas Rio Grande Valley, Port Isabel, TX, USA

**John Young**, Texas Department Transportation, Austin, TX, USA

**Richard Kline**, UTRGV, Brownsville, TX, USA

**Abstract:** Wildlife crossing structures (WCS) provide wildlife safe passage, habitat connectivity, and positively impact movement, and their effectiveness can be impacted by placement,

structure, and landscape attributes. Roads have a road-effect zone that influences wildlife behavior and survival, which can be expanded by increased traffic levels. Wildlife crossing structures can be negatively impacted by the road-effect zone, proximity of infrastructure and human presence. In Cameron County, the Texas Department of Transportation constructed nine wildlife crossing structures with non-continuous exclusion fencing on Farm-to-Market (FM) 106 and five WCS and 18 wildlife guards with continuous exclusion fencing on State Highway (SH) 100, to mitigate endangered ocelot (*Leopardus pardalis*) road mortalities. Our objectives were to: 1) determine if traffic noise influences use of WCS by target species; and 2) determine if traffic noise influences vigilant behaviors of bobcats (*Lynx rufus*) and coyotes (*Canis latrans*) at the WCS. WCS were monitored with camera trap arrays that consisted of four cameras on each side, with one camera taking videos. Noise levels were monitored with NSRT\_mk3 sound level meters at each WCS. Generalized linear models were used to examine if there were associations between WCS use with traffic levels and noise levels, and to compare the percentage of time of behaviors with noise levels and vehicle presence. This study will contribute to the understanding of how traffic and noise influence the use of wildlife crossing structures by target species and behavior of wildlife in response to traffic noise.

## **2:15: Strategic grassland conservation for swift foxes in multi-use landscapes**

**Ty Werdel**, Texas A&M University, College Station, TX, USA

**Colleen Piper**, University of Montana, Missoula, MT, USA

**Andrew Ricketts**, Kansas State University, Manhattan, KS, USA

**Matthew Peek**, Kansas Department of Wildlife and Parks, Emporia, KS, USA

**Dan Sullins**, Kansas State University, Manhattan, KS, USA

**Adam Ahlers**, Kansas State University, Manhattan, KS, USA

**Abstract:** Grasslands are among the most widely distributed, but most imperiled, biomes on Earth. North American grasslands once covered ~162 million ha prior to European colonization, but only ~30% of this landcover currently remains due to continued human-modified landscape changes. Strategic conservation of remaining grassland landcover, which considers species-specific habitat requirements, is critical for the persistence of grassland species and has become a global priority. Intact grassland landcover is critical for swift fox (*Vulpes velox*), a facultative prairie carnivore, and we sought to strategically identify areas where grassland conservation would most impact population persistence in an agro-prairie ecosystem. We modeled site (n = 381) occupancy by swift foxes using three years of camera-trap data (2018 – 2020) from western Kansas, USA, and integrated known-fate survival information to identify priority native grassland conservation areas. Additionally, we evaluated ownership of our identified priority conservation lands to determine strategies for conservation delivery. Our grassland assessment of two thresholds of predicted swift fox occupancy ( $\geq 0.09$  [priority] and  $\geq 0.18$  [high priority]) identified 2,377,193 ha and 84,420 ha for conservation in Kansas, respectively. Identified conservation areas were overwhelmingly located on privately owned working lands (98% [priority and high priority]), rather than federal or state-owned lands (2% [priority and high priority]), and highlight the need for using conservation easements and incentive-based programs to promote grassland conservation to private landowners.

## **2:30: Quantifying Degradation Rates of Environmental DNA (eDNA) of Ringtails (*Bassariscus astutus*) in Naturally Occurring Waters**

**Tiffany Nash**, Tarleton State University, Stephenville, TX, USA

**Jeff Brady**, Texas A&M AgriLife Research, Stephenville, TX, USA

**Devin Erxleben**, Texas Parks and Wildlife Department, Stephenville, TX, USA

**Doreen Mata**, Tarleton State University, Stephenville, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Thomas Schwertner**, Stephenville, TX, USA

**Abstract:** Organisms release environmental DNA (eDNA) into the environment through shed skin and hair, bodily fluids, and feces. Prior studies conducting eDNA analysis from water samples have successfully detected aquatic, semi-aquatic, and mammalian DNA. However, many of these species directly use water and less is known about success rates of mammals not closely tied to water. Ringtails (*Bassariscus astutus*) are terrestrial carnivores that may have infrequent contact with water bodies because of low dietary need for free water. Our review of the literature revealed that little is known about the rate eDNA degrades in standing water. Thus, standing water may contain small quantities of ringtail DNA. Our objectives were to 1) evaluate the efficacy of using eDNA from water samples to detect the presence of ringtails in the watershed and 2) determine the decay rate of DNA from ringtail feces in naturally occurring water at different temperatures. We collected 72 water samples from 13 sites across the Roger R. Fawcett Wildlife Management Area (2,209 ha), Palo Pinto County, Texas in areas where ringtails were known to occur. However, we were not successful in detecting ringtail DNA from water samples. Our results suggest ringtail DNA from fecal samples can persist in a lake, pond, and creek water for  $\geq 3$  weeks at 10°C, 20°C, and 30°C. Our findings will improve sampling methodology for assessing biodiversity using eDNA and inform researchers of temporal constraints when sampling.

## **2:45: Coyote Population Estimation in the Mojave Desert Region Using Noninvasive Genetic Sampling**

**Danielle Deming**, Texas Tech University, Lubbock, TX, USA

**Warren Conway**, Texas Tech University, Shallowater, TX, USA

**Brian Henen**, Marine Corps Air Ground Combat Center, Twentynine Palms, CA, USA

**Robert Bradley**, Texas Tech University, Lubbock, TX, USA

**Emily Wright**, Lubbock, TX, USA

**Courtney Ramsey**, Texas Tech University, Lubbock, TX, USA

**Abstract:** Since the mid-1900s, coyotes (*Canis latrans*) have expanded their geographic range throughout North America, due in part to anthropogenic influences. The Marine Corps Air Ground Combat Center (MCAGCC) in Twentynine Palms, California has substantial residential zones, and densely populated barracks, where human-coyote conflicts regularly occur. MCAGCC is also intensely involved with the management and recovery of the threatened Agassiz's desert tortoise (*Gopherus agassizii*). Tortoise depredation by canids, most likely coyotes, continues to present wildlife-wildlife conflicts in other desert regions and has potential risks in the Mojave Desert as well. Similarly, no reliable coyote population estimates exist for

MCAGCC, but these estimates are crucial for developing management actions for tortoises and coyotes. In 2021, we collected > 2500 canid scat samples at MCAGCC for use in noninvasive genetic sampling to develop spatially explicit mark-recapture population models using mitochondrial cytochrome-b gene amplification and microsatellite locus analysis. Species identification has been confirmed on approximately 150 samples, with a 96% accuracy rate on field identification. Individuals were identified using coyote specific primers and evaluating microsatellite genotypes. This research will inform us of coyote population size and connectivity, as well as their impacts upon tortoises – both of which will be useful for human and coyote management at and outside of MCAGCC.

### **3:00: A Novel Approach to Assessing Texas Kangaroo Rat Habitat Use**

**Derek Malone**, Texas Tech University, Lubbock, TX, USA

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Russell Martin**, Texas Parks and Wildlife Department, Canyon, TX, USA

**Richard Stevens**, Texas Tech University, Lubbock, TX, USA

**Carlos Villalobos**, Texas Tech University, Lubbock, TX, USA

**Abstract:** Very high frequency (VHF) radio tags have been used for decades to assess movement and habitat use questions. VHF tags are typically light and come with a longer battery life compared to similarly sized contemporary technology, but still they possess similar drawbacks. Additionally, they come with the added requirement that in order to collect data a researcher must be out there conducting telemetry to obtain location data. Alternatively, for a prohibitive cost you can deploy an automated radio telemetry system to collect location data continuously. In addition to VHF, Global positioning system technology has been utilized extensively for tracking and movement studies quantifying habitat use. However, the technological limitation for tag size and weight are amplified for this newer technology. Some of these constraints have been mitigated through the advent of solar rechargeable batteries allowing for smaller and lighter tags. However, these limitations are exacerbated for a burrowing nocturnal small mammal like the Texas kangaroo rat (*Dipodomys elator*). To address these limitations, we have developed a passive integrated transponder (PIT) antenna array system. This system will allow us to track the movements of Texas kangaroo rats within a one-hectare area with a 25-meter resolution continuously, without the need for active data collection by a researcher. This PIT antenna array system will be used to monitor Texas kangaroo rats over three separate one-hectare research plots to assess the impact of experimental vegetation manipulation conducted in an effort to create suitable habitat for this rare state threatened species.

### **3:15: Behavior of wild pigs towards conspecific carcasses: Implications for disease transmission in a hot, semi-arid climate.**

**Samantha Leivers**, Texas A&M University, Round Rock, TX, USA

**Tyler Campbell**, East Foundation, San Antonio, TX, USA

**Michael Bodenchuk**, USDA/APHIS, San Antonio, TX, USA

**John Tomecek**, Texas A&M University, Taylor, TX, USA

**Abstract:** Wild pigs (*Sus scrofa*) are an invasive species in the USA, and act as vectors for many pathogens. An emergent pathogen of concern is African swine fever (ASF), a deadly disease affecting swine that is endemic to Africa and has spread to other parts of the globe. ASF affects wild and domesticated pigs, and can be transmitted via several avenues, including interactions between and consumption of dead pigs by live conspecifics. As wild pigs are considered a threat in the transmission of ASF, understanding the behavior of wild pigs towards their dead conspecifics is imperative when considering the transmission of ASF and other diseases. We placed camera traps at wild pig carcasses dispatched during four aerial shooting events between November 2020 and June 2022 at East Foundation's San Antonio Viejo Ranch, South Texas. We recorded visitations to carcasses by live wild pigs and recorded their behavior, and assessed daily carcass decomposition rates by visiting carcass sites without cameras. We found no evidence of cannibalism and recorded live wild pig visitations to only 33% of carcasses before advanced stages of decomposition were reached. Carcass decomposition was rapid, regardless of season, and the time to first visitation and investigation of carcasses by live conspecifics was quicker than has been recorded in Europe. We posit that active scavenger guilds at our study site, coupled with high temperatures, result in the rapid decomposition of wild pig carcasses which reduces opportunities for live wild pigs to interact with them when compared to milder climates.

## **Conservation & Ecology of Birds and Bats**

### **2:00: Correlation Between Demographic Rates and the Influence of Catastrophic Weather Events on Montezuma Quail in the Trans-Pecos of Texas**

**Maya Ressler**, Borderlands Research Institute - Sul Ross State University, Marfa, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Ryan Luna**, Sul Ross State University, Alpine, TX, USA

**Abstract:** Montezuma quail (*Cyrtonyx montezumae*) are a cryptic species inhabiting the montane deserts of the southwestern United States and much of Mexico. Little is known about Montezuma quail population demography and life history, but precipitation is likely a key factor driving Montezuma quail reproduction during summer monsoon season. In the Texas Trans-Pecos, this species is potentially vulnerable to environmental catastrophes, such as the extreme winter events experienced in early 2021, but the implications of such events on their demography is not known. Winter events are known to contribute to over-winter mortality in other quail species, such as northern bobwhites (*Colinus virginianus*) but these concepts have yet been extended to evaluate Montezuma quail winter mortalities. Recent work suggests that such events may induce tail-specific correlation structures among demographic rates, though most models treat them as independent. Neglecting such correlations may lead to grossly erroneous predictions of population outcomes. We created a stochastic 3-stage Lefkovich matrix population model (MPM) to examine the effects of population parameter correlations on predicted dynamics, local abundances, and extinction probability of Montezuma quail populations. We found that stabilizing dynamics were possible when demographic rates were independent, but destabilizing dynamics when tail-specific correlations were considered. This suggests extreme weather events prevent stage related rescue effects and may destabilize Montezuma quail populations.

## **2:15: One Size Does Not Fit All: Species Composition of Wind Turbine Fatalities Varies by Region and with the Spread of White-nose Syndrome for Three Sensitive Bat Species**

**Amanda Hale**, Western EcoSystems Technology, Inc., Fort Worth, USA  
**Victoria Zero**, Western EcoSystems Technology, Inc., Cheyenne, WY, USA  
**Michael True**, Western EcoSystems Technology, Inc., Cheyenne, WY, USA  
**Quintana Hayden**, Western EcoSystems Technology, Inc., Cheyenne, WY, USA  
**Rhett Good**, Western EcoSystems Technology, Inc., Cheyenne, WY, USA  
**Catherine Read**, Western EcoSystems Technology, Inc., Cheyenne, WY, USA  
**Chris Murray**, Western EcoSystems Technology, Inc., Cheyenne, WY, USA

**Abstract:** The U.S. Fish and Wildlife Service has designated the northern long-eared bat (*Myotis septentrionalis*) as endangered, has proposed designating the tricolored bat (*Perimyotis subflavus*) as endangered, and the little brown bat (*Myotis lucifugus*) is currently under review for listing. Although white-nose syndrome (WNS) is the main driver of population declines, collision mortality at wind energy facilities could also influence population viability of these species. Western EcoSystems Technology (WEST) maintains the Renew database, containing data from hundreds of monitoring studies that can provide insights into the impacts of wind energy on these sensitive bat species. Using this database, we estimated the relative species composition across pre- and post-WNS time periods and by region. We supplemented these results with a case study from MidAmerican Energy Company's Iowa projects. For all three species, estimated species composition was lower post-WNS compared to pre- with the magnitude of change consistent with observed population declines. Furthermore, species composition varied among regions pre-WNS, with subsequent changes post-WNS being greatest in the Northeast for northern long-eared and tricolored bats and in the Midwest for the little brown bat. At MidAmerican's Iowa facilities, no northern long-eared bat was discovered post-WNS and fatalities of little brown and tri-colored bats have also declined. Population modeling efforts should incorporate these new estimates of species composition that vary across regions. By doing so, we will improve our understanding of wind energy impacts on the future viability of these declining species and can more appropriately target mitigation to have the greatest effect.

## **2:30: Sex Ratios of Mexican Free-tailed Bat Fatalities at Wind Energy Facilities for Local and Long-Range Migratory Populations**

**Sarah LiCari**, Texas Christian University, Fort Worth, TX, USA  
**Sara Weaver**, Bowman Consulting, San Marcos, TX, USA  
**Sarah Fritts**, Texas State University, San Marcos, TX, USA  
**Amanda Hale**, Texas Christian University, Fort Worth, TX, USA  
**Todd Katzner**, U.S. Geological Survey, Boise, ID, USA  
**David Nelson**, Appalachian Laboratory, University of Maryland Center for Environmental Science, Frostburg, MD, USA  
**Dean Williams**, Texas Christian University, Fort Worth, TX, USA

**Abstract:** Wind-energy production has expanded due to interest in increasing energy production and decreasing reliance on fossil fuels. Unfortunately, collisions and fatalities are unintended



consequences of wind-energy production for many bat species. The Mexican free-tailed bat (*Tadarida brasiliensis*) has a non-migratory population in California that has an assumed sex ratio of 50:50, as seen in other non-migratory bat species, and migratory sex-skewed (9:1 female:male) population in Texas that arrives in the summer to form maternal colonies. Knowing how males and females are impacted by collision mortality at wind turbines can provide insights into population-level effects. We determined the sex of bat carcasses discovered at wind turbines using DNA extracted from wing tissue samples collected during post-construction surveys in California (n = 502, 5 years) and Texas (n = 437, 3 years). Preliminary analysis of bats from California suggests that the sex ratio of fatalities did not differ significantly from 50:50 from 2016 to 2020 ( $p > 0.05$ ). In contrast in bats from Texas, the sex ratio of fatalities was significantly female-skewed in 2017 (6.8:3.2,  $z = 3.25$ ,  $p < 0.001$ ), became less female-skewed in 2018 (4.8:5.2) and 2021 (4.4:5.6), with neither 2018 nor 2021 being significantly different from 50:50 ( $p > 0.05$ ). This change in sex ratio in Texas might be demographically relevant if the loss of females from previous years is causing the migratory population to become less female-skewed over time. Studies of sex ratios at summer and winter colonies would allow determination of whether this same pattern is observed at the population level.

## **2:45: Influence of Drought Conditions on Black-Capped Vireo (*Vireo atricapilla*) Nesting**

**Brendan Mulhall**, Texas State University, Austin, TX, USA

**James Giocomo**, American Bird Conservancy, Durand, IL, USA

**Clay Green**, Texas State University, San Marcos, TX, USA

**Abstract:** The Black-capped Vireo (*Vireo atricapilla*) was delisted from the U.S. Endangered Species List by the United States Fish and Wildlife Service (USFWS) in 2018. As part of the USFWS Post-Delisting Monitoring Plan, nest searching and monitoring of vireo nests were completed in 2021 and 2022 to provide an estimate on parasitism and nest success in the region. Field work for this study took place in Kickapoo Caverns State Park in the Western Edwards Plateau. The two field seasons were characterized by mild drought conditions in 2021 and exceptional drought conditions in 2022. This led us to investigate the relationship between drought conditions and nesting activities of Black-capped Vireos. The logistic exposure method was used to quantify the relative success vireo nests had in each year. Nests found in 2021 ( $n = 18$ ) had a daily survival rate (DSR) of 0.96 and an overall chance of survival from nest building to fledging of 0.40. Nests found in 2022 ( $n = 15$ ) had a DSR of 0.88 and an annual survival rate of 0.04. Additionally, we found in 2021 that vireos only nested in Ashe Juniper (*Juniperus asheii*) 16% ( $n = 3$ ) of the time while in 2022 it was utilized in 46% ( $n = 7$ ) of nests. This is of particular importance because juniper removal is one method used to help enhance potential Black-capped Vireo habitat. The results of this study will help inform management decisions for Black-capped Vireo populations as historic drought conditions likely become more common under changing global climates.

### **3:00: The Rise and Fall of the Inca Dove in Texas**

**Cade Coldren**, Plant and Soil Science, Lubbock, TX, USA

**Abstract:** The Inca Dove (*Columbina inca*) has undergone a well-documented range expansion northward starting in the 1980's and 1990's. However, it's status in recent years is not well understood. As part of a larger study in Lubbock, Texas, I became aware of how rare the species has become locally and set out to investigate whether the recent decline in Lubbock was a local phenomenon or reflected in declines in other parts of its range. Using Christmas Bird Count (CBC) and Breeding Bird Survey (BBS) data from 1970 to 2021, I found declines in abundances, not only on the fringes of the range, but also in some areas within the core of its traditional range. Additionally, it appears to have contracted its range somewhat since the northward expansion. Temperature and water availability have been proposed as checks on further northward range expansion, but minimum winter temperature and rainfall patterns do not appear to explain the declines seen in both CBC and BBS data. The causes of the patterns seen here are not clear, but may include competition from Eurasian Collared-Doves (*Streptopelia decaocto*), disease, water availability in urban areas, and social factors. Thus, while the Inca Dove expanded its range northward, it appears to be declining, both in abundance and range.

### **Human Dimensions**

#### **2:15: The Impacts of Bird City Texas on the Nature Engagement and Nature Relatedness of Community Members**

**Rebecca Nishida**, The University of Texas at San Antonio, Creedmoor, NC, USA

**Jennifer Smith**, Dep. of Environmental Sciences & Ecology, UTSA, San Antonio, TX, USA

**Abstract:** Birds and their habitats are declining. Concomitantly, human populations in urban areas are growing and becoming increasingly disconnected from nature. Bird City Texas (BCT), a community-based certification program co-created by Texas Parks and Wildlife Department and Audubon Texas, aims to promote both bird conservation and nature engagement in Texas. Whether BCT has achieved its goals of increasing public knowledge of bird conservation and environmental stewardship behavior has not been assessed. In addition, whether BCT-certification has influenced perceived availability of nature amenities, participation in nature-based recreation, and nature relatedness of residents of BCT cities is unknown. Our objectives were to examine whether residents of BCT-certified cities differ from residents of non-certified cities in their nature engagement (both nature-based recreation and environmental stewardship behavior), knowledge of birds and their conservation, perceived availability of nature amenities, and nature relatedness. We distributed surveys to residents of two BCT-certified cities and two cities not BCT-certified through door-to-door methods. Average scores of nature-based recreation activity and nature relatedness between BCT residents and non-BCT residents did not differ significantly ( $P > 0.05$  for both constructs). However, average scores for perceived availability of nature amenities were significantly different between BCT and non-BCT residents ( $P < 0.05$ ). Our study serves as a baseline evaluation of BCT and provides insight into the potential benefits of BCT-certification. Our results can be used to improve the program to enhance nature engagement and nature relatedness in urban areas.

## **2:30: Mapping the soundscape of an exurban nature preserve**

**Hayden Deppe**, St. Edward's University, Austin, TX, USA

**Samuel Stone**, St. Edward's University, Austin, USA

**Noah Powell**, University of Texas/Wild Basin Creative Research Center, Austin, TX, USA

**Matthew McGinnis**, Texas State University, Katy, TX, USA

**Allison White**, St. Edward's University, Austin, USA

**William Quinn**, St. Edward's University, Austin, USA

**Darren Proppe**, St. Edward's University, Dripping Springs, TX, USA

**Abstract:** All landscapes can be characterized by acoustic activity – known as the soundscape. Nearly all modern soundscapes are comprised of both natural and anthropogenic sounds. High levels of anthropogenic noise have been associated with avoidance and reduced success for many wildlife species. While urban areas are often characterized by high levels of anthropogenic noise, sound levels in exurban areas may be more variable spatially and temporally. This is especially true in areas with strong elevation gradients, such as those found in the Hill Country region of Central Texas. Wild Basin Wilderness Preserve is a 257-acre exurban preserve near Austin, Texas. The rolling preserve landscapes are bordered by a high use roadway, low density housing, and an adjacent conservation property. To quantify the fine-scale variability in the soundscape, we collected sound data from passive acoustic recorders placed at 149 locations across the preserve from mid-2020 through 2022. In addition to daily and monthly variation, this timeframe included the return to normal activity period following Covid-19 shelter in place regulations. We have produced a series of temporally and spatially explicit maps that visualize the soundscape variability found at the Wild Basin Wilderness Preserve. Our results reveal the existence of quiet acoustic microhabitats nested within a noisier landscape, which may be critical for the protection of native wildlife species found on the preserve. Future work will compare soundscape data with spatial patterns of wildlife presence and use to assess the potential value of different acoustic niches.

## **2:45: Coyote Attacks Toddler - Now What?**

**Sam Kieschnick**, Texas Parks and Wildlife, Cedar Hill, TX, USA

**Abstract:** There are millions of interactions between coyotes (*Canis latrans*) and people. Most of these interactions are quite benign and unremarkable outside of some potential excitement for an observer. However, in the urban ecosystem, some interactions with coyotes can be unpleasant or even distressing to the public. Conflicts can arise. In this presentation, we will provide narratives of two separate events in the Dallas/Fort Worth Metroplex. Several incidents with coyotes and joggers in Frisco in 2018/2019 and one unfortunate attack from a coyote on a toddler in Dallas in 2022 will be discussed with full timelines of events. Different constituencies with various viewpoints will also be introduced. As urban wildlife biologists, we try to navigate these difficult situations, sometimes with unexpected results. At the end of this presentation, we will ask, “What would you do?”

### **3:00: Stewardship ideology influences hunters' acceptability of changes to alligator hunting seasons**

**Christopher Serenari**, Texas State University, San Marcos, TX, USA

**Elizabeth Pratt**, University of Georgia, Athens, GA, USA

**Abby Meeks**, Texas State University, San Marcos, TX, USA

**Kristy Daniel**, Texas State University, San Marcos, TX, USA

**Abstract:** Under the weight of unprecedented ecological change, outdated, irrelevant, or dysfunctional policies will need to be terminated. However, the process is made difficult and rare due to entrenched ways of governing. Promoting stewardship of wildlife within a democracy requires strong alignment with the ideological orientations of society. Hence, where hunting policies may be deemed unsustainable for large carnivore populations, an appeal to ideological dispositions, comprising ethics, frame of values, the role of science, and political identity, underpinning one's policy stance could produce a less conflictual path to pursue termination. Few studies have explored the role of stewardship ideology, and none, to our knowledge, in the case of large carnivores. We tested a theoretical model of stewardship ideology to investigate the prospect of terminating the spring hunting season for the long-term benefit of Texas's alligator population. A survey of 111 Texas alligator hunters revealed that the removal of the spring season would be generally unacceptable. However, modeling stewardship ideology suggests that a data-supported policy narrative that frames alligator stewardship in terms of how hunters can be better humans and hunters by reducing negative impacts to alligator populations, and doing so by playing a defender role, could advance the termination process. Further study of how stewardship ideology influences policy stance would fill critical gaps in theory and stimulate debate about how ideological dispositions can meet the current moment to usher in an era of policy experimentation in wildlife conservation that leads to a clearer account of large carnivore stewardship.

### **3:15: Lessons Learned from the First 10 Years of the Oaks and Prairies Joint Venture's Grassland Restoration Incentive Program (GRIP)**

**Derek Wiley**, Texas Parks and Wildlife Department/Oaks and Prairies Joint Venture, Throckmorton, TX, USA

**James Giocomo**, American Bird Conservancy, Durand, IL, USA

**Robert Perez**, OPJV/ABC, La Vernia, TX, USA

**Kenneth Gee**, OPJV/ABC, Ardmore, OK, USA

**Steve Riley**, American Bird Conservancy, Gretna, NE, USA

**Anna Matthews**, OPJV/ABC, San Marcos, TX, USA

**Ty Higginbotham**, Karnes City, TX, USA

**Amanda Haverland**, American Bird Conservancy, Santa Fe, NM, USA

**Thomas Janke**, Quail Forever, Gouldbusk, TX, USA

**Amber Brown**, OPJV, Karnes City, TX, USA

**Kati Biggs**, OPJV, Alamogordo, NM, USA

**Mitchell Riggs**, Quail Forever, Coleman, TX, USA

**Taylor Daily**, Pheasants Forever/Quail Forever, Kerrville, TX, USA

**Charlotte Wilson**, Pheasants Forever, Rosenberg, TX, USA

**Cole Fagen**, OPJV/ABC, Ada, OK, USA  
**Will Newman**, TPWD, Temple, TX, USA  
**Jon Hayes**, Audubon, Santa Fe, NM, USA  
**Leah Lowe**, ODWC, Coleman, OK, USA

**Abstract:** The Oaks and Prairies Joint Venture (OPJV) was formed in 2008 as a public-private partnership of agencies and organizations working across jurisdictional boundaries in portions of Texas and Oklahoma. The OPJV's major focus is reversing declines of grassland bird populations by supporting strategic habitat conservation (biological planning, conservation design, conservation delivery, mission-based monitoring, and assumption-driven research) for northern bobwhite (*Colinus virginianus*), grassland-obligate species, and their respective habitats. The OPJV geography is primarily private lands, requiring the efforts of private landowners to improve native grasslands management to conserve and restore grassland bird habitat. To accomplish this mission, the Grassland Restoration Incentive Program (GRIP) was created. Our objective for this paper is to document and share a decade of lessons learned in developing a partnership-based native grasslands conservation program to meet grassland bird conservation targets. This includes 9 lessons we feel are important in successfully designing and implementing a conservation program. Through designing simple, focused programs with staff that are dedicated to the mission and committed to constant improvement programs can be successful. Working together, OPJV partners have made significant progress toward meeting grassland bird habitat and population objectives, while tracking progress and improving conservation methods. Remembering these lessons and learning new ones will allow the OPJV to continue restoring native grassland habitat to improve grassland bird populations.

## **Conservation & Ecology of Birds 2**

### **3:45: Alterations to Avian and Plant Community Structure in Response to Habitat Restoration of Pinyon-Juniper Woodlands in Eastern New Mexico**

**Ariana Rivera**, Texas Tech University, Lubbock, TX, USA  
**Lucas Schilder**, Texas Tech University, Lubbock, TX, USA  
**Jane Rogosch**, U.S. Geological Survey Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, USA  
**Cade Coldren**, Plant and Soil Science, Lubbock, TX, USA  
**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Abstract:** Pinyon-juniper woodlands are a vast vegetation community that is vital to the western United States. Stand characteristics of these woodlands have been impacted by climate, land use practices, and intense fire suppression, causing rapid encroachment of woody plants into grasslands. Throughout New Mexico, efforts are ongoing to restore the pinyon-juniper woodlands to a historic stand structure and reduce fuel loads. There is a substantial number of avian pinyon-juniper specialists included on national and state lists of concern that may be impacted by these efforts. For example, the juniper titmouse (*Baeolophus ridgwayi*) prefers a mature stand structure of junipers that provide cavities for food storage and nesting. In contrast, the gray flycatcher (*Empidonax wrightii*) occupies pinyon-juniper woodlands, and in the northern

extent of its range, it occupies open ponderosa pine forests with grasslands. As the vegetation community changes, so will avian communities. We have partnered with the U.S. Bureau of Land Management and the U.S. Fish and Wildlife Service to study how avian community composition changes in concert with changes to the vegetation community following thinning. We stratified our random sampling into thinned and unthinned plots and established abundance of key species based on detection probabilities. We conducted point count surveys during the breeding seasons of 2021 - 2022 at our study area in Lincoln County, NM. This project is ongoing as the first component of a longer study to understand time-lags associated with both avian and vegetation response to landscape level management actions.

#### **4:00: A luxury commodity crop drives habitat selection of a migratory grassland shorebird in the Texas Coastal Plain**

**Tara Rodkey**, Texas A&M University Kingsville, Kingsville, TX, USA

**Richard Lanctot**, U.S. Fish and Wildlife Service, Anchorage, AK, USA

**Lee Tibbitts**, U.S. Geological Service, Anchorage, AK, USA

**Bart Ballard**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Migratory shorebirds are one of the fastest declining groups of North American avifauna. A recent range-wide tracking study identified the Texas Gulf Coastal Plain as a critical stopover area for the Buff-breasted Sandpiper (*Calidris subruficollis*), an obligate grassland shorebird and long-distance migrant. As conservation measures targeted at preserving habitat for this species are expected to also benefit a suite of other grassland birds, an understanding of what habitats are selected in this important migratory passage point is imperative. To study local movements and estimate habitat selection in the region, we tracked 52 (2021) and 37 (2022) adult Buff-breasted Sandpipers in Texas with GPS satellite devices during both spring and fall migrations. Devices were programmed to transmit 8–11 locations each day, providing an average of 10 days per bird. These data, in concert with the previous range-wide study, were used to perform resource selection analyses at two orders of selection using habitat covariates derived from USGS Cropland Data Layer and Sentinel-2 imagery. Results indicate significant selection for sod fields, with seasonal differences in resource selection. In the spring, when many crop fields were bare or in early growth stages, birds selected locations significantly closer to cotton than expected by random chance. However, in the fall, when cotton crops were leafed out, bird locations fell almost entirely in sod fields, with significant selection for locations with greater areas of sod. These results draw attention to a perhaps alarming reliance by the species on this specialized crop in a critical stopover region.

#### **4:15: Habitat Variables Associated with Scaled Quail Relative Abundance Across a Large Spatiotemporal Scale**

**Benjamin Hoose**, Texas A&M University, College Station, TX, USA

**Roel Lopez**, San Antonio, TX, USA

**Brian Pierce**, Texas A&M Natural Resources Institute, College Station, TX, USA

**Abstract:** Scaled quail (*Callipepla squamata*) are constituents of the conservation crisis surrounding severe declines of North American grassland birds. Habitat loss is a major threat to

grassland birds and may be a driver of scaled quail population decline, particularly at large spatial scales. A key step to determining whether habitat loss is driving species declines is identifying species-habitat associations. Accordingly, our objectives were to (1) identify habitat variables strongly associated with scaled quail relative abundance through exploratory data analysis, and (2) inferentially test identified patterns with independent data. To accomplish this, we collated over 20,000 scaled quail relative abundance records from the Texas Parks and Wildlife Department (TPWD) roadside quail count surveys and the USGS Breeding Bird Survey (BBS) from 1985 to 2019. We related these data to remotely sensed land cover, land use, land change, and land configuration data across the range of scaled quail in Texas. We conducted exploratory and inferential analyses using the TPWD and BBS data, respectively, within generalized linear mixed-effects models. Species-habitat associations varied strongly by ecoregion. Thus, scaled quail management should be adapted at the ecoregion, or smaller, scales. Accordingly, scaled quail conservation may be promoted by managing landscape components found to be strongly associated with scaled quail relative abundance in each ecoregion. These results constitute a baseline for developing habitat management strategies to reverse the decline of scaled quail in Texas.

#### **4:30: An Assessment of Prescribed Grazing for Lesser Prairie-Chicken Habitat on Beef Herd Health and Productivity**

**Lily Evans**, Texas Tech University, LUBBOCK, TX, USA

**Michael Whitson**, Texas Tech University, Lubbock, TX, USA

**Carlos Villalobos**, Texas Tech University, Lubbock, TX, USA

**Darren Hudson**, Texas Tech University, Lubbock, TX, USA

**Christian Hagen**, Oregon State University, Corvallis, USA

**Randy Howard**, Bureau of Land Management, Roswell, NM, USA

**Blake Grisham**, Texas Tech University, Lubbock, TX, USA

**Abstract:** The Sand Shinnery Oak Prairie Ecoregion (SSOP) population of lesser prairie-chickens (*Tympanuchus pallidicinctus*; LEPC) has recently been listed as endangered. Anthropogenic activities such as row-crop agricultural expansion, continuous domestic livestock grazing regimes, and fire suppression have reduced historic disturbance regimes and contributed to severe declines in LEPC occupied range and populations. An Area of Critical Environmental Concern (ACEC), managed by the Bureau of Land Management, encompasses ~17000 ha in the SSOP region of New Mexico where management focuses on LEPC habitat conservation under a multi-use mandate. Our goal is to assess the Bureau of Land Management's prescribed grazing regimes for lesser prairie-chicken habitat and beef herd health and productivity during grazing treatments. Additionally, cattle movement, effects of water and supplemental feeding location, and habitat use are being quantified from data collected using GPS store on board collars on 5 cows to further analyze possible effects on LEPC habitat. Two pastures were grazed during the study, Crowley (4014 ha) and Old Savory (3092 ha). We quantified 1) standing herbaceous biomass (kg/ha) and 2) plant community composition pre- and post-grazing treatment at patch scale and in relation to water source locations, and 3) available grass nutrient composition and 4) fecal nutrient deposition with crude protein, total digestible nutrients, calcium, and phosphorus levels. ANOVA results show a significant difference ( $p < 0.0001$ ) in herbaceous biomass from

pre- to one year post-grazing (64% in Crowley; 60% in Old Savory). Post-hoc comparisons show no significant difference ( $p>0.1$ ) from the end of grazing to one year post-grazing.

#### **4:45: A Temporal Comparison of the Avian Community Dynamics Within a Riparian Deciduous Forest Along the Aransas River Corridor**

**Alejandra Martinez**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Jessica Glasscock**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Reuber Lana Antoniazzi Jr**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Brian Oswald**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**Selma Glasscock**, Welder Wildlife Foundation, Sonora, TX, USA

**Abstract:** North American avifauna populations have experienced significant declines. Recent literature suggests a loss of nearly 3 billion birds with various root causes including habitat loss, climatic change, and unidentified factors. Temporal changes in breeding species community composition are critical parameters to evaluate the overall maintenance of biodiversity. We examined the temporal dynamics of a breeding avian community from summers of 2007, 2008, 2009, 2021, and 2022, and identified any occurrences of population shifts or trends. Our study area was a riparian deciduous forest along the Aransas River, on the Welder Wildlife Refuge, located in the Central Flyway migration corridor. Utilizing the Monitoring Avian Productivity and Survivorship (MAPS) protocol, we collected primary and supplementary data to compare community dynamics, including the effective number of species ( $^0D$ ), rank abundance curves, and species composition. We found similar species diversity over the years. Results from the rank abundance curves revealed the Northern Cardinal (*Cardinalis cardinalis*) to be the most abundant species each year; however, this species exhibited a decrease in abundance yearly. We also observed shifts in the second and third most abundant species in all sample periods. We found significant differences (PERMANOVA, Pseudo- $F_{(4,45)}$ ;  $p=0.001^*$ ) in community composition between historical and contemporary years. Similarity Percentage (SIMPER) analyses were performed to discriminate species contributing the greatest amount in overall dissimilarity between sample years (i.e., 2007-2008, 2007-2009, 2007-2021). Our research reveals the decline in a generalist species, Northern Cardinal, indicating the need for further exploration to identify driving factors behind avian declines.

#### **5:00: Examination of habitat use by Laughing Gulls (*Leucophaeus atricilla*) in both developed and undeveloped areas of the Lower Galveston Bay Watershed**

**Amanda Hackney**, Black Cat GIS and Biological, Pearland, TX, USA

**Abstract:** Laughing Gulls (LAGU) (*Leucophaeus atricilla*) are native, year-round residents of the Mid-Atlantic and Gulf Coasts. LAGU, like many gull species, feed on both natural and anthropogenic food sources. We examined existing observation data to determine where LAGU concentrated in the Lower Galveston Bay Watershed during breeding and non-breeding seasons. Bird presence data was obtained from citizen science platforms (eBird, iNaturalist). We ran an optimized hotspot analysis on shapefiles for both seasons. Hotspots in West Bay and the opening of Galveston Bay into the Gulf of Mexico were present in all years. In later years, hotspots occur



around Baytown, the Brazos River delta, and wetlands on Brazoria NWR. In non-breeding seasons, populations were more dispersed, but still utilizing several of the breeding season sites. A GIS space time cube was created to analyze population trends over time. The west side of Galveston Bay and inland remained a persistent hotspot for reports. New hotspots were clustered to the west and north- indicating that more reports have occurred in recent years in these inner city and outer loop areas. This work indicated several broad conclusions: gulls clustered near major waterway intersections, some activity is related to landfills and parks, there were more reports to the west and north of the bay over time, and hotspots were shifting inland during non-breeding months. Previous large-scale analyses in the Galveston Bay region have only used Texas Waterbird Society rookery surveys. Citizen science data offers a different view of LAGU habitat use across a rapidly urbanizing landscape.

## **Conservation & Ecology of Mammals 2**

### **3:45: Modeling Pronghorn Behavior and Space Use: Habitat Selection of Translocated and Resident Pronghorn in the Edwards Plateau**

**Erin O'Connell**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Abstract:** Translocation is the most widely used tool to combat megafauna population declines to prevent extinction. However, despite widespread use, there are no explicit measures for translocation success. To alleviate this challenge, it is essential to understand factors influencing habitat selection of translocated individuals. To address this, we estimated the post-translocation habitat selection for translocated pronghorn (*Antilocapra americana*) based on patterns of animal space use. We postulated that translocated pronghorn would avoid fences and areas close to well pads and roads, because patterns of human landscape modification are a pervasive form of disturbance for ungulates across a range spatial scales, leading to increased mortality and stress induced risk-avoidance behaviors. In February 2019, Texas Parks and Wildlife Department (TPWD) collared 20 resident pronghorn on Rocker b Ranch, near Big Lake, Texas. In January 2020, TPWD translocated 115 pronghorn from Pampa, Texas, to the Rocker b Ranch, 45 of which were fitted with Global Positioning Systems collars. We fit integrated step selection function (iSSF) models for each individual. Our results did not support evidence of a distinguishing group effect between translocated and resident pronghorn selection. We found no evidence of a functional response based on our linear regression of well pad density within the 2-year ranges of translocated and resident pronghorn against their well pad selection coefficient ( $\beta_0 = -1.16e-4$ ,  $\beta_1 = 5.60e-5$ ,  $R^2 = 0.03$ ,  $p = 0.639$ ). Further, these results suggest energy development and pronghorn overlap in areas of critical pronghorn habitat which has potential implications as energy development grows and inevitably reduces available habitat

#### **4:00: Examining Seasonal Movement Behavior of Pronghorn in the Texas Panhandle**

**Marlin Dart**, Texas A&M University - Kingsville, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Timothy Fulbright**, Texas A&M University - Kingsville, Kingsville, TX, USA

**Anthony Opatz**, New Mexico Department of Game and Fish, Santa Fe, NM, USA

**Levi Heffelfinger**, Caesar Kleberg Wildlife Research Institute, Lubbock, TX, USA

**David Hewitt**, Caesar Kleberg Wildlife Research Institute / Texas A&M University Kingsville, Kingsville, TX, USA

**Randy DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Michael Cherry**, CKWRI, Kingsville, TX, USA

**Abstract:** Understanding how individuals modulate behavior in response to interactions between life-history events and seasonal variation (e.g., temperature, resource availability) can inform management and knowledge of a species ecology. We used hidden Markov models to estimate behavioral states underlying movement from 72 collared pronghorn (*Antilocapra americana*; 36 males, 36 females) in the Texas Panhandle from 2017 – 2019. We assigned movements to one of three behavioral states: (i) encamped (short step lengths and high turning angles), (ii) foraging (intermediate steps lengths and high turning angles), and (iii) transiting, (long step lengths and low turning angles). We then calculated the mean proportion of steps of each behavioral state across individuals for four seasons representing discrete biological periods with varying physiological and/or resource demands. Seasons included rut, early horn sheath development, late horn sheath development, and rut preparation for males, and breeding, early gestation, late gestation, and lactation for females. Foraging constituted the highest proportion of steps for males and females at  $60.5\% \pm 1$  (SE) and  $69\% \pm 0.9$ , respectively. Transiting constituted  $29.3\% \pm 1.1$  and  $19.8\% \pm 0.9$  of steps, followed by encamped at  $10.2\% \pm 0.3$  and  $11.1\% \pm 0.3$  for males and females, respectively. Foraging was most common during each season for both sexes but peaked during lactation for females. Our results suggest that there may be limited seasonal or sex-specific variation in movement behavior of pronghorn in the Texas Panhandle in spite of seasonal variation in life history requirements and resource availability.

#### **4:15: Temporal Resource Partitioning of Desert Bighorn Sheep, Aoudad, and Mule Deer in the Trans-Pecos Region, Texas.**

**Olivia Gray**, Borderlands Research Institute/TPWD, Fort Davis, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Froylan Hernandez**, Texas Parks and Wildlife Department, Alpine, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Abstract:** Desert bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), and exotic aoudad (*Ammotragus lervia*) inhabit the mountainous regions of the Trans Pecos. Biologists are concerned about resource competition in co-occupied landscapes, specifically between non-native aoudad and Texas' native ungulates. Arid regions like the Chihuahuan Desert receive

little, highly seasonal rainfall, limiting the availability of water and vegetation resources. Ungulates use resources differently depending on seasonal activities (rutting, breeding, lambing, etc.). Limited resources, paired with cycles of ungulate use, may indicate temporal partitioning of resources among these three ungulate species. By examining these cycles through time, we will determine changes in resource importance and how ungulates may partition their use. Texas Parks and Wildlife Department deployed collars on 45 desert bighorn sheep (21 male, 24 female), 59 mule deer (34 male, 25 female), and 41 aoudad (33 male, 8 female) in the Van Horn Mountains from 2019 to 2020. We utilized data from these collars to inspect cyclic patterns in resource use of each species through time using autocorrelation surfaces. We examined cycles in distance to known water sources, and use of terrain ruggedness. Results did not show cycles in ungulates distance to water, showing water is not used daily with any regularity. Results do show daily cycles using rugged terrain in all ungulate species, with a seasonal shift during spring months in mule deer and aoudad. These results suggest that ungulates' use of crucial habitats varies on daily and seasonal scales, providing an opportunity for temporal niche partitioning.

#### **4:30: Livestock Grazing Effects on Pronghorn Preferred Forbs During the Winter in the Trans-Pecos, Texas**

**Leanna Morin**, Borderlands Research Institute, Sul Ross State University, Hondo, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Ty Goodwin**, Sul Ross State University, Alpine, TX, USA

**Abstract:** Pronghorn (*Antilocapra americana*) is a native North American ungulate found in semi-arid landscapes. In the Trans-Pecos region of Texas, populations declined to less than 3,000 individuals in 2012 due to drought, disease, habitat degradation, and fragmentation. Since 2011, translocations and habitat improvements are implemented to mitigate pronghorn loss. As part of these efforts, cattle grazing may be manipulated to improve pronghorn habitat. However, the effects of grazing on winter forage conditions are not well understood. As forage nutrition, abundance, and diversity declines in the dry, cool season, investigating these changes in more detail can reveal limitations and deficiencies of forage available for pronghorn consumption. This study aims to compare vegetation production, species diversity, and nutritional quality in 3 cattle grazing systems during the cool season. This project was conducted on the Mimms Ranch in Presidio County, Texas. We sampled 100 plots in a continuously grazed system, 150 plots in a rotationally grazed system, and 5 plots within each of 10 non-grazed pastures under otherwise similar conditions. We identified and collected all above ground biomass of all non-woody forbs within a 1 m<sup>2</sup> at each sampling point. We measured the acid detergent fiber (ADF) and total digestible nutrients (TDN) of winter 2021 vegetation samples. We ran a Redundancy Analysis to investigate the relationships between grazing systems and forb biomass, diversity, and energy contents. Understanding vegetation community response to livestock grazing systems may allow managers to adapt grazing practices to maximize the abundance and quality of winter forage for pronghorn.

#### **4:45: Modeling Pronghorn Behavior and Space Use: Fence Behavior of Translocated and Resident Pronghorn in the Edwards Plateau**

**Erin O'Connell**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Abstract:** Pronghorn (*Antilocapra americana*) are endemic North American ungulates that are thought to have cognitive maps of the landscape, and these memories could drive space use post-translocation. Therefore, understanding challenges specific to pronghorn space use is critical for monitoring translocation success. Barriers like fences are responsible for the inhibition of movement, increased energy demands, reduced access to quality forage, impact injuries, mortalities, and separation from metapopulations. To address this, we examined the post-translocation fence crossing behavior for translocated and resident pronghorn based on patterns of animal space use. We postulated that residents and translocated pronghorn would avoid fences, because patterns of human landscape modification are a pervasive form of disturbance for ungulates across a range spatial scales. In February 2019, Texas Parks and Wildlife Department (TPWD) collared 20 resident pronghorn on Rocker b Ranch, near Big Lake, Texas. In January 2020, TPWD translocated 115 pronghorn from Pampa, Texas, to the Rocker b Ranch, 45 of which were fitted with Global Positioning Systems collars. The ranch made 200 fence modifications prior to the arrival of translocated pronghorn. To investigate fence crossing behavior, we calculated the frequency and location of fence crossings among translocated and resident individuals. We found that translocated pronghorn cross multiple fences more frequently while residents tend to maintain pasture boundaries. Our results suggest that the naivety of the translocated pronghorn towards fences allows them to be more selective. Further, translocation may expedite the colonization of reconnected habitat following fence modification, conferring a previously unrecognized advantage of this practice.

#### **Conservation & Ecology of Natural Resources and Habitats**

##### **3:45: Effects of Grazing by Bison on Arthropod and Vegetation Communities**

**Ty Cospers**, Tarleton State University, Killeen, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Adam Mitchell**, Tarleton State University, Stephenville, TX, USA

**Molly Koeck**, Oklahoma State University, Stillwater, OK, USA

**Donald Beard**, Texas Parks and Wildlife, Quitaque, TX, USA

**Abstract:** With enclosed populations, it is important to understand when the population reaches or exceeds carrying capacity. In 1997, Texas Parks and Wildlife Department (TPWD) relocated 36 southern plains bison (*Bison bison bison*) to Caprock Canyons State Park (CCSP), a 6,070-ha state park in Briscoe County, Texas. In 2015, park biologists, using the USDA Web Soil Survey, estimated that carrying capacity was approximately 250 individuals. Currently, there are roughly 350 head of bison in the park. The objective of this study is to examine the effects of bison

grazing on vegetation and arthropods in the park. In 2018, TPWD established fenced areas to create grazing-exclusion plots. From 2020-2022, we conducted monthly surveys on the plant and arthropod communities in the grazed areas and grazing exclosures. We randomly sampled using 2 Daubenmire frames within the exclosure and 2 frames 30-m away in a random direction, which is accessible for grazing. Within each Daubenmire frame we estimated bare ground, litter, plant diversity, and plant height per species. We also surveyed for arthropods in the exclosure and grazed areas. Our results, indicate a trend towards higher relative cover of hairy grama (*Bouteloua hirsuta*), in the exclosure than in grazed areas but no trend for little bluestem (*Schizachyrium scoparium*) or western ragweed (*Ambrosia psilostachya*). Currently, we are analyzing other plant species and arthropods. CCSP can use this information to create a plan for managing the bison herd and the vegetation and arthropod communities in park.

#### **4:00: Comparing terrestrial wildlife diversity between native and non-native grassland ecosystems.**

**Mycha Van Allen**, Texas A&M University, Bryan, TX, USA

**Abstract:** Wildlife diversity is essential and valuable for the environment, society, and the economy. Grasslands have long been a biodiversity hotspot before human activity. Historically, grasslands comprised a large portion of the landscape in Texas. However, 99% of the native grasslands have been lost. Anthropogenic activity has significantly altered these grasslands through conversion to monoculture pastures, agriculture, invasive species introduction, and development. Conversion and degradation of native grasslands decrease biodiversity and decrease ecosystem functioning. Ecosystems services provided by diverse native grassland communities, including carbon sequestration, water quality and quantity, erosion control, and flood prevention, are monetarily valuable. Wildlife diversity benefits include an array of birds, insects, and bats that disperse seeds and provide pollination services, as well as game species such as quail, deer, and more. In this pilot study, we sought to determine a significant difference in the diversity of terrestrial wildlife taxa, including herpetofauna, birds, small mammals, bats, mesomammals, and invertebrates (insects, arachnids, and mollusks). We used a collection of sampling methods designed to evaluate species richness in a time and area constraint on non-native grass-dominant and native grass-dominant study sites. We surveyed sites in May, July, and September of 2022. Evidence suggests an association between wildlife species diversity and dominant vegetation systems ( $P < 0.0001$ ). This research may be used to demonstrate the quantifiable advantages of restoring and preserving native grasslands.

#### **4:15: Mapping Prairie Quality at a Landscape Scale**

**Amie Treuer-Kuehn**, TPWD, Austin, TX, USA

**Wendy Anderson**, Texas Parks and Wildlife Department, Austin, TX, USA

**Duane German**, TPWD, Austin, TX, USA

**Abstract:** Prairies make up large parts of Texas's ecoregions and are one of the most endangered ecosystems in North America. Prairies provide habitat for a diverse array of plant and animal species and are important for nutrient cycling, carbon storage, water quality, livestock, hunting, and other forms of outdoor recreation. The persistence of these ecosystems is threatened by

urbanization, conversion to agriculture, fire suppression, exotic plant species, and loss of landscape-level processes. Further, the current condition of these landscapes remains widely unknown. The goal of this project was to systematically sample portions of the Blackland Prairies, Grand Prairie, Crosstimbers, and Coastal Prairies to determine, through field sampling, remote-sensing, and modeling, the distribution and quality of grasslands within these areas. Field data and photo interpretation points were used to remotely sense grassland quality in a pilot study area roughly 2 million acres in size. We targeted six different grassland classes for mapping: Grass Farm, Monoculture Hayfield, High Quality Prairie, Mostly Exotic Pasture, Mostly Native Pasture, and Old Field/Fallow Field. Overall map accuracy was 80% and three grassland classes were mapped with over 81% accuracy: High Quality Prairie, Monoculture Hayfield, and Mostly Exotic Pasture. High accuracy in our grassland quality mapping targets was achieved by increasing the amount of field data collected, using lidar-derived data, and increasing the resolution of satellite imagery. These results will assist with on-the-ground conservation and restoration of grasslands and grassland-dependent species.

#### **4:30: Grassland Effectiveness Monitoring: Results from Pilot Tests of a Tiered and Integrated Approach for Habitat Treatment Assessment Across Programs**

**Anna Matthews**, American Bird Conservancy/Oaks and Prairies Joint Venture, San Marcos, TX, USA

**Rebekah Rylander**, American Bird Conservancy/Rio Grande Joint Venture, Austin, TX, USA

**Daniel Bunting**, Science Applications, U.S. Fish and Wildlife Service, Southwest Region, Austin, TX, USA

**Michael C. Duniway**, Southwest Biological Science Center, U.S. Geological Survey, Moab, UT, USA

**James Giocomo**, American Bird Conservancy, Durand, IL, USA

**Anna Knight**, Southwest Biological Science Center, U.S. Geological Survey, Moab, UT, USA

**Adriana Leiva**, Gulf Restoration Program, U.S. Fish and Wildlife Service, Corpus Christi, TX, USA

**Robert Perez**, OPJV/ABC, La Vernia, TX, USA

**Kourtney Stonehouse**, Partners for Fish and Wildlife Program, U.S. Fish and Wildlife Service, Falls Church, VA, USA

**Derek Wiley**, Texas Parks and Wildlife Department/Oaks and Prairies Joint Venture, Throckmorton, TX, USA

**Don Wilhelm**, Partners for Fish and Wildlife Program, U.S. Fish and Wildlife Service, Arlington, TX, USA

**Abstract:** Grasslands are an imperiled ecosystem in North America, with 2/3 of the historical distribution of this critical habitat lost. To counteract these declines, habitat restoration programs implement practices like brush management, prescribed fire, herbicide treatment, and prescribed grazing. About \$2.8 million/year is spent implementing practices like these on private lands by U.S. Fish and Wildlife-Southwest Region's Partners for Fish and Wildlife program, and millions more is spent by similar programs. However, little monitoring data is available to assess treatment success. The Grassland Effectiveness Monitoring (GEM) protocol was developed to fulfill this need and is designed to integrate with Bureau of Land Management and Natural Resources Conservation Service monitoring programs. It offers a simplified, tiered design that

allows for differing plant identification skill levels while producing useful habitat assessment metrics. This protocol was tested on Grassland Restoration Incentive Program prescribed fire and brush management projects in the Blackland Prairie and Cross Timbers regions of Texas in 2021 and 2022. Both treatments typically produce early successional habitat. We tested the assumption that prescribed fire yields better quality grassland habitat. Preliminary results indicate that prescribed fire sites had more native herbaceous cover, which comprised ~35.5% of the site area as compared to ~19% of brush management sites. Additionally, mean woody height on brush management sites was 4.6 meters and 1.8 meters on fire sites. Pilot study results show that GEM can produce data to evaluate habitat treatment success, and its flexibility makes GEM a useful tool to apply across programs, facilitating pooled analyses.

#### **4:45: Assessing Ground-Dwelling Arthropod Biodiversity in Rangelands Under Differing Grazing Strategies in Erath County**

**Adam Mitchell**, Tarleton State University, Stephenville, TX, USA

**Lark Holland Trainer**, Tarleton State University, Garland, TX, USA

**Abstract:** Arthropods make up 84% of all described species and contribute significant ecosystem services such as pollination, nutrient cycling, pest control, and as a major food resource for other species of wildlife. Recent studies suggest long-term declines in arthropod population densities and biomass. However, the magnitude and extent of arthropod decline in North America is not well understood, prompting a need to facilitate biomonitoring at local scales to determine long-term changes in arthropod communities and identify mechanisms for declines. The purpose of this study is to establish long-term monitoring in rangelands in Erath County and report changes in the diversity and composition of arthropod communities associated with cattle grazing. We established 8, 30-m transects during Summer 2019 and 2022 at Tarleton State University Agricultural Center where collections occurred before and after grazing events. Within each transect we measured vegetation characteristics (species richness, horizontal cover, and plant height) using three Daubenmire frames and sampled ground-dwelling arthropods using 6 pitfall traps on a monthly basis. We identified arthropods to the family level and quantified family richness, abundance, diversity, and evenness within each transect. In areas associated with non-native vegetation we found high densities of non-native arthropods, notably pillbugs (Isopoda: Armadillidiidae) and ants (Hymenoptera: Formicidae). In 2019 diversity was similar, but abundance similarity was inconclusive. Our findings will enhance natural history records and contribute to management decisions on maintaining arthropod diversity in rangelands in North-Central Texas.

#### **5:00: Effect of juniper removal on ground-dwelling arthropod biodiversity**

**Josef Leachman**, Tarleton State University, Stephenville, TX, USA

**Darrel Murray**, Tarleton State University, Stephenville, TX, USA

**Adam Mitchell**, Tarleton State University, Stephenville, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Abstract:** Ashe juniper (*Juniperus ashei*) has increased exponentially across Texas. Encroachment of this dense evergreen influences community dynamics by suppressing understory growth and outcompeting other native vegetation, thus affecting arthropod assemblages. Arthropods play a critical role in the environment for their ecological processes. Our objectives are to evaluate ground-dwelling arthropod community richness, abundance, and composition in response to Ashe juniper removal in riparian areas. In October 2020, juniper removal occurred on a 182-ha property adjacent to Palo Pinto Mountains State Park in Stephens County, TX, to remove Ashe juniper as part of a habitat remediation project. Results of brush management efforts indicated a 43% reduction in total canopy cover. We surveyed from April to July 2021 and 2022 during peak arthropod production at non-juniper, juniper removed (and reseeding of herbaceous cover), and juniper present sites. We sampled a total of 54 sites 4 times during the season using pitfall traps and vacuum sampling. Additionally, we measured ground cover using Daubenmire frames since herbaceous, litter, and bare ground cover can influence the presence of certain arthropod taxa. One-year post-removal, we did not detect a difference in arthropods among the three site treatments. Two-years post-removal, we detect differences in ground cover among the treatments, such as juniper areas having lower heterogeneity in ground cover. We are currently finalizing arthropod data and additional analyses. By evaluating the impact of juniper removal on arthropod productivity, adaptive management strategies can be applied to better understand how other faunal communities may respond to juniper removal.

## **Conservation & Ecology of Reptiles and Amphibians 1**

### **3:45: Movement, home range size, and habitat use of Eastern Black-tailed Rattlesnakes (*Crotalus ornatus*) in the northern Chihuahuan Desert**

**James Emerson**, Texas State University, Seguin, USA

**Dominic DeSantis**, Georgia College & State University, Milledgeville, GA, USA

**Vicente Mata-Silva**, University of Texas at El Paso, El Paso, TX, USA

**Amy Wagler**, University of Texas at El Paso, El Paso, TX, USA

**Jerry Johnson**, University of Texas at El Paso, El Paso, TX, USA

**Abstract:** Despite its wide distribution throughout the northern Chihuahuan Desert, extraordinarily little is known about the ecology or behavior of Eastern Black-tailed Rattlesnakes (*Crotalus ornatus*). The primary literature for black-tailed rattlesnakes was largely based on research conducted on the former conspecific (*C. molossus*), thus the re-validation of *C. ornatus* widened the void in our understanding of the species. The aim of this study was to elucidate movement patterns, home range size, and habitat use by *C. ornatus* in the northern Chihuahuan Desert of far west Texas. Radiotelemetry was used to monitor individual snakes from May 2015 through August 2018. Mean home range size for all individuals was 22.84 ha and mean daily distance moved was 9.28 m/day. Male snakes had larger home range sizes ( $P=0.009$ ), larger core use areas ( $P=0.02$ ), and higher daily distance moved ( $P=0.001$ ) than female snakes. Male movement peaked in August ( $P=0.004$ ) and female movement was statistically similar throughout the active season. Multinomial logit models were used to analyze habitat use patterns of *C. ornatus*, while controlling for snake, habitat availability, and season. Despite low availability within snake home ranges, most observations of snakes occurred in arroyos or on rocky slopes ( $P<0.001$ ). Microhabitat was also used non-randomly, with snakes seeking cover in



rocky refugia or under dense vegetation ( $P < 0.001$ ), rather than areas containing high proportions of gravel or plant litter. This study presents the first detailed information about habitat and microhabitat use, along with patterns of movement and home range size for the recently re-validated *C. ornatus*.

#### **4:00: Habitat Conservation Forecasting for the Western Massasauga**

**Wade Ryberg**, Texas A&M University, College Station, TX, USA

**Danielle Walkup**, Texas A&M University, Bryan, TX, USA

**Michelle Lawing**, Texas A&M University, College Station, TX, USA

**Corey Fielder**, College Station, TX, USA

**Brandon Bowers**, College Station, TX, USA

**Toby Hibbitts**, College Station, TX, USA

**Abstract:** An understanding of past climate-driven changes in Western Massasauga (*Sistrurus tergeminus*) distribution can offer a perspective on how resources might best be allocated to achieve the greatest future conservation benefits for the lowest cost and therefore maximize return-on-investments. Past projections or hindcasting of species distribution models (SDMs) across the range of *S. tergeminus* through the Last Glacial Maximum more than 20,000 years ago when ice sheets were at their maximum extent showed dramatically decreased areas of suitable habitat in most of the US, but increased areas of suitable habitat in Mexico. As climate changed through the mid-Holocene 7,000 to 5,000 years ago to present day conditions, the distribution of *S. tergeminus* suitable habitat and populations expanded. Future projections or forecasts of SDMs across the range of *S. tergeminus* show a continued expansion and northward shift of suitable habitat by 2050 and 2070. These model results suggest that *S. tergeminus* was fully capable of tracking changes in the distribution of their habitat in response to past climate change. By extension, these results also suggest that *S. tergeminus* should be able to track changes in the distribution of their habitat in response to future climate change, if anthropogenic barriers to dispersal do not dominate future landscapes. As such, investing resources in landscape conservation strategies that focus on corridors and habitat linkages, rather than fixed boundary-protected areas, should help preserve the connectivity of *S. tergeminus* populations under future climate change and therefore provide a better return-on-investment.

#### **4:15: Demography of reintroduced Louisiana Pinesnakes**

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**David Stewart**, U.S. Fish and Wildlife Service, Albuquerque, NM, USA

**Josh Pierce**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**Emlyn Smith**, USDA Forest Service, Bentley, LA, USA

**Abstract:** The Louisiana Pinesnake (*Pituophis ruthveni*) has exhibited drastic population declines resulting its listing as federally threatened under the Endangered Species Act. A captive population has been managed to produce head started individuals for release at a reintroduction site in the Kisatchie National Forest in Louisiana. Since 2010, releases of head started snakes have occurred annually where they have been monitored with a variety of passive techniques including box traps and automated PIT tag recorders. However, our current understanding of the

demography of this reintroduced population is limited. The development of spatially explicit population models admits the spatial structure of the ecological processes that influence the encounter history data, as well as the spatial aspect of how the data was collected, and thus estimated density can be understood in the context of the sample area. The long-term monitoring of this reintroduced population enabled us to develop a spatially explicit population model to estimate density within the sample area. A total of 291 snakes have been released that has resulted in a total of 325 detections of 89 individuals. Of these, 55 were captured more than once, and the maximum number of detections of a single individual was 39. Natural recruitment (5 individuals) has also been detected. These results will be used to inform the reintroductions at the current site, while also guiding monitoring of future reintroduced Louisiana Pinesnake populations.

#### **4:30: Modeling breeding pond habitat for amphibians of conservation concern**

**Wendy Anderson**, Texas Parks and Wildlife Department, Austin, TX, USA

**Amie Treuer-Kuehn**, TPWD, Austin, TX, USA

**Duane German**, TPWD, Austin, TX, USA

**Abstract:** The crawfish frog, *Lithobates areolatus areolatus*, and the Houston toad, *Bufo houstonensis*, are two native amphibian species of conservation concern in Texas. The crawfish frog is generally associated with prairies or grassland habitats which are one of the most endangered ecosystems in North America, and the federally endangered Houston toad requires a specific breeding habitat of pine and oak woodlands and savannas, specific soil geology, and shallow or ephemeral ponds. The Landscape Ecology Program at Texas Parks and Wildlife Department aims to support the conservation and restoration of these species' breeding habitat through the development of a high-resolution map of ephemeral and permanent wetlands. To map potential breeding habitat, available LiDAR within both species' geographic ranges were acquired and processed using Quick Terrain Modeler to produce a Digital Elevation Model (DEM). The DEM was then standardized in ERDAS Imagine, and the landscape topographic sinks were identified using ArcGIS Hydrology Toolset. An object-based image analysis was performed in eCognition to extract bodies of water over 200 m<sup>2</sup> from satellite imagery to determine which landscape sinks contained water during wet years. The LiDAR derived sink datasets were then modeled using randomForest in Rstudio using predictor variables to produce a final map of potential breeding habitat for each of these species.

#### **4:45: Survival of Repatriated Alligator Snapping Turtles in Native Texas Waters**

**Connor Adams**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Jessica Glasscock**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**Paul Crump**, Texas Parks and Wildlife Department, Austin, TX, USA

**Abstract:** The alligator snapping turtle (*Macrochelys temminckii*) is the largest freshwater turtle in North America. As such, *M. temminckii* are sought after for human consumption and are vulnerable to overharvest or bycatch. Despite having protection from harvest in Texas since the 1980s, *M. temminckii* are still harvested illegally for food and novelty products. Given their life

history, such threats may exacerbate declines in local populations. Therefore, efforts that can bolster wild populations are of importance to *M. temminckii* conservation. In June 2021, 23 *M. temminckii* confiscated by federal agents were released at three predetermined sites in east Texas. To determine the feasibility of repatriation efforts, we attached VHF radios to these individuals and performed weekly telemetry checks until July 2022 to estimate survival. We estimated survival probabilities using Hidden Markov Models (HMM) to account for inconsistencies in radiotelemetry data, and to assess mortality in the context of site and seasonal effects. Overall, we found that survival of repatriated *M. temminckii* was high. However, survival probabilities were greatly influenced due to differences in demographics across sites. We found the best-fit HMM with an interactive effect of site and season to be the strongest predictor of *M. temminckii* survival. Variation in resource availability (e.g., microhabitat availability) and site characteristics (i.e., hydrological regime) across seasons may influence repatriated *M. temminckii* survival. Long-term studies estimating survival are difficult but invaluable to conserve long-lived species. High survival of repatriated individuals highlights suitability of habitat and could be a tool to restore or bolster wild populations.

### **5:00: Reestablishment and Increase of Spot-Tailed Earless Lizard Home Range Following Aggressive Radiotracking Efforts**

**Evan Rangel**, Texas A&M University Kingsville, Kingsville, TX, USA

**Jacob Reyes**, CKWRI / TAMUK, Kingsville, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Abstract:** Spot-tailed earless lizards (STEL) are rare species that were recently elevated from subspecies to full species status. Both populations have dramatically declined resulting in increases in conservation interests. Recent research found STEL home ranges to be 4X larger than similar species of the genus. In our observations of STEL, we noted that individuals fled from humans but did not return to their previous site of observation. Therefore, we outfitted 30 STEL with VHF transmitters to track their daily movements for 1 week, then in a cross-over design, we pursued half the STEL to locations approximately 100 m from their original observation site while maintaining a distance from the other half of STEL. We continued to monitor movements, and after another week, we pursued the second STEL group to a new location while maintaining a distance from the first STEL group. We found that non-harassed STEL maintain  $0.09 \pm 0.01$  ha home ranges, but if harassed, they will escape to a new site and re-establish a previous-sized home range without returning to original home range sites. Only 1 STEL appeared to attempt to return to its original site, but was depredated as a result. Our results indicate that STEL home range size become 5.6X larger as a result of intensive tracking by researchers. Inflated or biased estimates of home range can result in misinterpretations that have potential to misguide conservation strategies and should be considered by future researchers when conducting home range studies of STEL.

## Conservation & Ecology of Birds 3

### 9:00: Range expansion of Crested Caracaras over a 55-year period in three distinct populations

**Jennifer Smith**, Dep. of Environmental Sciences & Ecology, UTSA, San Antonio, TX, USA  
**Amanda Lamberson**, The University of Texas at San Antonio, San Antonio, TX, USA

**Abstract:** Crested Caracaras (*Caracara cheriway*) are non-migratory raptors that exist as three populations in the United States (US) in Texas, Arizona, and Florida. Here, they inhabit open areas where their broad diet includes e.g., carrion, invertebrates, and small mammals. Occurrence records suggest that caracaras are expanding their distribution. Yet, the extent and rate of expansion is unknown. At the same time, caracaras appear to be increasing in urban areas suggesting they may be expanding into previously unoccupied habitat. We test these ideas by (1) assessing range expansion of caracaras separately for the three US populations over a 55-year period, and (2) evaluating changes in habitat occupancy over the same timeframe. We used point occurrence data collected between 1967 and 2021 from the Global Biodiversity Information Facility (GBIF) and the Breeding Bird Survey (BBS). Data were separated into 5-year time periods and overlaid on a 2x2km grid. For each 5-year period, the mean easting and northing of occupied cells was calculated separately for each population to estimate range centroids. The distance between each centroid and the outermost occupied cells was also calculated. We compared estimates to assess range shifts and expansion across time. While range expansion occurred in all populations, the greatest occurred for the Texas population. Using the National Land Cover Dataset, we also demonstrated that observations of caracaras in urban areas have increased. Our results have important implications for the management of caracaras, especially where they contribute to human-wildlife conflict, or where they are considered imperiled (Florida).

### 9:15: The Impact of Microclimate on Nest Site Selection and Reproductive Success in the Black-Crested Titmouse

**Jamie Liang**, Trinity University, Houston, TX, USA  
**Troy Murphy**, Trinity University, San Antonio, TX, USA

**Abstract:** For cavity nesting birds, nest quality may depend on: 1) nest-hole orientation 2) solar radiation 3) amount of surrounding vegetation. We examined the impact of these factors on nest site occupancy and reproductive success in the Black-Crested Titmouse (*Baeolophus atricristatus*). Nest occupancy and measures of reproductive success (number of eggs laid, hatched, and fledged) were recorded among 99 nest boxes in central Texas in 2021. Orientation was measured with a compass. Solar radiation was estimated using semi-hemispherical photos taken via Google Street View. Vegetation was quantified with NDVI, and by the distance from each nest box to the nearest vegetation under 2 meters and over 2 meters. Occupied nests (n= 46) were significantly more likely to be oriented to the southwest; however, orientation of occupied nests varied widely. Occupancy was not related to vegetative measures. Clutch size and lay date (but not hatching success or fledging success) were significantly related to orientation: nests holding larger clutches were oriented north to northwest, and nests with earlier lay dates were

oriented northeast. Lay date (but not clutch size or fledging success) was negatively correlated with distance to vegetation (over 2m), but not to other vegetation measures. Analyses of solar radiation are ongoing. These results are consistent with the hypothesis that nest site selection and reproductive success are influenced by microclimate. Our work will illuminate the factors that impact reproductive success in the Black-Crested Titmouse and has implications for artificial nest placement.

#### **9:45: Vocal behavior and urban avoidance in golden-cheeked warblers inhabiting exurban preserves**

**Darren Proppe**, St. Edward's University, Dripping Springs, TX, USA

**Lisa O'Donnell**, City of Austin Wildland Conservation Division, Austin, TX, USA

**Christopher Warren**, Maui Forest Bird Recovery Project, Makawao, USA

**Alexandra Yost**, Wild Basin Creative Research Center, Austin, USA

**Dania Marín**, Wild Basin Creative Research Center, Austin, USA

**Abstract:** The golden-cheeked warbler is a state and federally listed species that breeds exclusively in Central Texas. Its breeding range can be characterized by regions of high- and low-density human development. The 35,000-acre Balcones Canyonlands Preserve (BCP) was set aside as mitigation land for the golden-cheeked warbler in Travis County, a region which is experiencing unprecedented human growth. The BCP is comprised of multiple land tracts, which range greatly in size and configuration. The City of Austin and Travis County, who serve as the primary owners and land managers, have been conducting intensive surveys of warbler use on 100-acre plots since 2009. They have also conducted several collaborative studies, such as an intensive song recording effort led by Chris Warren in 2008-10. We integrated new and previously collected data to assess vocal behavior and urban avoidance in golden-cheeked warblers found on BCP plots. Specifically, we compared B song composition between 2008-10 and 2021-22. Further, we assessed the impact of increasing percentages of impervious surfaces on the likelihood of detecting a golden-cheeked warbler within any particular 100-meter cell within 100-acre survey plots. Our results indicate that golden-cheeked warbler B song composition has changed significantly over time and that the species is strongly averse to impervious surfaces. While the reasons and implications of changing songs require additional exploration, the impact of impervious surfaces clearly supports the continued need for the preservation of large tracts of wildlands to maintain golden-cheeked warbler populations in exurban landscapes.

#### **10:00: Pugilistic Doves: Is Wing Morphology Associated with an Odd Form of Aggression in Texas Doves?**

**Maia Dykstra**, Trinity University, San Antonio, TX, USA

**Troy Murphy**, Trinity University, San Antonio, TX, USA

**Abstract:** Aggressive wing-slapping behavior is commonly observed in both White-winged Doves (*Zenaida asiatica*; WWDO) and Mourning Doves (*Zenaida macroura*; MODO). Many species with similar behaviors, including other Columbidae species, exhibit morphological weaponization of wings. These adaptations take the form of skeletal projections such as spurs or

bony knobs and may also include increased bone thickness or density. Such weapons are typically found on the extensor process of the carpometacarpus. Bone modification is more pronounced in groups that participate more in competition and defense, and sexual dimorphism in these features is common. We have collected data on the size and shape of wing bones in adult WWDO and MODO to explore the hypothesis of bone weaponization in these birds. We predict that if weaponization does exist, we would observe sexual dimorphism in wing bones, particularly the carpometacarpus. We also predict skeletal differences between the colonially nesting WWDO and the less social MODO. After controlling for body size differences, we analyzed the linear measurements and shape of the carpometacarpus bone, as well as of the extensor process on this bone. There is a significant difference in the dorso-ventral thickness of the minor carpometacarpal digit between males of the two species, with thickness in MODO being approximately 10% greater, but no other significant differences have been identified. Although one of twelve measurements is consistent with one of our predictions, we do not consider this overwhelming support of our hypothesis. WWDO and MODO appear to possess no identifiable osteological weaponization, despite their wing-slapping behavior.

### **10:15: Parental Attentiveness of a Songbird across Varying Temperature Gradients**

**Lindsey Chiesl**, Tarleton State University, Stephenville, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Gabrielle Names**, North Dakota State University, Fargo, ND, USA

**Britt Heidinger**, North Dakota State University, Fargo, ND, USA

**Abstract:** Bergmann's rule predicts body size differences across latitudes associated with temperatures. One possible mechanism is parental behavioral differences, such as time on or off a nest or food delivery rates, that could influence growth rates resulting in body mass differences. Our study compares behavioral measurements at house sparrow (*Passer domesticus*) nests in Texas, Kentucky, and North Dakota associated with location, temperature, and nestling body size. We monitored house sparrows in nest boxes at our study locations during the spring and summer of 2022. We video recorded parental behaviors on incubation day 5, 6 or 7 and post-hatching on day 5, 6 or 7 from approximately 0630-1130 hrs. We collected morphological measurements of nestlings every two days post-hatch (day 2–10). Preliminary results show that female on-bouts were longer in North Dakota ( $n = 26$ , mean = 34.6 min/hr, 95% CI = 31.6–37.7) than in Texas ( $n = 27$ , mean = 26.2 min/hr, 95% CI = 20.2–32.3), and feeding rates are higher in North Dakota ( $n = 18$ , mean = 17.4/hr, 95% CI = 13.9–21.1/hr) than in Texas ( $n = 29$ , mean = 10.1, 95% CI = 8.2–11.9/hr). We are finalizing our remaining analyses on behavior, body size, and temperature. Using house sparrows as a model for songbirds, this study will increase our understanding of how parental feeding rates are associated with differences in nestling body size and temperature, with implications for how birds might respond to climate change.

### **Conservation & Ecology of Mammals 3**

**9:00: Implementing novel trail camera-based techniques for estimating demographic parameters of unmarked white-tailed deer in forests**

**Molly Koeck**, Oklahoma State University, Stillwater, OK, USA  
**Colter Chitwood**, Oklahoma State University, Stillwater, OK, USA  
**Anna Moeller**, Oklahoma State University, Stillwater, OK, USA

**Abstract:** Density and recruitment are hard to estimate, and quantifying them through physical capture can be invasive, expensive, and impractical. The use of camera traps as a tool for collecting demographic data has grown exponentially in recent years due to ease of use and benefits associated with collecting data noninvasively. Further, recent advances in unmarked abundance models and camera trap technology facilitate better estimates of demographic parameters of unmarked species. Our objective was to use the space-to-event unmarked abundance model (STE) to estimate density and recruitment of white-tailed deer (*Odocoileus virginianus*) in a densely forested area. Previous work with STE did not account for camera viewable area (viewshed), potentially leading to biased estimates associated with viewshed assumptions. Further, STE has not been used to quantify recruitment, so we will extend the usefulness of this unmarked model. In 2021 we randomly deployed 100 cameras across two wildlife management areas in southeast Oklahoma. At deployment, we measured the viewshed at each camera by taking six maximum distance measurements to account for variation in forest structure across the viewshed. We set camera traps to synchronously take time-lapse photographs every 10 minutes until they were retrieved, resulting in a sample of 3 million photos. Using STE, we successfully estimated late-summer white-tailed deer density at both sites which allowed us to derive fawn recruitment rates. When compared to estimates derived from an assumed viewshed, our results reported higher densities when viewshed is uniquely measured per camera, indicating that viewshed can have profound impacts on estimating density.

### **9:15: Temperature drives habitat selection and tolerance of predation risk in a climate generalist**

**Breanna Green**, CKWRI - Texas A&M Kingsville, Kingsville, TX, USA  
**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Richard Chandler**, Warnell School of Forestry and Natural Resources, Athens, GA, USA  
**Heather Abernathy**, Haub School of Natural Resources, Laramie, WY, USA  
**L. Mike Conner**, The Jones Center at Ichauway, Newton, GA, USA  
**Elina Garrison**, Florida Fish and Wildlife Conservation Commission, Tallahassee, FL, USA  
**David Shindle**, US Fish and Wildlife Service, Immokalee, FL, USA  
**Karl Miller**, University of Georgia, Athens, GA, USA  
**Michael Cherry**, CKWRI, Kingsville, TX, USA

**Abstract:** Spatiotemporal partitioning of habitat use is a common behavior that species employ to avoid predation. Balancing demands of foraging and thermoregulation under predation risk introduces competing drivers of selection often underappreciated in studies of predator-prey dynamics. As temperatures rise due to climate change, thermoregulatory pressures will increasingly impact movement patterns by forcing prey to accept higher predation risk in exchange for thermal refuge. For instance, as Florida panthers (*Puma concolor coryi*) utilize vegetation to ambush prey, white-tailed deer (*Odocoileus virginianus*; hereafter: “deer”) may select safer areas at the cost of increased solar radiation exposure. We tested the hypothesis that thermoregulatory demands influence predation risk tolerance in prey and that the strength of the

effect will vary between nocturnal and diel periods. We assessed step selection of 224 deer from June through September 2015 to 2018 in the Florida Panther National Wildlife Refuge and Big Cypress National Preserve in southern Florida, USA. Resource selection varied with temperature, suggesting the thermal landscape is an important factor of selection. As temperature increased, deer increased their use of high-risk areas, indicating deer were less predation risk averse when confronted with high thermoregulatory costs. However, this pattern was temporally dynamic. Temperature influenced predation risk tolerance during both nocturnal and diel periods but was strongest during nocturnal hours, when panthers are most active. These movements indicate that the need for thermal refugia influences predator avoidance and highlights the critical importance of landscape features which offer thermal shelter.

#### **9:45: Early-life conditions: a roadmap to larger antlered white-tailed deer**

**Joseph Hediger**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Matthew Moore**, Faith Ranch, Houston, TX, USA

**Cole Anderson**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Charles DeYoung**, Kingsville, TX, USA

**David Hewitt**, Caesar Kleberg Wildlife Research Institute / Texas A&M University Kingsville, Kingsville, TX, USA

**Stuart Stedman**, Faith Ranch, 77001, TX, USA

**Randy DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Michael Cherry**, CKWRI, Kingsville, TX, USA

**Abstract:** Early-life programming prepares an individual for the environment they are expected to exist in through life. This programming can be adaptive or mal-adaptive depending on the match or mismatch between the expected and the actual environment. In the event of an environmental mismatch, life history traits can be negatively influenced. We evaluated the effects of early-life conditions of white-tailed deer (*Odocoileus virginianus*) on the relationship between antler and body mass utilizing a 15-year dataset containing annual antler and body weight measurements for 471 known-age white-tailed deer. These individuals were born in one of two 445-hectare, high-fenced pastures or a 2.5-hectare pen. Within the pen, movement was limited, predators did not occur, and sires were selected for large antler sizes. All deer had access to ad libitum food and water. Deer born in pens were released to the larger pasture at ~4-months of age. The analysis utilized a linear mixed effects model with antler score and body weight as dependent variables. Independent variables were age and birth site. Capture year and animal ID were treated as random variables. Offspring born in pens were smaller bodied with larger antlers when compared to pasture-born deer. Our results suggest early-life conditions permanently influence the allocation of energetic resources towards either antlers or body mass in white-tailed deer. Whether these findings are adaptive or maladaptive depends on the expected environment these individuals will exist, as well as management goals and practices.

#### **10:00: Temporal variation in resources influences offspring quality of white-tailed deer in a semi-arid environment**

**Miranda Hopper**, TAMUK-CKWRI, Kingsville, TX, USA

**Bryan Spencer**, Caesar Kleberg Wildlife Research Institute - Texas A&M University



Kingsville, Kingsville, TX, USA

**Randy DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Aaron Foley**, CKWRI-TAMUK, Kingsville, TX, USA

**J. Alfonso Ortega**, CKWRI-TAMUK, Kingsville, TX, USA

**Landon Schofield**, East Foundation, Kingsville, TX, USA

**Tyler Campbell**, East Foundation, San Antonio, TX, USA

**Michael Cherry**, CKWRI, Kingsville, TX, USA

**Abstract:** Timing of resource availability has important implications for population performance. Resource availability relative to consumer requirement influences the consumer's ability to acquire nutrients as energetic demands fluctuate. Temporal variation matters for wildlife; however, the period when it matters most remains unknown. Therefore, we determined the biological period at which rainfall was most predictive of offspring quality. We used rainfall as our environmental variable because it varies greatly and directly affects plant growth. We used white-tailed deer (*Odocoileus virginianus*) as a model species and offspring body mass as a proxy for quality, as mass is correlated with survival and time to primiparity. We captured 480 fawns and 571 1.5-year-olds in the fall at four sites in South Texas from 2011 to 2021. We assigned precipitation data from seven biological seasons we hypothesized would affect mass to each deer record. We used linear mixed-effects models to identify the period when rainfall was most predictive of mass. Rainfall in the early growing season (April), approximately three months prior to birth of fawns, had the greatest effect on deer mass. For every ten cm increase in rainfall, fawn body mass increased by 2.17 kg ( $P=0.01$ ) and yearling body mass increased by 2.88 kg ( $P = 0.04$ ). Our results demonstrate that offspring quality is most affected by rainfall in seasons relevant to plant phenology rather than rainfall in seasons relevant to reproductive chronology. Therefore, when assessing how temporal variation in resources influences population performance, managers should consider multiple trophic levels to fully capture this process.

### **10:15: Estimating Breeding Values and the Heritability of Antler Traits in White-tailed Deer**

**Cole Anderson**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Randy DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Michael Cherry**, CKWRI, Kingsville, TX, USA

**David Hewitt**, Caesar Kleberg Wildlife Research Institute / Texas A&M University Kingsville, Kingsville, TX, USA

**Joseph Hediger**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Charles DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Stuart Stedman**, Faith Ranch, 77001, TX, USA

**Matthew Moore**, Faith Ranch, Houston, TX, USA

**Abstract:** Luxury phenotypic traits (horns and antlers) are both tools and targets for the management of ungulate populations. For instance, antler restrictions regulate males eligible for harvest by protecting younger age classes. Culling or selective harvest attempts to improve the horn or antler size of future generations by removing undesirable phenotypes from the breeding pool. However, the effects of these management strategies—intentional or unintentional—strongly

depend on the heritability of the traits and the ability of offspring to develop and display them. Mature animals with access to high-quality nutrition typically develop larger antlers, but the genetic influence on antler development in wild populations of cervids is poorly understood. We analyzed an ongoing, long-term research project that has followed multiple half-sibling cohorts of wild white-tailed deer (*Odocoileus virginianus*) to maturity. We recorded 2,167 antler measurements from 505 unique individuals. We estimated the narrow-sense heritability ( $h^2$ ) for 5 common antler characteristics: gross Boone & Crockett score (0.35), inside spread (0.00), main beam length (0.17), antler mass (0.27), and tine length (0.59) by regressing the mean offspring antler measurements of each antler trait on their sire's maximum antler measurement for each trait. Antler restrictions implemented on traits with low heritability will have the least chance of unintentional effects of harvest, such as high-grading. Conversely, selecting for traits with higher heritabilities will produce the largest gains per generation. Our results can help wildlife managers and legislators make better-informed decisions and regulations when managing cervid populations to produce the highest quality luxury phenotypic traits.

## **Conservation & Ecology of Reptiles and Amphibians 2**

### **9:00: The Thermal Ecology of Reintroduced and Native Texas Horned Lizards**

**Patrick Ryan**, Texas Christian University, Austin, TX, USA

**Abstract:** Due to habitat loss, the Texas horned lizard (THL) (*Phrynosoma cornutum*) has declined across its historic range. To date, reintroduction attempts for the species have been unsuccessful, calling into question the suitability of the habitat. THLs require suitable thermal habitat to meet their thermoregulatory needs, because of this, understanding the thermal habitat requirements of THLs is important. The objective of this study was to determine thermal habitat preferences of reintroduced THLs at Mason Mountain WMA (n=4 lizards) compared to a nearby natural population of THLs on the White Ranch (n=12 lizards). We also compared the thermal conditions of different microhabitats between the two sites. We used thermal dataloggers (n=24) to record the temperatures in different microhabitats throughout the day at each site, then compared how much time these data loggers were within the lizard's optimal and critical temperature range. The ground temperature selection by the lizards versus random points on the ground were assessed to see what factors affected selection including, study site, time of day, and microhabitat. It was found that the two sites didn't differ from each other in terms of microhabitat thermal quality ( $p=0.51$ ) but covered microhabitats provided significantly better thermal habitat quality than the other microhabitats ( $p<0.01$ ). Like other studies, vegetative cover seems to play an important role in thermal habitat quality. These findings suggest that habitat management should maintain vegetative cover for THLs, and more work should be done to look at what specific types of vegetative cover provide the best thermal habitat.

### **9:15: Use of Environmental DNA in Wetland Habitats for Detecting Cryptic Species: A Case Study on the Western Chicken Turtle (*Deirochelys reticularia miaria*)**

**Mandi Gordon**, Environmental Institute of Houston, University of Houston-Clear Lake, Houston, TX, USA

**Jason Nagro**, University of Houston - Clear Lake, Houston, TX, USA

**Danielle DeChellis**, University of Houston - Clear Lake, Houston, TX, USA  
**Louisa Collins**, Tangled Bank Conservation, Asheville, NC, USA  
**Hannah Nelson**, Tangled Bank Conservation, Asheville, NC, USA  
**Joseph Apodaca**, Tangled Bank Conservation, Asheville, NC, USA  
**Jenny Oakley**, University of Houston - Clear Lake, Houston, TX, USA  
**George Guillen**, University of Houston - Clear Lake, Houston, TX, USA

**Abstract:** The southeastern United States represents one of the most ecologically diverse regions in the world, though this area has experienced declines in surface area of wetland habitats. This may be particularly detrimental to wildlife, such as the cryptic Western Chicken Turtle (WCT, *Deirochelys reticularia miaria*), due to their dependency on and movement between intermittent wetlands. The WCT is a Species of Greatest Conservation Need in Texas and is currently under review for federal protection under the Endangered Species Act. Environmental DNA (eDNA) has previously been used to document cryptic species, though application within intermittent wetlands is limited. To inform the Species Status Assessment process for the WCT and to evaluate applicability of eDNA within intermittent wetlands, we collected samples from three matrix types: ambient surface water ( $M_A$ ), resuspended sediment ( $M_R$ ), and soil ( $M_S$ ). Water samples were filtered through 3  $\mu$ m cellulose nitrate (CN) filters prior to qPCR analyses. In total, 66 sites were sampled monthly from March-August over three years (2020-2022). Overall, 745 samples ( $M_A = 337$ ;  $M_R = 338$ ;  $M_S = 70$ ) were analyzed via qPCR. Of the 66 sites, 16 (24.2%) yielded positive (two or more qPCR replicates) or potential (one qPCR replicate) detections for WCT. Across events with detections, three (4.7%) resulted in detections for all matrix types. For all matrices,  $M_A$  returned the highest proportion of detections (70.3%). While we have demonstrated that eDNA can be used to confirm presence of WCT in intermittent wetlands, future studies should consider matrix type and site conditions.

### **9:30: Three-toed Box Turtle (*Terrapene carolina*) Spatial Ecology at Multiple Scales in North Texas**

**Sara Joseph**, University of North Texas, Denton, TX, USA  
**Andrew Gregory**, DENTON, TX, USA  
**Jaime Jimenez**, University of North Texas, Denton, TX, USA

**Abstract:** Box turtle (*Terrapene carolina*) populations are steadily declining due their unique natural history, effects of climate change, and anthropogenic land use change. There is a need for updated information on box turtle space use to inform conservation efforts. This study used VHF radiotelemetry and GPS data loggers to examine box turtle macro- and microhabitat use in North Texas. Box turtle home range sizes averaged 6.6ha (range=0.79-18.08,  $n=23$ ), with males ( $n=9$ ) having larger home ranges than females ( $n=14$ ;  $W=31.5$ ,  $P=0.05$ ). Home range size was best explained by sex and body size. Overall, the percentage of the home range that was categorized as high-quality box turtle habitat was negatively correlated with home range size. At the macrohabitat scale, the most informative variable for box turtle habitat selection was NDVI. Also at the macro-habitat scale, box turtles further selected for deciduous forest more than expected and wetlands less than expected by chance (Fisher's exact test,  $P<0.0001$ ). At the microhabitat scales, box turtles selected for sites with higher percent litter ( $t=-2.16$ ,  $P<0.05$ ) and understory cover ( $t=-5.03$ ,  $P<0.05$ ). Using CART analysis, we partitioned the nested importance

of macro- and microhabitat and identified NDVI as the single most important variable for predicting suitable box turtle habitat. Box turtles were associated with an NDVI >0.38, areas with this NDVI have a 65% probability of use. We postulate that NDVI would be useful model the availability of high-quality box turtle habitat at landscape scales to aid in management and conservation efforts.

#### **9:45: Validation of an Environmental DNA Protocol to Detect Red-eared Slider Turtles (*Trachemys scripta elegans*)**

**Doreen Mata**, Tarleton State University, Stephenville, TX, USA

**Tiffany Nash**, Tarleton State University, Stephenville, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Jeff Brady**, Texas A&M AgriLife Research, Stephenville, TX, USA

**Devin Erxleben**, Texas Parks and Wildlife Department, Stephenville, TX, USA

**Abstract:** Environmental DNA (eDNA) is genomic DNA shed from an organism found in environmental samples such as soil and water. Analysis of eDNA extracted from water sources may provide a relatively quick method to investigate semi-aquatic turtle community and is also extendable to other aquatic vertebrate communities. eDNA methodology requires validation of both field techniques and of an assay in the laboratory. Our objectives were to determine a protocol to evaluate the use of eDNA for red-eared sliders (*Trachemys scripta elegans*) with a known presence through trapping at the McGillivray and Leona McKie Muse Wildlife Management area (798 ha) in Brown County, Texas and to evaluate the decay rate of turtle feces to determine the probability of detection over time using eDNA. We conducted our eDNA study April–September of 2021, and we detected red-eared sliders in 11 of our 70 water samples. We sent 42 of our samples to College Station, Texas for next generation sequencing. This will be able to confirm our positive results and identify positives we missed. Our decay rate study currently suggests that turtle DNA for fecal samples can persist for 2 weeks at 10, 20, and 30 degrees Celsius. We will complete results for the decay rate study by December 2022. Our study will contribute to our understanding of using eDNA of turtles for conservation and management.

#### **10:00: Comparative Calling Phenology of Anurans Across Geographic Gradients**

**Veda Allen**, Stephen F. Austin State University, Austin, TX, USA

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**Daniel Saenz**, USDA Forest Service, Southern Research Station, Nacogdoches, TX, USA

**Tatiana Suarez-Joaqui**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Anurans (frogs and toads) in North America with wide geographic ranges can exhibit latitudinal and geographic variation in their reproductive ecology. To explore patterns in geographic variation of their timing, intensity, and abiotic correlates of their reproduction, we quantified the calling phenology of four widespread species of anurans across three sites. Automated recording units were deployed in 2015 at Attwater Prairie Chicken NWR (ANWR; n = 5 ponds), Powderhorn Ranch (PHR; n = 3 ponds), and Davy Crockett National Forest, DCNF, and SFA Experimental Forest, SFAEF (ETX; n = 6 ponds) to passively record for 6 minutes each night (1min/hr; 2100 h–0200 h). The number of males calling per species were counted (range:

0-5) to calculate the average number of males calling per pond per night. Calling index graphs were made to display mean number of males calling. Logistic regression was used to determine correlations between abiotic factors and the probability of males calling. All species in ANWR and PHR had significantly longer calling windows and intensities compared to ETX. Onset of males calling for these species is triggered by temperature and rainfall, but responses to these correlates vary between sites. Variations in probabilities of males calling may be attributed to habitat and climatic differences present at each site. Overall, anurans with wide ranges exhibit slight differences in their reproductive phenologies.

## **Tools & Technology**

### **9:00: Seed-Spec: A Native Seed Blend Development Tool**

**Brian Hays**, Bamert Seed Company, Muleshoe, TX, USA

**George Peacock**, Colorado State University, Burleson, TX, USA

**Abstract: Abstract:** Establishing native vegetation in any restoration project can be a challenging task. The species and varieties that match the site must be identified and used to help ensure adequate establishment and persistence. Data exists to help project managers identify what species are native to a given area and commercially available, but can be cumbersome, not user friendly, and time consuming. Bamert Seed Company has worked with Colorado State University to develop a web application to easily identify a project area of interest (AOI) and provide information on native species composition for the AOI. The tool will provide a list of commercially available species that correspond to the plants that grow natively in the AOI and intuitively walk the user through developing a site-specific native seed blend. The recommended seeding rate from NRCS will be used to calculate the pounds of pure live seed (PLS) that will be needed for the project. Users will have the ability to adjust the seeding rate based on their establishment objectives and seeding method they will be using. Having this tool will allow the land manager a timely way to determine the best blend for their AOI and get the seed blend to a vendor/seed dealer with knowledge that the species selected will work for their specific site. We will discuss the importance of native plants and the benefits they bring to restoration projects such as adding biodiversity and improving soil health.

### **9:15: White-tailed Deer Surveys with Thermal Drones and Distance Sampling**

**Lori Massey**, CKWRI-TAMUK, Buffalo, TX, USA

**Aaron Foley**, CKWRI-TAMUK, Kingsville, TX, USA

**Jeremy Baumgardt**, CKWRI-TAMUK, Kingsville, TX, USA

**Randy DeYoung**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Zachary Pearson**, CKWRI-TAMUK, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Abstract:** Improvements in thermal imaging and changes in Federal Aviation Administration (FAA) regulations provide new opportunities for drone-based night wildlife surveys. Advances in thermal technology include isotherm capabilities, which highlights a range of temperatures producing higher-contrast imagery. Our goal was to evaluate nighttime surveys of white-tailed

deer (*Odocoileus virginianus*) in South Texas using a drone and a thermal camera programmed to search for specific temperature ranges. Our objectives were 1) determine if nighttime surveys increased detection probabilities relative to daytime surveys, 2) whether isotherm technology improved number of detections relative to traditional technology and 3) determine the effect of season on detection rates. We surveyed a 102-ha game-fenced property during February, April, and July 2022. Distance sampling analyses indicated that detection probability was .63-1.00, slightly higher than the daytime surveys. The isotherm setting did not significantly increase number of detections relative to traditional thermal technology. However, the isotherm allowed us to identify deer in warmer ambient temperatures (24°C) than traditional thermal technology (~20°C). Further, contrast between the deer and the background was noticeably better with isotherm vs traditional thermal. In terms of seasonality, detection rates vary due to changes in swath width most likely from fluctuations in canopy cover. Overall, our results indicate that deer are missed during both daytime and nighttime surveys; incorporating distance sampling methods can improve accuracy of estimated population sizes by correcting for visibility bias. Additionally, matching isotherm settings to ambient temperatures allowed us to survey during temperatures previously thought to be too warm for ideal contrast.

### **9:30: Molecular evolution of the prion protein gene (PRNP) in pronghorn (*Antilocapra americana*)**

**Angela Grogan**, Texas Tech University, Lubbock, TX, USA

**Matthew Buchholz**, Lubbock, TX, USA

**Courtney Ramsey**, Texas Tech University, Lubbock, TX, USA

**Matthew Johnson**, Texas Tech University, Lubbock, TX, USA

**Warren Conway**, Texas Tech University, Shallowater, TX, USA

**Abstract:** Chronic wasting disease (CWD) affects both native and non-native North American cervids and has become a major conservation issue for wildlife managers worldwide. As CWD expands geographically, concerns about management and species susceptibility continue to be part of a larger narrative of wildlife management, conservation, and human health. Given how CWD is transmitted, and the history of spontaneous generation of novel prion diseases, the possibility of interfamilial transmission has become a concern. Historically, pronghorn (*Antilocapra americana*) have been sympatric with multiple susceptible Cervids and occur within the CWD core endemic area of Colorado and Wyoming. Our previous research identified that pronghorn have one additional octapeptide repeat, for a total of 6 repeats, rather than the 5 peptide repeats present in Cervids. Additionally, pronghorn share similarities to Cervid genotypes characterized by codons 95, 96, 116, 132, and 225, which might confer greater susceptibility to CWD in specific Cervid species. Given pronghorn have this additional octapeptide repeat, possess the genotype PrP<sup>ARQ</sup> that affects relative scrapie susceptibility, and are aligned with Cervids for the five key codons for CWD susceptibility, more research into the evolution of *PRNP* in pronghorn is needed to gain a better understanding of susceptibility of pronghorn to CWD and other prion diseases. We are using phylogenetic analyses, including dated trees, to better understand the evolution of *PRNP* in pronghorn.

### **9:45: Using 3D models of forage cover structure to monitor cattle grazed upland gamebird habitat**

**Silverio Avila**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Kye Johnston**, Victoria, TX, USA  
**Lori Massey**, CKWRI-TAMUK, Buffalo, TX, USA  
**J. Alfonso Ortega**, CKWRI-TAMUK, Kingsville, TX, USA  
**Leonard Brennan**, Kingsville, TX, USA  
**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Upland gamebirds require a diverse plant composition and arrangement of woody, herbaceous, and bare ground cover to complete each of their life stages. Monitoring rangelands for these species can often be time-consuming, and sampling becomes subjective due to the heterogeneity of the composition and structure of vegetation. Drone imagery and remote sensing have been used to perform research in rangelands with the purpose to quantify and measure landscape features and estimate forage mass. In this study, we used drones to evaluate forage utilization in a grazing system that is designed to improve Northern bobwhite (*Colinus virginianus*) habitat. We collected imagery on two dates from eight 10 ha plots at an altitude of 50 m in a grazed pasture (4 plots) and a non-grazed pasture (4 plots). We created an orthomosaic, Digital Surface, and Terrain Models (DSM and DTM respectively) using structure-from-motion. We generated a normalized Digital Surface Model (nDSM) to obtain vegetation height. we classified the nDSM vegetation into bare ground (0-5 cm), medium (5-38 cm), and tall (>38 cm). We calculated percent land cover (PLAND), mean patch area (MPA), and patch density (PD). Preliminary results show the spatial configuration of classes is different, grazed pasture has larger amounts of areas < 5 cm, and higher PD and lower MPA of medium-height vegetation. The amount and distribution of vegetation height for bobwhites was improved following grazing. The use of drones has the potential to look at the interspersions of landscape features and vegetation structure to evaluate upland gamebird habitat.

## **Student Poster Abstracts**

### **1. Using Accelerometer Data to Remotely Categorize Wild Animal Behavior**

**Georgina Eccles**, Caesar Kleberg Wildlife Research Institute - Texas A&M University - Kingsville, Kingsville, USA  
**Matti Bradshaw**, Kingsville, TX, USA  
**Jay VonBank**, U.S. Geological Survey, Jamestown, ND, USA  
**Bart Ballard**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Accelerometers (ACC) in tracking devices are a powerful tool in studying movement-based behavior of wild animals. Quantifying fine-scale movements of body orientation in animals fitted with tracking devices allows researchers to investigate important biological and ecological questions without directly observing the animals' behavior. Here, we show the application of ACC and how we will analytically categorize different behavioral states of tracked northern pintails (*Anas acuta*; hereafter pintails). In an ongoing, continental-scale tracking study, we fitted female pintails with 15g GPS/GSM/ACC tracking devices. To quantify behavioral states in these tracked birds, we fitted these same tracking devices to captive pintails and filmed them under controlled settings. We collected 127 hours of video footage of birds exhibiting an

array of behaviors. Our behaviors of interest are walking, swimming, stationary, flight, and three types of foraging behavior, tipping, surface dabbling, and land feeding. These 127 hours of video footage will be used to classify ACC bursts into known behaviors. We will test different machine learning algorithms for behavior classification using training and test data and we will select the algorithm that most successfully classifies behaviors. Classified behaviors using ACC signatures will assist in quantifying daily activity budgets of tracked pintails by matching ACC signatures. We expect these behavioral data to assist in addressing important questions in pintail winter ecology and spring migration ecology.

## **2. Avian Community Responds Positively to Prairie and Emergent Wetland Restoration at Riverby Ranch Mitigation Area in North Texas**

**Tessa Boucher**, University of North Texas, Fort Worth, TX, USA

**James Bednarz**, University of North Texas, Denton, TX, USA

**Andrew Gregory**, DENTON, TX, USA

**Abstract:** Habitat loss and fragmentation due to agricultural development and urbanization are leading causes of biodiversity decline worldwide. Specifically, grassland and wetland bird species depending upon these habitats are seriously declining and are currently considered species of conservation concern. To meet ever-growing population demands, North Texas Municipal Water District has recently constructed the Bois d'Arc reservoir to provide freshwater to 1.7 million North Texans. This is the first major reservoir to be built in Texas in approximately 30 years. The environmental impacts of this reservoir are being mitigated by restoring ~ 6900 ha of degraded range land to native prairie and emergent wetland habitat at Riverby Ranch Mitigation site. The goal of our research was to use the avian community as bioindicators to assess the progress of this restoration. Post-restoration data were collected using point-count sampling locations in restored wetlands and grassland habitats. Similar surveys were conducted on a working ranch and natural prairie as reference sites. Grassland bird density was greater at Riverby Ranch (4.65 birds/ha) compared to either the working ranch (3.11 birds/ha) or natural prairie (1.63 birds/ha). Species Richness was also higher on Riverby Ranch ( $n = 67.5$ , SE  $\pm 3.80$ ) compared the working ranch ( $n = 26.2$ , SE  $\pm 2.79$ ) or the natural prairie ( $n = 14.6$ , SE  $\pm 1.06$ ). Overall, soil enhancements, topographical restoration techniques, and the planting of diverse vegetation at the restoration areas were effective in attracting and supporting a diverse avian community of grassland and wetland specialists.

## **3. Foraging Behavior of American Kestrels (*Falco sparverius*) is Influenced by the Time of Day and External Temperature in North Texas**

**Brooke Poplin**, University of North Texas, Denton, TX, USA

**James Bednarz**, University of North Texas, Denton, TX, USA

**Kelsey Biles**, Houston Audubon Society, Denton, TX, USA

**Abstract:** Recent monitoring has shown that American Kestrel (*Falco sparverius*) populations are declining across North America. Several researchers have suggested these declines are most likely attributed to unfavorable conditions encountered during migration or on kestrel wintering grounds. To understand factors that may influence winter ecology and survival of



American Kestrels, we quantified the foraging success of falcons during the daylight hours in Denton County, North Texas. We did intensive observations on focal kestrels for 30-min time intervals throughout the day and recorded the number of foraging attempts and successful prey captures. Behavioral data were then analyzed using regression analysis. We collected foraging data during 324 observation sessions over three field seasons. Both foraging attempts and successful foraging attempts were significantly positively related to the time of day ( $R^2 = 0.626$  and  $0.684$ , respectively, and  $p < .01$ ). Peak foraging activity occurred at temperatures above  $25^\circ\text{C}$  when kestrels made an average of 4.8 attempts/hr and success peaked at 79% likelihood of capture per foraging attempt. There was a positive linear relationship of foraging attempts and success with temperature ( $R^2 = 0.821$  and  $0.905$ , respectively and  $p$  values of  $< .01$ ). Additionally, kestrels exhibited a peak in foraging activity and success in the month of February, before migration, probably in response to the need to sequester fat in preparation for spring migration. We suggest these positive linear relationships can most likely be attributed to the increasing activity in arthropods as the temperature gets warmer.

#### **4. Connecting the Dots: Documenting the Full Annual Period Movement Patterns of Migrant American Kestrels.**

**Madeleine Kaleta**, University of North Texas, Denton, TX, USA

**Kelsey Biles**, Houston Audubon Society, Denton, TX, USA

**James Bednarz**, University of North Texas, Denton, TX, USA

**Andrew Gregory**, Denton, TX, USA

**Abstract:** The American Kestrel (*Falco sparverius*) is a widely distributed raptor across North America. Despite their abundance, populations have declined by over 50% since the 1960s. Reasons for the decline are mostly unknown, but data from nest box studies indicate relatively high reproductive success, suggesting that the cause of the decline may be related to survival overwinter and during migration. To understand the full annual cycle of American Kestrels and identify potential areas of risk or mortality, we deployed Lotek PinPoint 40 GPS loggers (trackers) on 20 kestrels wintering throughout north Texas in 2020-21. GPS fixes were recorded every 5 days during expected stationary periods, and every 3 days during migratory periods. Seven individuals (35%) returned the following season (2021-22) with trackers intact, of which, data were remotely downloaded from two individuals. One adult male migrated 1,083 km to northern Nebraska and one juvenile female migrated 878 km to northern Kansas. Utilizing a 95% minimum convex polygon method, the male had a winter home range of 60.8 ha and a summer home range of 92.2 ha. The female had a smaller home range of 34.3 ha for the winter and 37.8 ha in the summer. This is one of the first documented full-annual-cycle migration routes and nesting locations of wintering migratory American Kestrels. By examining kestrel movement ecology and annual survivorship, we will begin to understand factors influencing risk and to identify habitats and locations requiring conservation protection to stabilize the population trajectory of the American Kestrel.

#### **5. Anuran Communities and their Calling Phenologies: Using Acoustic Data to Establish Species Presence**

**Teresa Kenny**, Texas A&M University, Bryan, TX, USA

**Abstract:** Frogs are cryptic animals that are sensitive to abiotic changes in their environment. The calling phenologies of frogs can be useful tools to determine the species' detection probability, based on characteristic features of their vocalizations. I monitored ten species of anurans for one year in Colorado County, Texas with automatic recording devices. My project focuses on the environmental factors that influence the calling phenology of the Cricket frog (*Acris blanchardi*), Green treefrog (*Hyla cinerea*), Striped chorus frog (*Pseudacris fouquettei*), Eastern narrowmouth toad (*Gastrophryne carolinensis*), Southern leopard frog (*Lithobates sphenoccephalus*), Crawfish frog (*Lithobates areolatus*), Gulf coast toad (*Incilius nebulifer*), American bullfrog (*Lithobates catesbeianus*), Green frog (*Lithobates clamitans*), and Squirrel treefrog (*Hyla squirella*) in 2015. I modeled the calling behavior of each frog individually. My models show that air temperature and rain accumulated after five or ten days are significant factors that influence frog calling behavior. Most frogs in my study called from the months of March to July, when the temperature was between 24 °C and 30 °C. Additionally, rain accumulation above ten millimeters over ten days generally predicted a higher probability of calling behavior. Understanding the phenology of amphibians is vital for identifying and supporting their populations.

## **6. Influence of traffic volume on the variation in the mammal community composition within the road effect zone**

**Thomas Yamashita**, CKWRI - TAMUK, Kingsville, TX, USA

**David Wester**, Kingsville, TX, USA

**Zachary Wardle**, CKWRI - TAMUK, Kingsville, TX, USA

**Daniel Scognamillo**, Kingsville, TX, USA

**Landon Schofield**, East Foundation, Kingsville, TX, USA

**John Young**, Texas Department Transportation, Austin, TX, USA

**Jason Lombardi**, Kingsville, TX, USA

**Abstract:** Disturbance from vehicle noise and human activity extends into the nearby habitat, creating a road effect zone characterized by changes in the wildlife community structure and species' behavior. This can impact conservation efforts along roads, such as wildlife crossing construction. To ensure that conservation efforts are effective, we must understand how vehicle traffic impacts mammals living around roads. We set up camera traps along a low-traffic highway on the East Foundation's El Sauz Ranch in Willacy County and along a high-traffic highway on a private ranch located in Kenedy County in March 2022. We set up cameras using a randomized block design along seven transects set perpendicular to the highway. Seven cameras were set up in each transect, at 200 m intervals, starting 50 m from the highway. We assessed how traffic volume and distance from highway affected mammal diversity, richness, and community composition. We have detected ocelot, bobcat, coyote, badger, raccoon, nilgai, white-tailed deer, Virginia opossum, eastern cottontail, javelina, and feral hog on camera traps. Species richness and diversity were greater further from roads, especially on the high-volume highway. Our study will provide information on how carnivores, ungulates, and other mammals use these road effect zones and how vehicle traffic impacts use. By comparing a low-traffic road to a high-traffic road, we will provide key information to landowners and the Texas Department of Transportation about how traffic volume could impact management practices of working lands around highways and future highway mitigation efforts for ocelots and other mammals.

## **7. An Evaluation Of Small Mammal Diversity, Population Demography, Occupancy, And Damage Among Three Row Crop Irrigation Systems On The Southern High Plains**

**Annie Braack**, The Wildlife Society at Texas Tech, Lubbock, TX, USA

**Blake Grisham**, Texas Tech University, Lubbock, TX, USA

**Abstract:** Over recent decades, row crop irrigation systems have become increasingly popular on the semi-arid Southern High Plains (SHP). However, no information exists pertaining to how these systems impact small mammal population demographics. Also, no data exists on frequency and intensity of small mammal damage to irrigation infrastructure. The goal of our study was to understand small mammal population demography and damage to three types of irrigation systems on the SHP. Our first objective was to assess small mammal population demographics among three types of irrigation: 1) dryland (control), 2) center pivot, and 3) subsurface drip. Our second objective was to assess if small mammals demonstrated any selection preference among different types of irrigation tubing. Both objectives were also conducted within three crop growth stages: 1) early, 2) vegetative, and 3) reproductive growth stages of corn and sorghum crops. We captured, marked, and released small mammals using H.B. Sherman traps on 36 study sites, May-August 2021 – 2022 for our first objective. We built exclosures that included different types of gnawing materials and used camera-traps to assess if small mammals selected or avoided materials for gnawing. Preliminary results indicate that small mammal abundance was significantly higher in both types of irrigated fields compared to the dryland control and gnawing materials were chosen at random.

## **8. Fire and Mice: The Effects of Prescribed Fire on Rodent Communities**

**Margaret Sinner**, Texas A&M - College Station, Cypress, TX, USA

**Abstract:** Prescribed fire is a common method for managing rangelands for livestock and wildlife. In areas like the coastal sand plains ecoregion of Texas, prescribed fire is being used to remove mature gulf cordgrass (*Spartina spartinae*) and create early successional conditions that provide greater nutritional value for livestock. The long-term benefits of these fires for large herbivores have been shown, but the effects on small mammals that use this vegetation for food and shelter are largely understudied. Small mammal species (i.e., mouse and rat species) can be used as indicators for ecosystem health, functioning and overall biodiversity. To understand the response and recovery of these species to prescribed fire, a long-term monitoring study was conducted on the East Foundation's El Sauz Ranch. From 2019 to 2022, we monitored unburned control and treatment areas; treatment areas were burned at varying intervals during winter (dormant season). We used Sherman live traps in 200 × 200 m trapping grids to assess changes in abundance and species richness. We will use capture-mark-recapture methods to estimate abundance where all individuals are uniquely marked with passive integrated transponder (PIT) tags. Over 4 years, 8,050 unique individuals were caught, with 10 different species identified. Preliminary results show that species richness ranged from 4 to 8 across trapping grids, and that small mammal communities recover from prescribed fire within 2–3 years. These data will help

managers assess the health of rangeland ecosystems and determine a prescribed fire schedule that can benefit livestock and wildlife.

## **9. Potential Effects of Coprophagous Behavior in Texas Tortoises**

**Saren Perales**, CKWRI / TAMUK, San Antonio, TX, USA

**Christin Moeller**, Texas A&M University- Kingsville, Kingsville, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Sandra Rideout-Hanzak**, Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA

**David Wester**, Kingsville, TX, USA

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Abstract:** Coprophagy is a known behavior of Texas tortoises (*Gopherus berlandieri*); however, the extent of this behavior has not been documented. It is largely unknown whether Texas tortoises display preferences for their own scat, other tortoises' scat, or even the scat of other species. Therefore, we studied this behavior by placing 10 Texas tortoises individually in a 10 m<sup>2</sup> pen, and providing 20-g of various randomized scat types in a cafeteria-style experiment. Scat choice included the tortoises' own scat, which was collected during the days prior to the experiment, scat from other Texas tortoises, and scat from raccoons (*Procyon lotor*), coyotes (*Canis latrans*), and nilgai (*Boselaphus tragocamelus*). These species were selected because they were the most prevalent scat on the landscape associated with Texas tortoises. Quantity of scat consumed was measured every 12-hours during a 48-hr period. Similar quantity of each scat was placed in containers that were exposed to the environment and used as controls for potential shrink:swell due to desiccation from heat or swelling from humidity. Seven of the 10 tortoises ate at least one scat type and one tortoise consumed some of each scat type. Texas tortoises displayed individual preference for scat type but did not display a generalized preference for scat type. Five tortoises consumed raccoon scat, which creates a potential mortality and risk factors associated with *Baylisascariasis procyonis* parasitic infection.

## **10. Habitat Preferences of Texas Tortoises in Southern Texas**

**Christin Moeller**, Texas A&M University- Kingsville, Kingsville, TX, USA

**Saren Perales**, CKWRI / TAMUK, San Antonio, TX, USA

**Wraith Rodriguez**, CKWRI / TAMUK, Kingsville, TX, USA

**Juan Elissetche**, Caesar Kleberg Wildlife Research Institute, Edcouch, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Sandra Rideout-Hanzak**, Kingsville, TX, USA

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Jason Singhurst**, TPWD, Austin, TX, USA

**Abstract:** Texas tortoise (*Gopherus berlandieri*) populations were once distributed throughout southern Texas with densities as high as 16 tortoises/ha. More recent studies have estimated densities at 0.26 tortoise/ha, and their distribution has become sporadic throughout their historic range. Populations of Texas tortoises are thought to be restricted to thorn scrub and coastal prairie habitats. Older studies (~50 years) found Texas tortoises in loma habitat; however, the

importance of such habitat to tortoises remains unclear. Therefore, we conducted a habitat availability and use analysis for Texas tortoises in southern Texas. We collected 149 tortoises within a 270-ha area. Of the 8 habitats identified within our study area, Texas tortoises only used the grassland loma in greater proportion than available, with 120 tortoises (80.5%) located within that habitat. Tortoises used evergreen loma and salt prairie habitats in proportion to their availability, and wetlands, open water, coastal flats, dredge spoils, and thorn scrub habitats much less than those habitats' availability. Density of Texas tortoises within the grassland loma was 3.9 tortoises/ha, which is a 15-fold increase from the 0.26 tortoise/ha estimate. Our results suggest that thorn scrub is not a preferred habitat by Texas tortoises and loma habitats should be protected as critical habitat for this state-threatened reptile.

## **11. Is Agriculture Harmful to Spot-Tailed Earless Lizards?**

**Preston Richardson**, CKWRI / TAMUK, Kingsville, TX, USA

**Evan Rangel**, Texas A&M University Kingsville, Kingsville, TX, USA

**Jacob Reyes**, CKWRI / TAMUK, Kingsville, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Abstract:** Spot-tailed earless lizards (STEL) are rare species whose population numbers and distribution have drastically declined. One hypothesis for their decline includes agricultural practices. Our objectives were to determine if agriculture practices resulted in direct or indirect negative impacts. We built a 1-ha enclosure to simulate a crop field. We placed 20 STEL outfitted with VHF transmitters to monitor their movements. We disked and mowed the enclosure. In both cases STEL that were above ground fled the approaching agricultural equipment, while underground STEL remained underground and the equipment would pass over them. Mortality or injury to STEL did not occur. We then placed 4 groups of 16 STEL, of which half served in the treatment and control groups, respectively, into separate 38-L aquaria. Round-up® (herbicide) and Besiege® (pesticide) were either sprayed directly on STEL within aquaria or STEL removed, applied to substrate, and STEL returned after the spray dried. STEL snout-vent length and weight were measured at day 0 and 14. Mortality did not differ between treatment and control STEL. Growth was unaffected by Round-up®; however, weight gain was less for both juvenile and adult STEL by direct and indirect spray methods. Besiege® affected juvenile and adult STEL growth and weight gain by both spray methods. Lizards were monitored an additional 30 days where growth and weight gain between the treatment and control STEL were similar again. Therefore, it appears that agriculture practices have a mild, indirect negative impact on STEL.

## **12. Loggerhead Shrike Predation of Spot-Tailed Earless Lizards**

**Evan Rangel**, Texas A&M University Kingsville, Kingsville, TX, USA

**Jacob Reyes**, CKWRI / TAMUK, Kingsville, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Ruby Ayala**, Laredo, TX, USA

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Abstract:** Spot-tailed earless lizards (STEL; *Holbrookia lacerata* (Plateau STEL), and *H. subcaudalis* (Tamaulipan STEL)) were once distributed throughout central and southern Texas; however, today, their distribution is patchy across only portions of their previous range. Theories as to why their distributions has shrunk include brush and invasive grass encroachment, agricultural practices, and predation; however, few publications document predation of STEL. We built a 1-ha enclosure in southern Texas and outfitted 30 STEL with VHF transmitters and followed their movements and mortalities from August – October 2022. During this time, 25 of 30 STEL (83%) were depredated by loggerhead shrikes (*Lanius ludovicianus*). We observed shrikes in the area and all 25 STEL were found impaled on mesquite (*Prosopis glandulosa*) thorns, a known behavior of shrikes. Remaining populations of STEL are found primarily in agricultural fields that lack thorn trees and barbed-wire fences by which shrikes could utilize for their unique predation tactic. More research is needed to determine the extent to which shrikes could be significant factors in the distributional decline of STEL.

### **13. Noisescape along Wildlife Road Mortality Mitigation Areas in Southern Texas**

**Anna Mehner**, University of Texas Rio Grande Valley, Port Isabel, TX, USA

**John Young**, TEXas Department Transportation, Austin, TX, USA

**Richard Kline**, UTRGV, Brownsville, TX, USA

**Abstract:** Continuing urban and human expansion contributes to destruction, fragmentation, and degradation of wildlife habitat. Increased noise from this expansion can have negative influences on wildlife, including increased fitness costs, decreased health, and population fragmentation. Decibels can be weighted for different frequency responses, A-weighting (dBA) or C-weighting (dBC), or as Z-weighting (dBZ), which is linear or unweighted. In Cameron County, the Texas Department of Transportation constructed nine wildlife crossing structures (WCS) with non-continuous exclusion fencing on Farm-to-Market (FM) 106 and five WCS and 18 wildlife guards with continuous exclusion fencing on State Highway (SH) 100, to mitigate endangered ocelot (*Leopardus pardalis*) road mortalities. Our objectives were to: 1) describe the noise levels along each road and at each WCS; 2) describe the noise levels in the habitat 1 km out from each road; and 3) understand if wildlife use of WCS would be best predicted by noise measurements in dBZ, dBA, and/or dBC. WCS were monitored with camera trap arrays that consisted of four cameras on each side. Noise levels were monitored with NSRT\_mk3 sound level meters. A two-factor analysis of variance was used to compare average noise levels between WCS. Logistic regressions were used to compare noise levels at each decibel weighting in relation to complete crossings through the WCS of target species. This study will help establish a baseline noisescape for each highway and contribute to the understanding of how noise propagates from each road in different vegetation types.

### **14. Stopover Habitat Associations of an Imperiled Migratory Bird in The Central Flyway**

**Andres Rosales**, Texas A&M University Kingsville, 78363, TX, USA

**Tara Rodkey**, Texas A&M University Kingsville, Kingsville, TX, USA

**Richard Lancot**, U.S. Fish and Wildlife Service, Anchorage, AK, USA

**Lee Tibbitts**, U.S. Geological Service, Anchorage, AK, USA

**Bart Ballard**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Migratory shorebirds in North America have experienced significant declines in the past 50 years. One-third of shorebird species are considered “tipping point” species that show continuous accelerated declines, which could lead to a 50% loss in the next 50 years. As a long-distance migrant who depend on grasslands throughout most of its lifecycle, the Buff-breasted Sandpiper is a species of global conservation concern and has been identified as a flagship species by the Arctic Migratory Bird Initiative and the Midcontinent Shorebird Conservation Initiative. To develop more effective conservation strategies for this species, a more holistic understanding of their habitat requirements across their migratory pathway is critical. Habitat use by these cryptic birds is currently based on opportunistic sightings of birds in short stature grasslands or early growth agricultural areas, where they are more easily seen. We synthesized data on vegetation height, crop type, and general habitat type collected from locations visited by satellite-tracked birds within the Central Flyway of the Americas (7 regions across 6 countries). Detecting vegetation height in grasslands is, as of yet, still unfeasible through remote sensing, therefore compilation of bird-driven (not observer driven) ground observations is invaluable to build a better understanding of the habitat requirements of this imperiled species. By summarizing habitat use across their migratory flightpath, we aim to identify patterns among sites, which can then be used to guide future conservation and management for the species.

## **15. How Does Variance in Natural Factors Alter the Hunting Patterns of Mississippi Kites in Urban Spaces?**

**Audrey Crawford**, Texas Tech University, Lubbock, TX, USA

**Conner Green**, Texas Tech University, Lubbock, TX, USA

**Billy Huynh**, Texas Tech University, Lubbock, TX, USA

**Brent Bibles**, Unity College, New Gloucester, ME, USA

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Abstract:** The Mississippi Kite (*Ictinia mississippiensis*) has become a common breeding season resident of urban areas across the southern Great Plains. The species can be found occupying urban parks, school campuses, and residential areas. Several studies have examined aspects of Mississippi kite ecology, such as diet, breeding ecology, and nest sites selection. However, their daily activity budget remains poorly understood. To gain a better understanding of kite behavior, we constructed a behavioral ethogram and recorded kite activities over 10-min observation periods. During each observation period, we recorded activities for a randomly selected kite. Primary recorded behaviors were ‘perched’ and ‘flight’. We recorded locations (e.g., tree, power line) and activities (e.g., stationary, preen) of perched kites as secondary behaviors. We estimated heights of kites in flight categorically as ‘low’ ( $\leq 25$  m), ‘high’ (25 – 75 m), and ‘soar’ ( $> 75$  m). We conducted 175 observation periods, all in parks in Lubbock, Texas, from 26 June to 24 August 2022. During our observations, we recorded kites as perched 13.0% of the time and in flight 87.0% of the time. The majority of kite flights were at soaring heights (48.1%), with low (25.0%) and high (26.9%) occurring in similar proportions. We are currently conducting regression analysis to identify any relationships between flight heights and time of day, temperature, humidity, wind speed, and cloud cover.

## **16. Body Weight of Small Vertebrates Across a Gradient of Plant Invasion and Habitat Change**

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Mason Helm**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Andrew Mullaney**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Duston Duffie**, CKWRI / TAMUK, Kingsville, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Invasive and non-native vegetation can result in reduced ecosystem function presumably due to the loss of native plant diversity. Historically, open rangelands of southern Texas have been invaded by non-native grasses and native, woody shrubs. Small vertebrates play vital roles in ecosystems as primary and secondary consumers; however, little is known of their response to invasive vegetation. To evaluate the effects of invasive vegetation on small vertebrates, we surveyed small mammal and herpetofauna communities at the Welder Wildlife Refuge in San Patricio County, Texas. In December 2019, we established six plots: two consisted of native vegetation, two consisted of invasive vegetation, and two intermediate plots. As of August 2023, we recorded 419 captures of 30 reptile species and 2,331 captures of 11 small mammal species. To determine the potential effects of invasive vegetation on these communities, we compared body weight of each species between each plot. For our three small mammal species, responses differed by species but weights were generally heaviest in invaded and intermediate plots. For our five most commonly captured reptile species *Crotalus atrox* was significantly heavier in the invaded plots. The other species showed no significant responses to plot type (i.e., level of invasion). Invaded and intermediate plots consisted of woody shrubs that may provide more cover and additional food resources for small mammals resulting in heavier individuals. Similarly, *C. atrox* prey on small mammals, so larger prey likely results in larger individuals. Thus, these plant communities can be advantageous to certain small vertebrates.

## **17. Whitebrush (*Aloysia gratissima*) Ecology and Control Options for Management**

**Katie Pennartz**, Texas A&M University - Kingsville, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Megan Clayton**, Texas A&M AgriLife Extension Service, Uvalde, TX, USA

**Anthony Falk**, Texas A&M University - Kingsville, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Abstract:** Management of shrub populations has been a common practice on South Texas rangelands since the early 1800's. Increases in woody plant presence in historically herbaceous communities alters the structure and function of the landscape resulting in a loss of ecosystem services. Decreases in forage production and game habitat are frequent consequences of shrub encroachment that influence landowners to implement management strategies. Prior knowledge of ecological site and species characteristics can assist in designing targeted strategies with long term, high control outcomes. Whitebrush (*Aloysia gratissima*) is a native shrub in South Texas that exhibits locally invasive behavior, forming monoculture stands that often require intensive management. Our goal was to create a site and species-specific management strategy for



whitebrush in South Texas by 1) trialing common and newly released chemical control methods and 2) observing the reproductive ecology. We conducted an efficacy trial of a recently released herbicide that resulted in a high level of control regardless of season of application. In addition, four widely used herbicides were applied during the dormant season with increased surfactant rates to evaluate efficacy of nontraditional seasonal applications. While surfactant rate was not found to influence mortality, herbicide and application rate were highly significant ( $p = 1.224 \times 10^{-4}$ ,  $3.267 \times 10^{-14}$ ). Seed ecology characteristics, evaluated through laboratory and greenhouse experiments to further our understanding of the lifetime of management effects, indicated low to moderate levels of seed viability (6-49%) and low germination (4-24%). Results from this study will help determine an effective treatment standard to benefit land managers of South Texas rangelands.

## **18. Weather Effects on Herpetofauna Detection on a South Texas Rangeland**

**Duston Duffie**, CKWRI / TAMUK, Kingsville, TX, USA

**Andrew Mullaney**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Cord Eversole**, Texas A&M International University, Laredo, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Worldwide, herpetofaunal species are declining due to factors such as habitat conversion, disease, and climate change. Monitoring herpetofauna populations can be difficult due to the cryptic nature of many species and effort associated with long-term monitoring programs. To maximize surveying efforts, researchers need to understand both where and when to conduct surveys. South Texas has a semiarid climate that experiences frequent drought cycles, which can alter available resources and habitat conditions. In May 2020, we began monitoring herpetofauna communities at the Welder Wildlife Refuge in San Patricio County using drift fence arrays at six plots. These plots were chosen as part of a companion study evaluating the effects of invasive vegetation on herpetofaunal communities. As of August 2022, we recorded 6310 captures of 11 amphibian species and 419 captures of 30 reptile species. We evaluated effects of temperature and rainfall on detection probability for 6 anuran and 5 snake species. For the anuran species, detection probability increased with an increase in rainfall and a decrease in maximum temperature for most species. For the snake species, effects of both rainfall and temperature differed by species. Detection probability increased with a decrease in rainfall and maximum temperature for 3 species, while no differences were observed in detection probability for the remaining snake species. Our results provide researchers more information about the conditions that provide the greatest probability of detection for herpetofauna species. We plan to continue to survey these communities in 2023 to further evaluate effects of weather and vegetation on herpetofauna.

## **19. Mating mystery: A closer look at the breeding ecology of the Painted Bunting**

**Alejandra Gage**, University of North Texas, Denton, TX, USA

**James Bednarz**, University of North Texas, Denton, TX, USA

**Andrew Gregory**, Denton, TX, USA

**Abstract:** The Painted Bunting (*Passerina ciris*) is considered a “species of conservation concern” by the US Fish and Wildlife Service due to persistent population declines. The mating system of the species remains poorly understood and is described as both monogamous and polygynous with anecdotal evidence as support. Based on the limited amount of parental care provided by the male of the species and previously collected female home range data, we suspect female Painted Buntings are mating with more than one male. The aim of this study is to accurately define the mating system of Painted Buntings in North Texas. Using whole genome sequencing via barcoding, we will identify 30-50 single nucleotide polymorphisms (SNPs) for use in a genetic paternity analysis. During the 2022 season, we collected data on 6 nests and genetic samples were collected from 17 nestlings and 2 nonviable eggs. Since 2017, we have collected blood samples from 464 adult and juvenile buntings in our study area. We expect that most broods will be fathered by more than one male. When developing future conservation strategies for this species, it is essential to understand the role that multiple paternity may play on population dynamics, natural evolutionary processes, and the effective population size of Painted Buntings.

## **20. Development of an Improved Survey Method for the Texas Kangaroo Rat (*Dipodomys Elator*)**

**Julien Washington**, Texas Tech, Lubbock, TX, USA

**Derek Malone**, Texas Tech University, Lubbock, TX, USA

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Russell Martin**, Texas Parks and Wildlife Department, Canyon, TX, USA

**Abstract:** The Texas kangaroo rat (*Dipodomys elator*) currently inhabits five counties in Texas. Habitat fragmentation and changing vegetation patterns are believed to be responsible for the reduction of the population such that it is currently a state threatened species under petition for federal protection. The species rarity and nocturnal activity periods result in them being difficult to survey, monitor, and study. We are testing different approaches to develop a repeatable and reliable survey method for these elusive animals. Our experimental approach consists of employing and comparing a variety of survey methods along ten 1.6 km transects located at the Matador Wildlife Management Area. We are using the substantively more abundant Ord’s kangaroo rat (*D. ordii*) as a proxy for Texas kangaroo rats, as the two species are very similar, with the main differences being slight pelage differences and choices of soil types. Our survey trials consist of walking spotlight transects, driving spotlight transects, walking thermal scope transects, driving thermal scope transects, and burrow surveys. We are assessing methods on basis of detection probabilities with covariates of moon phase, time, temperature, and cloud cover. Our results should provide guidance to optimize survey methods for Texas kangaroo rats, and serve to facilitate improved surveys and monitoring of this elusive species.

## **21. Assessing the Impacts of Waterfowl Habitat Management in the Western Gulf Coast Region**

**Javier Segovia**, Texas A&M University of Kingsville, Kingsville, TX, USA

**Georgina Eccles**, Caesar Kleberg Wildlife Research Institute - Texas A&M University -

Kingsville, Kingsville, USA

**Jordan Giese**, Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, Kingsville, TX, USA

**Daniel Collins**, U.S. Fish and Wildlife Service, Albuquerque, NM, USA

**Kevin Kraai**, Texas Parks & Wildlife Department, Canyon, TX, USA

**Bart Ballard**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** The Texas Coast is one of the most important wintering regions for many waterfowl species, offering high-energy foraging habitat that is crucial during late winter, particularly for migratory species. Since the 1990s, the Gulf Coast Joint Venture (GCJV) has worked to provide foraging habitat for waterfowl species under the Texas Prairie Wetlands Project (TPWP).

However, there is no assessment on whether TPWP management is benefitting waterfowl and meeting their objectives in providing important foraging habitat. The aim of this research is to investigate the influence of GCJV habitat management on female northern pintail (*Anas acuta*; hereafter pintail) during spring migration. The pintail is an excellent model for this study given they demonstrate high winter site fidelity and is a species of concern for management. The objectives are to link the use of the TPWP program sites during late winter to spring migration performance. Female pintails were captured in late winter throughout the Texas Mid-Coast. Females were fitted with Ornitela 15g GPS/GSM transmitters. We will calculate the proportional use of TPWP enrolled sites and link this to (1) date of spring migration departure, (2) number of spring migration stopovers, and (3) date of arrival on breeding areas. We will use a Generalized Linear Mixed Model to determine the effect of proportion of time on TPWP sites on the three spring migration metrics. We expect to provide insight into the relative contribution of the TPWP sites to pintail late winter ecology and spring migratory performance.

## **22. Spatial and temporal variation in mammal communities of a unique forest ecosystem in northeast Texas.**

**Marc Moss**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Connor Adams**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Jessica Glasscock**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Rising above the pine forests of the Gulf Coastal plain on iron ore mountain tops, upland deciduous forests were once a common cover type in northeast Texas. However, unsustainable logging practices in the early 1900's, along with changing land-use practices (i.e., fire suppression, monocultural silviculture) have led to a decline of these unique uplands. Because habitat features within these uplands are scarce upon the landscape, habitat features therein could provide important resources for wildlife. Here, we investigate the spatiotemporal activity of mammal communities across cover types in northeast Texas. Campak 1080P trail cameras (n = 18) were deployed across three cover types (i.e., upland deciduous forest, mixed slope forest, bottomland hardwood forest) from June 2022 to January 2023 at Couch Mountain Ranch in Camp County, TX. We also collected habitat data describing forest structure at each camera location. Based on these data, we determined detection probabilities for all recorded taxa and compared activity across cover types. We observed a general pattern in which increased detections of feral hogs (*Sus scrofa*) corresponded with decreased detections of white-tailed deer (*Odocoileus virginianus*) and other mesocarnivores. Furthermore, we observed recognizable

shifts in activity among the mesocarnivore guilds. This study contributes to our knowledge of mammal communities in an understudied and unique ecosystem in northeast Texas. Given the drastic alterations that have occurred within upland deciduous forest of the region, wildlife managers will benefit from future studies that focus on understanding how communities may respond to varied forms of land-use and/or forest management.

### **23. Vegetation Selection and Activity Patterns by South Texas Bats**

**Kylie Perez**, Texas A&M University, Bryan, TX, USA

**Abstract:** Bats have a greater diversity of behavior than any other mammalian order. Therefore, understanding activity patterns and vegetation selection is imperative in the success of maintaining bat populations in south Texas. In more recent studies, conducted on the San Antonio Viejo Ranch (SAV) belonging to the East Foundation, activity patterns for four summer resident bats was conducted - Eastern Red Bat (*Lasirius borealis*), Cave Myotis (*Myotis velifer*), Evening Bat (*Nycticeius humeralis*), and Brazilian Free-tailed Bat (*Tadarida brasiliensis*). These results showed peak nightly activity hours for these bats. For all species included in the study, total bat activity peaked at 02:00, with a secondary peak occurring between 05:00 and 06:00. My results conducted at the El Sauz Ranch, roughly 100 miles southeast of SAV, concurred with this study with a few differences. It is crucial to determine how bats respond to changes in vegetation type and species composition given different land uses. From this, we can understand and provide a baseline for activity patterns and add the information of vegetation selection for these south Texas bats to prepare for future disturbances. This lack of information has led me to research effective management strategies needed to protect these vital species in a more comprehensive and cohesive manner than previously understood. This discussion will also cover a review of current literature and gaps in knowledge.

### **24. Applying eDNA Analysis to Identify Winter Food Habits of American Kestrels in the South Plains of Texas**

**Sarah Fonville**, Texas Tech University, Lubbock, TX, USA

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Abstract:** The American kestrel (*Falco sparverius*) is generalist predator that inhabits open spaces across most of North and South America. Despite their abundance, kestrel populations are in decline across their ranges overall. Previous food habit studies have been conducted during the spring and breeding season, but few studies describe kestrel food habits in the winter. Several studies suggest kestrels prey heavily on invertebrates or reptiles, but these ectothermic animals are inactive and likely unavailable in cold winter months. Sampling for residual eDNA from prey on kestrel beaks could lead to a more complete understanding of food habits for this species, and its role as a predator in ecological communities. During winter of 2021-2022, we captured 49 American kestrels in the Southern High Plains and collected eDNA samples by swabbing their beaks for residual eDNA. DNA was extracted from these samples in collaboration with project collaborators at UC Davis in California. The sequencing process is still ongoing, and we plan to collect another 50 samples in winter 2022-2023. We will assess winter food habits to identify

prey species composition and possible prey partitioning between the sexes of this sexual-size dimorphic species.

## **25. Microclimate Characteristics of White-tailed Hawk Nests in South Texas**

**Madeleine Barham**, Texas A&M University, Flower Mound, TX, USA

**Danielle Walkup**, Texas A&M University, Bryan, TX, USA

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Abstract:** The white-tailed hawk (*Geranoaetus albicaudatus*) is listed as state threatened in Texas, where they breed in open areas throughout the coastal bend region of Texas. Previous research has indicated that anthropogenic activities may have a negative impact on white-tailed hawk breeding activities, and investigating aspects of their breeding ecology will help further management for this threatened species. To date, there is no information available regarding the microclimate of white-tailed hawk nests during the breeding season. Environmental conditions are important drivers for many species' ecological characteristics. Although adult Accipitriformes can respond to fluctuating conditions by changing their activity patterns, nestlings have very limited abilities to do so. However, the microclimate of the nest, as well as parental behavior, can help ameliorate the influences of extreme environmental conditions. A component of our research efforts is to assess the microclimate of white-tailed hawk nests post-hatch by use of data loggers that collect temperature and humidity data. Temperature data was also collected in combination with nest cameras used to monitor white-tailed hawk nests in south Texas. Results from the assessment of microclimate data and environmental conditions from 4 white-tailed hawk nesting pairs will be presented.

## **26. Parental Budgets and Feeding Behavior of Nestling White-tailed Hawks**

**Gavin Moon**, West Texas A&M University, Canyon, TX, USA

**Danielle Walkup**, Texas A&M University, Bryan, TX, USA

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Madeleine Barham**, Texas A&M University, Flower Mound, TX, USA

**Abstract:** Members of the Accipitriformes usually have sexually divided parental roles in which the female contributes more to nestling care and nest defense whereas the male provides the majority of food and defends the larger territory. The white-tailed hawk (*Geranoaetus albicaudatus*) is one of North America's least studied birds of prey, and little quantitative information is available regarding parental care and feeding behavior during the breeding season, although we hypothesize white-tailed hawks divide parental roles similar to other Accipitriformes. One goal of this study is to describe the sex-specific differences or similarities of nesting white-tailed hawks in context of behavioral budgets related to feeding of nestlings. To determine the behavioral budgets, we placed trail cameras at 12 white-tailed hawk nests containing hatchlings throughout south Texas properties in spring 2021. Cameras were set to take 60 seconds of video whenever they were triggered by movement, with a 60-second pause between triggers. Cameras were active 24 hours per day and ran from 14 April to 3 July 2021.

We are assessing relationships of nestling age with adult attendance and feeding frequency, and contrasting nest attendance by male and female members of pairs. Analyses are ongoing and results will be presented from 4 nesting pairs of white-tailed hawks.

## **27. Tricolored Bats in Texas: Acoustic Monitoring to Inform Conservation in the Era of White-nose Syndrome**

**Ember Bower**, Texas State University, San Marcos, TX, USA

**Brittney Oliver**, Texas State University, Austin, TX, USA

**Sarah Fritts**, Texas State University, San Marcos, TX, USA

**Sara Weaver**, Bowman Consulting, San Marcos, TX, USA

**Abstract:** Cave-roosting bat species have suffered significant population losses across the U.S. from white-nose syndrome (WNS), a deadly disease caused by the fungus *Pseudogymnoascus destructans* that thrives in cave microclimates. The tricolored bat (*Perimyotis subflavus*) has experienced serious population-level declines due to WNS in portions of their range. While fatalities of *P. subflavus* from WNS have not been documented to date in Texas, this species is likely to be protected across the U.S. as it was recommended for listing as Endangered by the U.S. Fish and Wildlife Service in September 2022. Understanding of the Texas population of *P. subflavus* is limited, and information about distribution, seasonal population movement and fluctuation, and habitat selection is needed to inform management practices. Our objective is to assess the influence of landscape variables on the occupancy probability of *P. subflavus* across the state of Texas using stationary acoustic monitoring at 96 sites continuously from 2020-2023. Seasonal data will be assessed from four, 4-day periods per year and we will use habitat type (barren, water, cultivated, developed, forest, grassland) at three spatial scales and karst proximity as covariates. Preliminary results from summer 2021 from 82 detectors indicate that *P. subflavus* occupancy probability increases from 53% to 93% as longitude increases across Texas, with a naïve occupancy of 63% throughout the state. Elevation and latitude were not significant. We will incorporate landscape data into future dynamic and multi-species occupancy models to further examine the critical regions and habitat needed to manage and conserve species at risk from

## **28. Native Grassland Restoration in the Edwards Plateau Ecological Region of Texas**

**Molly O'Brien**, TAMUK, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**David Wester**, Kingsville, TX, USA

**Anthony Falk**, Texas A&M University - Kingsville, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Sandra Rideout-Hanzak**, Kingsville, TX, USA

**Abstract:** Developing successful restoration techniques for native plant communities in disturbed landscapes is critical for conservation of rapidly-changing biomes globally. Restoring native grasslands is desired because grasslands have experienced great declines in their historic distribution worldwide. Although region-specific restoration techniques exist throughout the North American Great Plains, there has been limited research in the Edwards Plateau Ecological

Region of Texas, where semi-arid rangelands have experienced decades of degradation and loss of native herbaceous vegetation communities. In this research, combinations of commonly used restoration techniques were tested to assess their efficacy for restoring native grassland vegetation in retired agricultural fields in Menard County, Texas, USA. Seventy-two 0.04 ha experimental units were randomly assigned one of two site preparation treatments (disking or control), one of three native seed mix treatments (high diversity [27 species], low diversity [9 species], or control), and one of two herbicide application treatments (glyphosate [Roundup PowerMAX® II Herbicide applied at 1.68 kg active ingredient/ha] or control) using a split-split-plot arrangement of factors. Experimental units were monitored in permanent quadrats where plant species composition and density were measured during the spring and fall seasons for two years (2021-2022). Eighteen seeded species were recorded during the first three sampling periods. Current data suggest the addition of either native seed mix has not increased seeded species density (0.49 plants/0.25 m<sup>2</sup>) beyond what the seed bank offered in the controls (0.50 plants/0.25 m<sup>2</sup>). This study aimed to provide region-specific restoration methodology recommendations for disturbed lands in the Edwards Plateau Ecological Region of Texas.

## **29. Species-specific Patterns of Consumption of Oral Rabies Vaccine Baits in the South Texas Plains**

**Haley Sloan**, Texas A&M, Wimberley, TX, USA

**John Tomecek**, Texas A&M University, Taylor, TX, USA

**Tyler Campbell**, East Foundation, San Antonio, TX, USA

**Abstract:** Oral Rabies Vaccine (ORV) baits have been aerielly dropped along the US-Mexico border since 1995 for canine rabies. However, there is little information on the fate of baits when they are on the landscape. Our goal is to determine what species are consuming with ORV baits in the South Texas Plains. We used ArcGIS to generate eight 1 km<sup>2</sup> grids with 18 camera trap sites in each grid. We hand applied one bait per camera trap for two grids during each application trip. We collected camera data from 144 different sites for four consecutive weeks during each of the four calendar seasons on the East Foundation's San Antonio Viejo Ranch. We will determine species-specific consumption of ORV baits, and how other factors, such as season may affect consumption patterns. We will generate competing a set of competing models and use Akaike's Information Criterion (AIC) to determine which model best explains specific-specific patterns of bait use among those considered. We will evaluate how temperature, distance to water, season, and species impacts ORV bait consumption. We will then run an analysis of variance to determine if the relationship between the variables is significant. We predict that species and season will affect ORV bait consumption. The results from this study will help better inform ORV management practices for future ORV aerial drops.

## **30. Composition of the mammalian community at the Stephen F. Austin Experimental Forest prior to timber harvest and shorter fire return interval**

**Ethan Menzel**, Stephen F. Austin State University Student Chapter of The Wildlife Society, Groesbeck, TX, USA

**Jessica Glasscock**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**Alejandra Martínez**, Stephen F. Austin State University, Nacogdoches, TX, USA  
**Reuber Lana Antoniazzi Jr**, Stephen F. Austin State University, Nacogdoches, TX, USA  
**Connor Appel**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Camera trap surveys have been used extensively for inventorying wildlife and are particularly valuable for long-term monitoring. Our goal is to assess the temporal dynamics of a mammalian community under the influence of changing management applications. The Stephen F. Austin Experimental Forest, located in the Pineywoods ecoregion of Texas, is used for silvicultural and wildlife research. Management of the Experimental Forest has incorporated treatments, such as thinning and prescribed fire, but these treatments have been applied infrequently. Future management applications include a timber harvest and a more frequent fire return interval. We collected camera trap data on the mammalian community during the fall of 2019 to 2022. Twenty-two trail cameras were installed at intervals  $\geq 200$  meters and were deployed for ~19 days to accumulate no fewer than 400 trap nights. These data were utilized to evaluate the community dynamics, including the effective number of species, rank abundance curves, and species composition. Species diversity was similar across years. Those species observed yearly included the white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), wild pig (*Sus scrofa*), nine-banded armadillo (*Dasypus novemcinctus*), coyote (*Canis latrans*), eastern gray squirrel (*Sciurus carolinensis*), and Virginia opossum (*Didelphis virginiana*). Based on additional statistical analyses, our results will serve as the baseline of the mammalian community and will allow us to observe any trends or shifts in the community dynamics with changing management applications. Testing different treatments of forest management allows us to provide quality information that is useful for decision-making plans.

### **31. Rangewide Genetic Diversity of the Greater Prairie-Chicken (*Tympanuchus cupido*)**

**Katarina Kieleczawa**, University of North Texas, Denton, TX, USA  
**Andrew Gregory**, Denton, TX, USA

**Abstract:** Genetic diversity is important to the health of wildlife populations but is being lost for many species due to declines in the number of individuals and loss of connectivity. The Greater Prairie-Chicken (*Tympanuchus cupido*) is a lek-mating grouse whose population and range have contracted greatly since the beginning of the 20<sup>th</sup> century due to agriculture and other anthropogenic land uses. In collaboration with several state and federal agencies we collected lek feathers and tissue from across four states for use in an analysis of range-wide genetic diversity and population structure using microsatellite loci. We found that genetic diversity across the range remains relatively high ( $H_E=0.832$  versus  $H_O=0.698$ ). In addition, we found moderate evidence of genetic structure linked to each state. Future landscape genetic analysis will expand the number of loci used and link observed population structure to landscape attributes to support management.

### **32. Evaluating the Effectiveness of Redesigned Wildlife Exits Along a South Texas Highway**

**Jamie Langbein**, University of Texas Rio Grande Valley, Port Isabel, TX, USA  
**Kevin Ryer**, University of Texas Rio Grande Valley, Brownsville, TX, USA



**John Young**, Texas Department Transportation, Austin, TX, USA  
**Richard Kline**, UTRGV, Brownsville, TX, USA

**Abstract:** Roadside exclusion fencing is commonly used to mitigate wildlife road mortalities as well as property damages caused by wildlife-vehicle collisions. A potentially lethal effect of exclusion fencing is that animals may become trapped on the roadside of the fence and unable to leave the right-of-way. On State Highway 100 in Cameron County, Texas, Texas Department of Transportation (TxDOT) modified segments of fencing to install ten wildlife exits as a solution that would allow animals to escape the roadway by exiting through a modified opening in the fence. However, in the initial design, some individuals learned to use the wildlife exits in reverse to enter the roadway within a year. In this study, a new design of wildlife exit was implemented, with narrower openings, a steep ramp and a clear plastic one-way door. The objectives of this study were to: 1) compare the effectiveness of the two new designs, 2) compare the effectiveness of the new designs to the old design, and 3) compare the percentages of animals that escape the roadway using the wildlife exits by study period. These new wildlife exits were monitored using camera traps, including a video camera attached to an infrared trip wire sensor to capture wildlife interactions with the new wildlife exits. Effectiveness of designs were compared using t-tests and an analysis of variance was used to compare overall use of the wildlife exits by study period. This study will provide insights into wildlife use of exits and help to guide future designs.

### **33. A Comparison of Avian Sampling Methodologies: Is Species Richness Accurately Detected?**

**Alejandra Martinez**, Stephen F. Austin State University, Nacogdoches, TX, USA  
**Jessica Glasscock**, Stephen F. Austin State University, Nacogdoches, TX, USA  
**Reuber Lana Antoniazzi Jr**, Stephen F. Austin State University, Nacogdoches, TX, USA  
**Brian Oswald**, Stephen F. Austin State University, Nacogdoches, TX, USA  
**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA  
**Selma Glasscock**, Welder Wildlife Foundation, Sonora, TX, USA

**Abstract:** Different avian sampling methods obtain biases, which act as filters, such as the ability to capture aural species over cryptic species. Therefore, the need for choosing a suitable sampling method or set of methods, in terms of efficiency and cost-effectiveness, is essential. The ability to choose a suitable sampling method is critical to obtaining accurate community and population data, whilst considering the project objectives, budget, and personnel. Utilizing the Monitoring Avian Productivity and Survivorship (MAPS) protocol, mist-netting, and point count survey data, we compared the effectiveness of each sampling method in detecting a complete avian community, with consideration of implications for monitoring programs, allocation of limited resources, and time to detection. Our study site is a riparian deciduous woodland along the Aransas River, on the Welder Wildlife Refuge, located in the Central Flyway migration corridor. Interpolation and extrapolation (iNEXT) analysis (<sup>0</sup>D) revealed variation in species diversity for each sampling method. MAPS observed the largest species diversity, whereas mist-nets observed the least amount. However, point count surveys observed the largest number of individuals. We found significant differences (PERMANOVA, Pseudo-F<sub>(2,26)</sub>; p=0.001\*) in community composition between methodologies. A total of 62 species were detected: 3 unique species observed through MAPS, and 8 unique species observed through point counts; 16 species

observed through MAPS but not captured; 21 species observed through MAPS and point counts but not captured in nets; and 14 species observed through all methods. Depending on project goals and resources, a combination of methodologies would best capture a complete avian community.

### **34. Forecasting Spatial Abundance of Northern Bobwhite in South Texas Using Roadside Surveys**

**Alejandro Bazaldua**, CWKRI-TAMUK, Kingsville, TX, USA

**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Andrea Montalvo**, East Foundation, Hebbronville, TX, USA

**Aaron Foley**, CKWRI-TAMUK, Kingsville, TX, USA

**Kristyn Stewart**, CKWRI-TAMUK, Sinton, TX, USA

**Sabrina Szeto**, Sabrina Szeto Consulting, Isen, GER

**Abstract:** Northern bobwhite (*Colinus virginianus*) is a popular game bird experiencing population declines. Given that bobwhites are subject to harvest, having reliable measures of population abundance is important for proper management and conservation of the species. Currently, many landowners rely on general population trends at the regional level or on local, anecdotal observations to assess the quality of the upcoming hunting season and plan harvest. The purpose of our research is to develop a more precise and finer-scale estimate of bobwhite relative abundance that may be used by landowners to help forecast the quail season at a regional extent in south Texas. Specifically, our objectives are to quantify the relationship between bobwhite relative abundance, landscape characteristics, and rainfall to annually develop a spatial map of bobwhite relative abundance. We conducted quail roadside surveys during August–September 2022 across 13 sites in south Texas and quantified landscape composition and structure (percent cover of rangeland, urban, water, other; mean rangeland patch size, mean Euclidean distance) and rainfall within a 25-km buffer of each route. We used linear regression to evaluate the influence of landscape characteristics and rainfall on bobwhite relative abundance and used this relationship to develop a spatial map of bobwhite relative abundance. Such a predictive map of bobwhite abundance can be a helpful tool to annually assist landowners in forecasting the upcoming hunting season and better plan harvest.

### **35. Single-species management and its effect on small mammal biodiversity**

**Thomas Bates**, Trinity University, San Antonio, TX, USA

**Brittany Slabach**, Trinity University, San Antonio, TX, USA

**Abstract:** Heterogeneous landscapes provide habitats for a variety of different organisms and are important habitats for maintenance of biodiversity. Single-species management strategies can have both direct and indirect benefits for non-target organisms. We are investigating how management aimed at target species influences non-target species biodiversity at Government Canyon State Natural Area, San Antonio, Texas. The oak-juniper shrubland habitat serves as a breeding site for a variety of migratory songbirds, including the target species Black-capped vireos (*Vireo atricapilla*). Active management will be necessary to maintain the habitat. Prior to management actions, small mammal biodiversity has been monitored across different habitat

types, using live trapping methods, twice monthly. Species were identified using morphological characteristics, and standard mark-recapture techniques were used. A total of 1311 traps were set over 11 trap nights, with an overall trap success of 8.2% (107/1311). 57.9% (62/107) of captures were new captures, and 55.5% (30/54) of these individuals were female. Low biodiversity was observed with a total of 94.4% (51/54) of all captures representing *Peromyscus lacieanus*; 3.4% (2/54) *Peromyscus leucopus*, and 1.9% (1/54) *Reithrodontomys fulvescens*, respectively. Our findings suggest seasonal changes in movement patterns, and small sub-populations throughout the site. The low observed biodiversity suggests larger scale landscape characteristics may be more important to explaining biodiversity. Investigation of high human use areas is underway to provide more meaningful management plans. Species conservation requires a holistic perspective of the effects of management techniques on biodiversity as a whole.

### **36. Comparing Precision and Scale-Transferability of Rangeland Monitoring Methods for Grassland Restoration in the Trans-Pecos, Texas**

**Jason Crosby**, Sul Ross State University, Alpine, TX, USA  
**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA  
**Justin French**, Borderlands Research Institute, Alpine, TX, USA  
**Ty Goodwin**, Sul Ross State University, Alpine, TX, USA  
**Billy Tarrant**, Borderlands Research Institute, Alpine, TX, USA  
**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Abstract:** Rangeland ecosystems make up nearly half of the earth's land surface. These landscapes provide habitat for various flora and fauna and provide essential ecosystem services. However, anthropogenic activities such as habitat fragmentation and excessive livestock grazing regimes have transformed rangelands into brush-dominated landscapes. The consequences of habitat degradation include loss of wildlife, soil erosion, reduced water harvest, and lower carbon sequestration. Such concerns drive restoration and many monitoring methods exist to measure such efforts. Detecting change from restoration is essential to determine its efficacy. My project aims to compare methods to evaluate the rate of change for brush cover and herbaceous production after restoration efforts. I will use satellite-derived spectral data from the National Aeronautics and Space Administration /United States Geological Survey Landsat Program and manual monitoring using established line-intercept transect methods for my brush assessments. This will determine the scales at which Landsat data can capture change in brush communities with an equal or greater degree of precision than industry-standard manual monitoring. For herbaceous plant production, I will compare remotely sensed data from Landsat and fine-scale spectral data to manual quadrat sampling. My analysis will also determine gains per unit cost (in terms of hours and dollars per change in unit of precision). Determining which methods are most efficient for assessing change rates following restoration in these landscapes will assist stakeholders in planning and implementing grassland restoration in the region.

### **37. Common Forbs of the Trans-Pecos: A Field and Lab Guide**

**Ty Goodwin**, Sul Ross State University, Alpine, TX, USA  
**Leanna Morin**, Borderlands Research Institute, Sul Ross State University, Hondo, TX, USA  
**Jason Crosby**, Sul Ross State University, Alpine, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Abstract:** The Trans-Pecos region of Texas is one of the most diverse ecoregions in the world. However, for plants, the rich diversity makes it highly challenging to identify different species. Stochasticity in climate, and plant growth patterns, combined add to the difficulty of understanding the region's diverse flora. The primary purpose of this work is to provide descriptions and pictures that aid in the identification of common forb species in the field and on a cellular level. Additionally, we aim to provide reference material and bridge a gap between the biological world and the natural resource management profession. When conducting vegetative monitoring, it is common to find specimens that are nearly impossible to identify due to a lack of distinguishing characteristics. The same case arises when conducting dietary work. Plant material that has been mechanically masticated and chemically digested showcases no standard structural properties. Using scraped or ground samples that mimic digestive processes, we identify the defining characteristics of the dermal tissue structure and shape. These descriptions can then be utilized as a reference to identify partial cellular structures in fecal samples, stomach contents, or unidentifiable “twigs” collected in the field. The project also explains the functional livestock and wildlife value of flora. Correct identification and knowledge of a plant species can be used in the lab and everyday settings. The text is a collection of general knowledge, personal observations, and working science from many peer-reviewed resources brought together to help aid botanical studies in the Trans-Pecos region.

### **38. Measuring water and nutrients in rangeland grass species: What can we learn from drones?**

**Kimberly Tanguma**, CKWRI, Laredo, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Anthony Falk**, Texas A&M University - Kingsville, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Silverio Avila**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Lori Massey**, CKWRI-TAMUK, Buffalo, TX, USA

**Abstract:** Water plays a vital role for native rangeland species. Water absence causes stomata closure in which will result in the reduction of water loss and a decline in the leaves' photosynthetic rate. Limited water availability within plant species will have a negative effect on plant diversity, animal nutrition, and overall native plant health. Having little to no diversity within plant species will decrease the overall nutritional value at the pasture scale. Wildlife and livestock will compete for water and readily available native species in order to meet their nutritional requirements. Our goal is to use multispectral sensors on drones to monitor rangeland species and their spectral reflectance differences under different moisture conditions. Our objectives are (1) to quantify the relationship between water and spectral signature in native grasses using multispectral imagery from drones, (2) evaluate the spectral signatures of native species to determine nutrient content of native plants. To achieve our objectives, we plan to fly

drones at an altitude of 50 m above ground level and acquire multispectral imagery. Flights will be at the Texas Native Seeds fields at Texas A&M University- Kingsville. We will place soil and leaf moisture sensors to compare field collected data and aerial imagery. We will take grass samples and analyze their nutrient content to determine the relationship between nutrients and reflectance values. This study will provide new insights to assess the relationship between soil moisture, nutrition content, leaf moisture, and reflectance values from native grasses in South Texas.

### **39. Histological Analysis of Desert Bighorn Sheep, Aoudad, and Mule Deer Diets in the Van Horn Mountains, Texas**

**Eliana Dykehouse**, Sul Ross State University, Alpine, TX, USA

**Olivia Gray**, Borderlands Research Institute/TPWD, Fort Davis, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA

**Froylan Hernandez**, Texas Parks and Wildlife Department, Alpine, TX, USA

**Abstract:** Since the introduction of aoudad (*Ammotragus lervia*) in West Texas, suspicions have been raised concerning the effects that they may have on native desert bighorn sheep (*Ovis canadensis*) and mule deer (*Odocoileus hemionus*). If competition among the species is present, diet is just one possible component that may be impacted. The goal of this project was to measure the diet composition of desert bighorn sheep, aoudad, and mule deer in the Van Horn Mountains, TX, through histological analysis. Within a co-occupied landscape, 5 fecal samples were collected for each species each month for a year. Fecal samples were dried, ground, bleached, and mounted on slides. Three cover slips were prepared per slide, and 6 transects were run per coverslip. Identifiable cell structures were photographed. Currently, we are identifying cell fragments to the genus or species level by comparing photos to an existing reference library. Though the results are not final, we have found an unexpected amount of grass in desert bighorn samples. We frequently observed woody plants which include grey oak (*Quercus grisea*) and Apache plume (*Fallugia paradoxa*). In addition, cacti and succulents such as prickly pear (*Opuntia* spp.), tasajillo (*Cylindropuntia leptocaulis*), ephedra (*Ephedra* spp.), and yucca (*Yucca* spp.) have occurred consistently throughout the diets of all three species. Once data has been compiled, we hope to estimate the degree of dietary overlap to contribute to the larger question of whether aoudad, desert bighorn, and mule deer significantly impact each other.

### **40. Understanding the Diet of an Unmanaged Population of Coyotes in Southern Texas**

**Anna Racey**, Texas A&M University, Boerne, TX, USA

**Tyler Campbell**, East Foundation, San Antonio, TX, USA

**John Tomecek**, Texas A&M University, Taylor, TX, USA

**Abstract:** Diet of a species is integral knowledge in planning wildlife management. Predator selection of prey items can strongly influence the population dynamics of other wildlife, as well as food availability for those species. One such species is the coyote (*Canis latrans*), whose great

dietary plasticity may lead to variability in their impacts on other species. Although coyote diet has been well-studied throughout their range, what is less well known is the diet of coyote populations in the absence of human intervention on native wildlife populations. As larger rangelands cease active management of coyotes, managers interested in mitigating damage on other wildlife and livestock must understand coyote diet in the scope of a less-managed system. Therefore, our project aims to compare the diet of an unmanaged coyote population in South Texas to populations who experience human intervention, including management, harvest, trapping, and supplemental feeding. We collected coyote scat from 20 one-kilometer long transects on the roads of the East Foundation's San Antonio Viejo Ranch once per month for a year. We recorded GPS location, placement on the road, substrate type, road development, and size dimensions. We identified morphologically and analyzed prey items using relative volume based on an intercept grid system. We predict that there will be a difference between diets due to the unmanaged population exhibiting natural activity patterns as well as older age structures. This will lend insight into the management of this species on South Texas rangelands and beyond.

#### **41. Comparing two detection methods for estimating occupancy of chestnut-bellied scaled quail in South Texas**

**Caleb McKinney**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Ashley Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Katherine Travis**, Caesar Kleberg Wildlife Research Center - Texas A&M University  
Kingsville, Kingsville, TX, USA

**Leonard Brennan**, Kingsville, TX, USA

**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Ryan Luna**, Sul Ross State University, Alpine, TX, USA

**John McLaughlin**, Lubbock, TX, USA

**Abstract:** Animal behavior is a complex amalgamation of actions structured by physical and social environments and can influence the success of animal monitoring strategies by altering important parameters such as detection rates. The likelihood of a bird calling may be density dependent, and in areas of low occupancy birds may not call because the risks of announcing its presence may outweigh the benefits of conspecific communication. In turn, passive observation methods (point counts) may underestimate occupancy. Playback surveys provide an auditory stimulus intended to increase detection and may perform better than point counts. Our objective was to test the effectiveness of point count and playback surveys for detecting chestnut-bellied scaled quail (*Callipepla squamata castanogastris*; hereafter "scaled quail"). Between 17 May and 28 June 2022, we conducted 1020-point count and scaled quail playback surveys at two study sites in Dimmit and Duval Counties, Texas. Observers performed a five-minute point count, followed by a two-minute period where scaled quail calls were broadcasted and scaled quail detections were recorded. We detected scaled quail during 16.8% ( $\pm 2.6\%$ ) of point count surveys, and detections increased to 28.5% ( $\pm 2.7\%$ ,  $p < 0.001$ ) after inclusion of playback responses. Continued research will test the impact of vegetation cover on scaled quail occupancy, and determine if the effectiveness of playback surveys differs between vegetation

types. If playbacks increase detection rates by a greater magnitude in areas of lower overall occupancy, it could have implications for population monitoring in areas of suboptimal but usable space.

#### **42. Winter Habitat Selection, Movement and Survival of Scaled Quail in the Trans-Pecos, Texas**

**Caleb Hughes**, Sul Ross State University, Alpine, TX, USA

**Ryan Luna**, Sul Ross State University, Alpine, TX, USA

**Lalo Gonzalez**, Borderlands Research Institute, Alpine, TX, USA

**Justin French**, Borderlands Research Institute, Alpine, TX, USA

**Louis Harveson**, Sul Ross State University, Alpine, TX, USA

**Abstract:** Scaled quail (*Callipepla squamata*) have experienced population declines across their range in the last several decades. This population decline is partially attributed to habitat degradation, as habitat loss reduces scaled quail's useable resources for food, water, and shelter. This becomes critical during the winter season in the Trans-Pecos, where lower food availability and cold weather make habitat resources essential for withstanding winter weather events. In addition, juvenile recruitment and available brood stock for the following nesting season are negatively affected by winter mortality, making winter a potentially influential period for scaled quail populations. Monitoring daily cycles in scaled quail habitat selection and movement allows us to observe how scaled quail respond to winter conditions, such as changes in movement patterns, selection of thermal refuges, and vulnerability to mortality. Our study seeks to describe these dynamics to supply knowledge on this understudied seasonal aspect of scaled quail ecology. We will trap quail in southern Brewster County, Texas during the winters of 2022-2023 and 2023-2024 using walk-in funnel traps and fit them with aluminum leg bands and Global Positioning System backpacks to obtain location data and monitor survival across the winter season. Location data will be analyzed using an integrated Step Selection Analysis to identify scaled quail's selection and movement behaviors throughout the winter. Examining individual variation in these dynamics will help identify habitat attributes and movement behaviors conducive to greater individual fitness, thereby better informing future management efforts for scaled quail in the Trans-Pecos.

#### **43. Ecohydrology Improvements and an Evaluation of the Performance of Native Grasses in the Chihuahuan Desert**

**Aaron Ortega-Gonzalez**, Borderlands Research Institute - Sul Ross State University, Alpine, TX, USA

**Abstract:** The decline of scaled quail (*Callipepla squamata*) populations has been mainly attributed to habitat degradation. Increasing plant diversity and reducing soil erosion may help alleviate this problem. Therefore, we have deployed a holistic strategy to restore riparian habitat within the Chihuahuan Desert based on building structures known as "trincheras" and reseeded native vegetation to improve hydrological processes to establish native plants. We expect restoration efforts to increase water harvest, reduce soil erosion, increase native vegetation, and positively affect scaled quail by increasing cover and food availability. Restoration efforts began

in August of 2021, in a private ranch in Southern Brewster County. To date, we have built 130. Of those, 50 are being assessed before and after the rainy season (May – October 2022) to measure how much soil these structures are trapping and changes in the vegetation structure and plant cover. Simultaneously we have been assessing the performance of different native grass species in a greenhouse with 4 different grass species (bristlegrass [*Setaria vulpiseta*], sideoats grama [*Bouteloua curtipendula*], whiplash pappusgrass [*Pappopharum vaginatum*], and blue grama [*Bouteloua gracilis*]) as a first trial to identify best native grasses to seed in trincheras. Also, these 4 groups were divided into another 4 groups representing different rainfall rates: 2 inches, 4 inches, 6 inches, and 8 inches. This allowed us to assess the seed germination response for each grass species. Preliminary results indicate that trincheras increase soil retention and that *Bouteloua gracilis* and *Bouteloua curtipendula* have better outcomes than the other 2 species.

#### **44. Developing a Large-Scale Virtual Fencing System to Improve Wildlife Habitat**

**Shanna Gleason**, TAMUK - CKWRI, Newcastle, TX, USA

**Daniel Ramirez**, Texas A&M University- Kingsville/Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**J. Alfonso Ortega**, CKWRI-TAMUK, Kingsville, TX, USA

**Jason Karl**, University of Idaho, Moscow, ID, USA

**Silverio Avila**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Abstract:** Virtual fencing in livestock production systems offers cattle ranchers an alternative to physical fences which can be labor intensive, costly, and provide limited flexibility. Current systems utilize collars/ear tags worn by the animal that deliver first an audio cue and electric pulse to alert the animal when coming close to the boundary. Although these systems have been tested at small scales and over short time periods, broad scale study on the application of these systems is needed. Additionally, the possible benefits of such systems for improving wildlife habitat are relatively unknown. Our goal is to develop a system that can be used on large pastures and doesn't rely on an internet signal. Subsequently, we can evaluate the effectiveness of this system and use remote sensing to learn how vegetation is impacted. We will use a drone to quantify vegetation utilization patterns by modeling vegetation height to monitor changes in structure, and to identify the difference in utilization near the boundary. Additionally, we want to track bobwhite quail locations using VHF drone technology to determine if this expected change in vegetation structure in the virtual enclosure is causing an increase in quail occurrence due to improved habitat. These results will provide more information that is needed before widespread implementation of virtual fencing can occur, and will open more possibilities for managers to implement new grazing regimes, improve wildlife habitat, manipulate vegetation, and overall control animal movement.

#### **45. Assessing Amphibian Use of Flooded Wildlife Crossings with eDNA**

**Madison Nadler**, University of Texas Rio Grande Valley, Brownsville, TX, USA

**Kevin Ryer**, University of Texas Rio Grande Valley, Brownsville, TX, USA

**John Young**, Texas Department Transportation, Austin, TX, USA

**Richard Kline**, UTRGV, Brownsville, TX, USA



**Abstract:** Wildlife crossing structures (WCS) are generally designed for use by medium to large mammals. During heavy rains, WCS are likely to flood, deterring use by most mammal species. Many transportation departments look at existing water drainage culverts to modify for dual use as a WCS. WCS are commonly monitored with camera traps, but this method is not reliable for detecting all herpetofauna, especially aquatic and semi-aquatic species. Environmental DNA (eDNA) is a commonly used non-invasive method for detecting aquatic and semi-aquatic species not easily caught by other survey methods. WCS have been installed along State Highway 100 and farm-to-market 106 to mitigate ocelot (*Leopardus pardalis*) mortalities in Cameron County Texas. Some of these WCS are prone to occasional flooding (ephemeral) while others have flowing water year-round (flowing) and may be attractants to herpetofauna. Water samples will be collected approximately once a month at WCS with flowing water (n=3) and at all sites two to three days after heavy rain events (n=6), dependent on water presence. Samples will be tested for eDNA through PCR assays and metabarcoding analyses using primers that detect all amphibian species found in Cameron County. PERMANOVA will be run to analyze the effects of water type (flowing or ephemeral) on the amphibian community, and a t-test will compare the total number of species between water type. We hypothesize that the amphibian communities will differ in WCS with flowing and ephemeral water. This data may be useful for management of threatened or endangered amphibians around roadways.

#### **46. Habitat and Spatial Factor Underlying Community Organization of Tadpoles in East Texas**

**Tatiana Suarez Joaqui**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Daniel Saenz**, USDA Forest Service, Southern Research Station, Nacogdoches, TX, USA

**Cory Adams**, USDA Forest Service, Southern Research Station, Nacogdoches, TX, USA

**Toby Hibbitts**, College Station, TX, USA

**Kathryn R. Kidd**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**Abstract:** Habitat and spatial factors, as well as species interactions (e.g., predation), can affect the structure and function of populations and communities across landscapes. In this study, we explored how spatial factors, such as regional aquatic habitat breeding size (HS) and distance to the nearest suitable habitat (DH), interact with the presence of top predators and shape anuran diversity patterns in permanent ponds in the Davy Crockett National Forest (Texas). We surveyed larval anuran assemblages across four different top predator regimes (PR) including 1) Largemouth bass (B), 2) Green sunfish (G), 3) a combination of both B and G, and 4) salamander/invertebrate predators (SI). Field surveys were conducted between June 2021 to June 2022. Spatial variables were calculated using *in situ* pond area and information from pond shapefiles. To quantify the effect of HS, DH, and PR, a Generalized Linear Model (GLM) with negative binomial distribution was performed using relative abundance or richness separately as response variables and HS, DH, and PR as predictive variables. In total, 11 tadpole species were collected across 20 ponds. The three most relatively abundant species collected were *Lithobates clamitans* (Bronze frog, n = 4,606), *L. sphenoccephalus* (Leopard frog, n = 3,656), and *Dryophytes versicolor* (Gray treefrog, n = 1,293). GLM indicated that only DH had a significant positive effect on species' relative abundance (p < 0.001). Habitat isolation might enhance the

increased relative abundance of highly vagile species on the landscape, possibly due to priority effects in colonizing isolated habitats and subsequent reduction in competition.

#### **47. Methods to Increase Native Vegetation in Areas Invaded by Lehmann's Love Grass**

**Andres Solorio**, Borderland Research Institute, Sul Ross State University, Alpine, TX, USA

**Abstract:** Native and non-native grassland species can negatively interact and compete. Sometimes those negative interactions can affect native species by leading them to eradication, and converting a diverse rangeland into monocultures. This is due to non-native species having aggressive behavior and better response than natives towards drought and wildfires. Also, some non-native plant species are not preferred by wildlife. For example, scaled quail (*Callipepla squamata*) habitat is indirectly affected by negative interactions with invasive species such as Lehmann Lovegrass (*Eragrostis lehmanniana*). Therefore, we initiated a restoration project for scaled quail habitat to mitigate Lehmann Lovegrass monocultures and increase native plants for scaled quail. This project was located in Southern Brewster County and is part of the Chihuahuan Desert. Our study is designed to find and evaluate ways to decrease and control Lehmann Lovegrass. We established 200 16m<sup>2</sup> plots with 4 different treatments. We used 3 line intersections in each plot to compare if there are significant differences between treatments and define which treatments have a better result to decrease and control Lehmann Lovegrass. Treatments are soil disturbance, native plant seeding, soil disturbance and seeding, and a Control. Data was taken before treatments were implemented during the summer of 2022 and post-rainy season in October 2022. Preliminary results indicate that seeding native grasses have the most significant amount of native vegetation within our treatments.

#### **48. Texas Tortoise Response to Prescribed Fire in South Texas Coastal Rangelands**

**Camryn Kiel**, Texas A&M University, College Station, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Ashley Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Sandra Rideout-Hanzak**, Kingsville, TX, USA

**Michael Morrison**, College Station, TX, USA

**Andrea Montalvo**, East Foundation, Hebbronville, TX, USA

**Abstract:** Prescribed fire has become an increasingly popular tool in managing vegetation conditions and can create heterogeneity in vegetation cover and structure. Some wildlife species that utilize both grassy and brushy areas may benefit from the variation in vegetation that fire produces. However, studies examining the effects of fire on herpetofauna are infrequent. Currently, we have found no data on fire effects specific to Texas tortoises (*Gopherus berlandieri*), which is listed as state threatened in Texas. Though the Texas tortoise may be considered a rather sedentary species with short activity periods, their movement and activity may be closely linked to temperature. This study aims to assess survival and movement of these tortoises through burn events by comparing the movements of tortoises in pastures that experience summer burns, control patches that are not burned, and patches that will be burned in the winter. Additionally, temperature information was collected on the tortoises' carapaces to examine how tortoise performance is associated with the external temperatures they experience.

This study may allow us to determine a season of burning that is directly less lethal to the tortoises and that indirectly supports their populations by providing variation in available vegetation cover and structure. At the end of the study, we may be able to make recommendations to landowners in south Texas on how they can manage their property in a way that also supports conservation of wildlife.

#### **49. How are Herbaceous Plant Relationships Affected by Prescribed Fire?**

**Forrest Fay**, Texas A&M University-Kingsville, Kingsville, USA

**Sandra Rideout-Hanzak**, Kingsville, TX, USA

**Juan Elissetche**, Caesar Kleberg Wildlife Research Institute, Edcouch, TX, USA

**David Wester**, Kingsville, TX, USA

**Meghan Anderson**, Texas A&M University- Kingsville, Kingsville, TX, USA

**Abstract:** Much of Texas' historic rangeland plant composition was shaped by fire, and the removal of fire from rangeland ecosystems has led to compositional changes in vegetation communities. Previous research has examined the effects of prescribed fire on herbaceous vegetation mortality, production, nutritional value, and community composition in coastal southern Texas. However, no study has examined prescribed fire's effects on nearest neighbor plant relationships in this region. We are evaluating effects of varied return interval and season of burning on nearest neighbor herbaceous plant relationships in the Gulf Prairies and Marshes ecoregion of south Texas. Our objective is to determine how differing prescribed fire regimes affect those relationships. At East Foundation's El Sauz ranch, sixteen burn units (>200 ha) were randomly assigned a treatment regime beginning in 2016: Summer-short, Summer-long, Winter-short, Winter-long, or Control (no fire). We have established six sampling transects in each burn unit scheduled for treatment between summer 2022 and 2024 to assess the effects on herbaceous plant relationships. Surveys are conducted pre-burn and will be repeated ~6, ~12, ~18, and ~24 months post-burning, with Control units being surveyed concurrently. Using modified step-point transects, we record ground cover at each point, nearest herbaceous plant species to each point, nearest rooted neighboring herbaceous species to that plant, and distance between the two plants. We will determine effects of varied prescribed burning regimes on herbaceous species diversity and spatial relationships among neighboring plants. Our results will help land managers to better create prescribed burning prescriptions to meet specific objectives.

#### **50. Pre-restoration Waterbird Surveys at Natural and Man-made Water Sources**

**Zachary Bellows**, Tarleton State University, Stephenville, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Josef Leachman**, Tarleton State University, Stephenville, TX, USA

**Abstract:** Restoration efforts of landscapes are rarely evaluated for their effect on wildlife or resources. It is important to understand the outcomes of restoration to implement an adaptive approach to management and conservation. Texas Parks and Wildlife Department purchased Palo Pinto Mountain State Park, in Palo Pinto County, TX, USA, in 2011. Since then, the park has expanded to 4,871 ac with the addition of a tract of land that is undergoing restoration efforts. Within the original park, there is one large water source and multiple smaller water

sources that are natural features of the landscape. At the restoration site, there are two man-made water sources that will undergo restoration in the future. We are conducting a comparative study of the natural and man-made water sources to examine the effect of restoration on the man-made water sources. We conduct surveys twice a month year-round starting in October 2022 from 30 minutes before sunrise to 1 hour after sunrise. From a concealed location <5 m from the water edge, we record waterbirds located in or near the water source or flying overhead. We record the number of individuals, behavior, and sex. With these observations, we will provide Texas Parks & Wildlife with baseline information on the community and population of waterbirds in the park and inform a plan for restoration around each water source.

## **51. PMSG and Timing Effects on the Follicle Stimulation of Axis Deer During Artificial Insemination**

**Sarah Goodman**, Sam Houston State University, Huntsville, TX, USA

**Phil Urso**, Sam Houston State University, Huntsville, TX, USA

**Abstract:** For decades, the deer breeding industry has grown substantially. However, little is known about the reproductive synchronization of Axis does in a confinement setting, and the various timing and hormone usage and its effects on follicle development. This project was designed around the artificial breeding program at a private industry deer breeder in Axis (n=47) does. Treatments were two doses of PMSG (1cc and 1.25cc) and a continuous range of time points from CIDR pull to artificial insemination (58 to 64 hours). On the day of AI, number of follicles (corpus hemorrhagicum), size of follicles, and uterine score during AI were recorded. All data was collected by the same artificial insemination technician across all deer in this study. All data were analyzed in SAS v9.4 via PROC REG. The overall model was not significant ( $P = 0.18$ ), and there was no significant effect of PMSG ( $P = 0.07$ ) or time ( $P = 0.60$ ) on total follicles. Regarding uterine score, the overall model was not significant ( $P = 0.91$ ), and there was no significant effect based on PMSG ( $P = 0.93$ ) or time ( $P = 0.66$ ). Anecdotally, there was a difference in total follicles based on PMSG. Does that received 1 cc had on average 8 CHs whereas the 1.25cc group had 6 CHs at the time of AI. While these results are not significant, the data collected can be used to improve the knowledge pool in the captive deer breeding industry.

## **52. Distribution Models of Texas Tortoise**

**Colin Tucker**, Tarleton State University, Stephenville, TX, USA

**Hemanta Kafley**, Tarleton State University, Stephenville, TX, USA

**Jacqueline Sanchez**, Tarleton State University, Stephenville, TX, USA

**Kayla Brown**, Tarleton State University, Stephenville, TX, USA

**Abstract:** The status of many wildlife species that are potentially rare is a growing concern for conservation agencies. Effective conservation planning warrants an understanding of accurate species distribution. Habitat association of state threatened Texas tortoise *Gopherus berlandieri*, a Species of Greatest Conservation Need within the state, is largely understudied. However, it is widely accepted that the range of the species is contracting and the population is declining. We downloaded the tortoise sighting data for the past ten years from the global biodiversity information facility. We selected ecologically relevant variables among 19 bioclimatic variables

(available on worldclim.org) that may determine the occurrence of the tortoise. We developed ecological niche models using Maximum Entropy approach in Maxent Ver 3.4.4 program. We fit the data to model species distribution using various model settings in the program Maxent. We also collected species occurrence data through field surveys adopting the opportunistic search method in Cameron County in South Texas and used the independent data set for testing our models. We selected the models that had adequate predictive power and revealed an ecologically meaningful relationship between the predictor variables to the species occurrence. The models produced spatially explicit distribution maps of the Texas tortoise *Gopherus berlandieri*. This study will contribute to the conservation efforts of the declining species population. Our modeling approach can be replicated in the future to monitor the distribution pattern of the species that can influence future management practices for the conservation of Texas tortoise.

### **53. Plant DRIPS—Plant Drought Response and Insect Pollinator Studies: Plant- pollinator interactions across flowering perennials in North-Central Texas**

**Addison Singleton**, Tarleton State University, Stephenville, TX, USA

**Adam Mitchell**, Tarleton State University, Stephenville, TX, USA

**Abstract:** Interactions between plants and pollinators are of considerable importance to ecosystem health, global biodiversity, and human well-being. Declines in pollinators have been clearly identified with threats such as habitat loss and fragmentation due to urbanization, intensive agriculture, and climate change. In Texas, climate models suggest increased frequency and severity of drought, which can reduce wild floral resources in areas that are already limited by other factors in the landscape. Identifying plants that provide robust floral resources under environmental stressors can provide guidance on maintaining the integrity of ecosystem services provided in anthropogenic settings. The purpose of this study is to identify perennials that improve pollinator diversity and resource use under projected drought stress for North-Central Texas. We established 12 garden beds (2 m x 14 m) containing 20 species of drought-tolerant perennial plants commonly used in urban landscapes. We conducted weekly observations from May to November 2022 and recorded pollinator visitors during 1-minute observations at each plant. We sampled pollinator abundance in beds and an adjacent plot of native vegetation weekly using a vacuum sampler to obtain baseline community data. Extreme drought conditions persisted for the duration of the growing season and limited native floral resources. Our findings will aid in determining pollinator preference and resource use in urban settings where resources are limited due to drought and other forms of water stress, as well as promoting a suite of robust flowering perennials for consideration in restoration or conservation plantings.

### **54. Golden-cheeked Warbler Lidar Based Habitat Model Tested With Acoustic Recorders**

**James Peterson**, Texas A&M, San Antonio, TX, USA

**Clara Whiting**, Texas A&M NRI, San Antonio, TX, USA

**Abstract:** The golden-cheeked warbler (*Setophaga chrysoparia*) is a federally endangered avian species that breeds exclusively in Central Texas. The habitat for the golden-cheeked warbler (GCWA) has been studied extensively and is largely defined as having a closed canopy with a mixture of hardwoods and mature Ashe juniper. The Center for Environmental

Management of Military Lands (CEMML) utilized LiDAR data from Joint Base San Antonio, Camp Bullis, Texas from 2020 to create a model of GCWA habitat on base. The final iteration of this model deemed some areas unsuitable based on patch size and distance from suitable habitat. Our study investigated the validity of these exclusions by using both acoustic recorders and traditional point count surveys to assess occupancy. Point counts were conducted during deployment and retrieval of the acoustic recorders at each site (n=33). Audio recorders found GCWA at 64% of the points, indicating that some of the model's exclusions were inaccurate. Humans detected GCWA at only 12% of the points, suggesting that observer presence could be a limiting factor. Based on our findings the model requires modification to incorporate more GCWA habitat. Habitat is a critical factor for golden-cheeked warblers; refining the parameters of suitable habitat allows DoD natural resources personnel to improve management of military lands for both military training and these endangered species.

## **55. Occupancy of eastern red bats across Texas, a species highly affected by wind energy**

**Brittney Oliver**, Texas State University, San Marcos, TX, USA

**Ember Bower**, Texas State University, San Marcos, TX, USA

**Sara Weaver**, Bowman Consulting, San Marcos, TX, USA

**Sarah Fritts**, Texas State University, San Marcos, TX, USA

**Abstract:** Increasing threats to bats, including the rapid and extensive development of wind energy facilities, call for investigating bat populations. The unintended consequence of wind energy on bat populations is of particular importance in Texas, the leading wind energy producer in the U.S. Wind energy affects many bat species, but three migratory tree-roosting bat species (*Lasiurus borealis*, *L. cinereus*, *Lasionycteris noctivagans*) have higher rates of documented fatalities at wind turbines, potentially causing population-level declines. Our objective was to illuminate variables that impact these species' distribution and movement patterns across space and time. We placed 96 acoustic detectors across Texas, selecting sites according to the North American Bat protocol. We are collecting nightly acoustic calls for three years (2020–2023) and examining seasonal data from four, 4-day periods per year. To date, we have conducted single-species hierarchical occupancy models for 82 sites on *L. borealis* for summer (pre-volancy) 2021 with several weather covariates on the detection process and latitude, longitude, and elevation on the occupancy probability. We detected *L. borealis* at 48 of the 82 sites across Texas. Results indicate that detection probability increased with temperature and Julian date and decreased with elevation. As the project continues, we will assess the influence of landcover at multiple scales on distribution, migration, movement patterns, and community dynamics. This information can guide management practices such as wind energy siting, wind turbine curtailment, and implementation of ultrasonic acoustic deterrents.

## **56. Evaluation of South Texas Clay Loma Characteristics**

**Juan Elissetche**, Caesar Kleberg Wildlife Research Institute, Edcouch, TX, USA

**Forrest Fay**, Texas A&M University-Kingsville, Kingsville, USA

**Sandra Rideout-Hanzak**, Kingsville, TX, USA

**David Wester**, Kingsville, TX, USA

**Scott Henke**, Texas A&M University-Kingsville, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Meghan Anderson**, Texas A&M University- Kingsville, Kingsville, TX, USA  
**Cord Eversole**, Texas A&M International University, Laredo, TX, USA  
**Jason Singhurst**, TPWD, Austin, TX, USA

**Abstract:** Clay lomas are a unique land feature found in only four counties along the southern coast of Texas. They have not been well-evaluated for plant diversity nor as a wildlife resource. The objective of this project is to quantitatively describe soils and vegetation of lomas. Using maps and descriptions provided by Texas Parks and Wildlife Department, we have identified potential loma sites throughout South Texas. We are selecting fifteen sites on various private and public properties to survey over the course of this study: East Foundation's El Sauz ranch, NextDecade Rio Grande LNG, Laguna Atascosa National Wildlife Refuge, and the King Ranch Norias Division. Soil samples are collected every 10 meters along two transects on each loma, one aligned in the direction of the prevailing southeast wind and another perpendicular to it. In addition to traversing the loma, each transect extends 100 m from the loma's edge on both ends. In each unique vegetation community on each loma, 5-m  $\times$  5-m plots are established for quantifying vegetation. Species frequency, cover, and density in plots are surveyed using 5 0.25-m<sup>2</sup> frames. With these data, lomas will be classified into one of three known loma types: Loma Evergreen Shrubland, Loma Deciduous Shrubland, or Loma Grassland. Additionally, previously-unidentified loma classifications will be created when appropriate. Using soil, landform and vegetation data we will also be able to determine areas where new lomas may be identified. Our results will aid Texas Parks and Wildlife Department in creating conservation management plans for this rare landform.

## **57. Monitoring the Effects of Wildlife Crossings on Bobcat Range in South Texas**

**Jolie Gonzalez**, University of Texas Rio Grande Valley, Edinburg, TX, USA  
**Jamie Langbein**, University of Texas Rio Grande Valley, Edinburg, TX, USA  
**Caitlin Brett**, University of Texas Rio Grande Valley, Edinburg, TX, USA  
**Victoria Hanley**, University of Texas Rio Grande Valley, Edinburg, TX, USA  
**John Young**, Texas Department Transportation, Austin, TX, USA  
**Richard Kline**, University of Texas Rio Grande Valley, Edinburg, TX, USA

**Abstract:** Due to their large home ranges, bobcats (*Lynx rufus*) are highly susceptible to habitat fragmentation caused by roads. Larger roads serve as territorial boundaries, decreasing the size of their home range, and smaller roads serve as travel lanes and hunting grounds, increasing the risk of road mortality. When present, bobcats use wildlife crossing structures (WCS) to safely travel underneath roadways, decreasing the risk of road mortality. However, it is unclear how WCS affect the home ranges of bobcats living in habitats that are fragmented by roadways. To analyze the utility of WCS in connecting habitat fragmented by a road, bobcats in South Texas will be identified to individual to allow tracking of individual movement based on camera trap data along a roadway. Using camera data from nine WCS on Farm-to-Market Road 106 (FM 106) in Cameron County, Texas, as well as camera data from a study monitoring the habitat adjacent to FM 106, bobcats will be identified to individual to create a database of known bobcats captured by camera traps in these areas. Movement of known bobcats will be tracked

and mapped using camera data from July 2021 to May 2022 to provide insight into the use of crossing structures by bobcat individuals present in the habitat near and adjacent to FM 106.

## **58. Examining the Implications of Arbuscular Mycorrhizal Fungi on Plant-Pollinator Interactions Associated with Texas Grasslands**

**Isabella Szebelledy**, Tarleton State University, Stephenville, TX, USA

**Adam Mitchell**, Tarleton State University, Stephenville, TX, USA

**Abstract:** Global, long-term studies show a decline in pollinating insect abundance, floral resources, and available habitat for the past 40 years, prompting a need to improve conservation efforts for pollinator-plant relationships at local scales. These relationships are especially vulnerable in grassland ecosystems, which have experienced significant decline globally. Although primarily wind-pollinated, grass conservation is important for pollinator success because grass provides nesting structure, tolerates drought conditions, and grass pollen may provide a supplemental resource for pollinators when other floral resources are limited. Arbuscular mycorrhizal fungi (AMF) are associated with plant roots, uptaking nutrients and assist's in priming plant's for faster defense responses, thereby influencing components of plant reproduction. The purpose of our study is to assess the efficacy of AMF on pollinator communities associated with Texas grasslands by addressing the following objectives: (1) Quantify insect pollinator networks (alpha diversity, composition, and connectivity) associated with native and nonnative grasses, (2) Assess productivity and nutritive value of pollen from a suite of grass species, and (3) Determine the influence of AMF on insect behavior and floral traits. We will consider a complete randomized block design under twelve treatment combinations including mycorrhizal inoculum (soil either treated with mycorrhizae, no treatment, or fungicide), nutrient load, soil water availability to simulate drought, and X species of warm-season perennial grasses. We will sample soil characteristics, secondary metabolite production, pollen chemical composition, and insect pollinator frequency and diversity. We will provide a baseline for understanding aboveground-belowground trophic interactions to improve conservation on pollinating insects in grassland ecosystems.

## **59. Drought Conditions Associated with Available Habitat for Bison at Caprock Canyons State Park, TX**

**Hunter Jacobson**, Tarleton State University, Stephenville, TX, USA

**Heather Mathewson**, Tarleton State University, Stephenville, TX, USA

**Hemanta Kafley**, Tarleton State University, Stephenville, TX, USA

**Donald Beard**, Texas Parks and Wildlife, Quitaque, TX, USA

**Abstract:** To increase understanding of range management, it is often helpful to understand how current vegetation conditions have changed in the recent past. Texas Parks & Wildlife (TPWD) founded Caprock Canyon State Park (CCSP) outside of Quitaque, Texas in Briscoe County. In 1997, TPWD introduced 36 southern plains bison (*Bison bison bison*) to the park. There are currently approximately 350 bison in the 6,070-ha park. Our objective is to examine changes in vegetation since the bison introduction at CCSP to better understand changes over time in available habitat. We use 30-m spatial resolution Landsat imagery freely available in GloVis and



USGS databases to obtain normalized difference vegetation index in March of 1991 and 2022. Preliminary analyses suggest a potential decline in vegetation between 1991 and 2009, therefore we are examining the hypothesis that this might be correlated with drought conditions in the area. We will obtain drought indices from the park to examine correlations with vegetation changes. This information will help CCSP biologists understand current habitat conditions and aid in their management plan for the park.

## **60. Effects of canopy cover on habitat and space use by coyotes and gray foxes along urban-rural gradients**

**Danielle Gay**, Texas State University Student Chapter, Austin, TX, USA

**Joseph Veech**, Texas State University, San Marcos, TX, USA

**Darren Proppe**, St. Edward's University, Dripping Springs, TX, USA

**Floyd Weckerly**, Texas State University - San Marcos, San Marcos, TX, USA

**Abstract:** The coyote (*Canis latrans*) has become North America's most widespread canid, likely due to being a habitat generalist and able to live in close proximity to human settlement. Gray foxes (*Urocyon cinereoargenteus*) are widely distributed across North America. However, extensive analysis of the species' general ecology and population dynamics is lacking. My study aims to increase the fundamental understanding of gray fox habitat use and species occurrence, as well as examine how coyotes have expanded their niche to utilize both the forested and human-altered landscapes that vastly contrast with their historical habitat of open plains and prairies. My research will consist of a two-part camera trapping study with canopy cover and impervious surface as predictors of coyote and gray fox occurrence throughout the United States. Part I of my project will emphasize a nationwide study on an urban-rural gradient. Part II will focus on a local analysis of occurrence using data from the greater Austin, Texas, area. Data on species occurrence will be obtained from camera traps deployed by various wildlife monitoring programs across the United States. In ArcGIS, buffer zones at 300, 600, and 1200 m will be established at each camera location, and mean percent canopy cover and impervious surface will be obtained from the National Land Cover Database at each buffer zone. Using the mean percent canopy cover and impervious surface for each buffer zone at each camera location will allow for an analysis of how each of those variables affects the occurrence of coyotes and gray foxes.

## **61. Wild Turkey Response to Mega-Wildfire in South Texas**

**Kaylee Lovejoy**, Texas A&M University - Kingsville, Kingsville, TX, USA

**Jason Lombardi**, Kingsville, TX, USA

**William Kuvlesky**, TAMUK, Kingsville, TX, USA

**Aaron Foley**, CKWRI-TAMUK, Kingsville, TX, USA

**Humberto Perotto**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Abstract:** The wild turkey (*Meleagris gallopavo*) is a key gamebird species to the Texas wildlife community that has an important ecological role in insect and native seed consumption and as part of the native food chain. In March 2022, a mega-wildfire impacted Kleberg County and burned over 200 square kilometers of rangeland. One of the major factors causing the fire to become so large was increased fuel loads from expanding vegetation growth during the higher

rainfall periods in 2020 directly followed by drought conditions in 2021. Our objectives are to develop spatio-temporal approaches to assess changes in occupancy, detection, and abundance of wild turkeys after a large-scale fire and use thermal videography to assess wild turkey abundance using drones. To achieve these objectives, we are deploying 80 camera traps across four 10 km transects on the King Ranch that cover both unburned and burned sections of rangeland as well as the fire front itself. Each transect will be broken into twenty 500-m sampling units with one camera trap randomly placed within each. Once data is collected and sorted, we will use a multi-state multi-season occupancy framework to examine our research objectives. Using the data from the camera traps and information from King Ranch personnel we will select locations of sites where turkeys may be roosting, and we will conduct night surveys using thermal sensors mounted on drones. These results will provide critical information on how mega-wildfires influence the occupancy, detection, and abundance of wild turkeys and aid in the development of future post-wildfire management techniques.

## **62. Disease and Disturbance: Understanding the relationship between large-scale habitat disturbance and chronic wasting disease**

**Ian O'Hartigan**, Trinity University, San Antonio, TX, USA

**Brittany Slabach**, Trinity University, San Antonio, TX, USA

**Abstract:** Chronic wasting disease (CWD) is a fatal, neurodegenerative prion disease that affects cervids. Genetic research suggests that amino acid substitutions at the prion protein gene (PRNP) site can result in reduced prevalence of CWD. In elk (*Cervus canadensis*), the M132 allele is associated with high CWD prevalence or susceptibility. Transmission of the prion occurs through direct contact with fluids (blood, saliva, or feces) of an infected animal with higher transmission expected in more social species. Prions can also exist in a bioavailable state for years in the environment, with clay soils in particular, associated with increased CWD prevalence. Industrial landscape disturbance such as mining and gas development alter geochemical soil properties, and may result in landscape characteristics that increase the prevalence of environmental CWD. We discuss the relationship between industrial landscape disturbance and CWD in North America, and use behavioral and genetic data from a free-ranging population of elk in Kentucky as a case study. 298 elk were sampled from 2011 to 2014, direct observations were conducted, and PRNP was sequenced. 79.12% (235/298) of sampled individuals were homozygous M132 suggesting increased susceptibility to CWD, although behavioral data suggests little transmission potential. Reclaimed mines and other development sites serve as habitat for a variety of cervids in North America. Industrial development is booming particularly in Texas, and our understanding of the relationship between these disturbances, CWD ecology and management represents gaps in our knowledge. These disturbances are important factors to consider in managing CWD over the short and long-term.

## **63. Using a ground-nesting bird to model variability in scale of effect in heterogeneous landscapes**

**Katherine Travis**, Caesar Kleberg Wildlife Research Center - Texas A&M University  
Kingsville, Kingsville, TX, USA

**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

**Ashley Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Caleb McKinney**, Texas A&M University-Kingsville, Kingsville, TX, USA  
**Fidel Hernandez**, Texas A&M University-Kingsville, Kingsville, TX, USA  
**R. Dwayne Elmore**, Oklahoma State University, Stillwater, OK, USA  
**Kent Andersson**, Oklahoma State University, Stillwater, OK, USA  
**Craig Davis**, Oklahoma State University, Stillwater, OK, USA  
**Sam Fuhlendorf**, Oklahoma State University, Stillwater, OK, USA  
**Rachel Carroll**, Oklahoma State University, Stillwater, OK, USA  
**Bradley Kubecka**, Tall Timbers; Rolling Plains Quail Research Foundation, Magnolia, TX, USA  
**Rebekah Ruzicka**, Rolling Plains Quail Research Foundation, Ault, CO, USA  
**Dale Rollins**, San Angelo, TX, USA  
**Ryan Luna**, Sul Ross State University, Alpine, TX, USA  
**Blake Grisham**, Texas Tech University, Lubbock, TX, USA  
**C. Brad Dabbert**, Texas Tech University, Lubbock, TX, USA  
**Sarah Fritts**, Texas State University, San Marcos, TX, USA  
**Scott Carleton**, National Park Service, Omaha, NE, USA

**Abstract:** All organisms exist in heterogeneous landscapes, functioning across multiple scales that may be context specific. The scale of effect refers to the spatial scale at which a landscape has the strongest impact on an organism's response, and organisms are expected to have disparate responses across spatio-temporal scales. Understanding the variability in scale of effect is of particular importance in human-altered landscapes, where anthropogenic impacts may affect organisms in unpredictable ways by altering functional heterogeneity. Humans have greatly altered shrubland and grassland ecosystems through land use change, fire suppression, and brush management practices. These impacts are of particular concern to ground-nesting birds, whose reproductive success is highly dependent on landscape configuration. The scaled quail (*Callipepla squamata*) inhabits arid and semiarid ecosystems that exhibit spatio-temporal variability in heterogeneity, partially driven by variability in annual climatic conditions. They have experienced recent range-wide declines, and drivers of this decline remain largely unexplained. In this study, we will use scaled quail nests as a model to analyze how variation in scale of effect is driven by annual variation in landscape context. We will aggregate scaled quail nest locations across four states and two decades to assess variation in scale of effect in relation to annual landscape dynamics and climatic variability determined from the Rangeland Analysis Platform. Results will illustrate intraspecific space-time dynamics of scale of effect within inherently heterogeneous landscapes.

#### **64. Sand Shinnery Oak Prairie Ecoregion Plant Community Composition Response to Various Spring Prescribe-Fire and Post-Fire Rest Regimes in Eastern New Mexico**

**Michael Whitson**, Texas Tech University, Lubbock, TX, USA  
**Blake Grisham**, Texas Tech University, Lubbock, TX, USA  
**Warren Conway**, Texas Tech University, Shallowater, TX, USA  
**David Haukos**, Kansas State University, Manhattan, KS, USA  
**Christian Hagen**, Oregon State University, Corvallis, OR, USA  
**Carlos Villalobos**, Texas Tech University, Lubbock, TX, USA

**Abstract:** Wildfires and grazing by free-ranging herbivores historically directed plant community composition and created mosaics of habitats at scales that met the annual lifecycle needs of several species in the Southern Great Plains. Anthropogenic alteration of natural disturbances through continuous domestic livestock grazing regimes, fire suppression, row-crop agricultural, energy development, urban expansion, coupled with natural influences such as severe droughts, have severely altered plant communities in the Southern Great Plains. These alterations have greatly reduced available critical habitats required to meet the annual lifecycle needs of lesser prairie-chicken (*Tympanuchus pallidicinctus*; LEPC) populations, which have resulted in drastic LEPC population declines. Prescribed fire has been used with success in a variety of landscapes to direct plant community structure and species composition. However, quantification of vegetation response to prescribed-fire regimes and post-fire rest cycles in the Sand Shinnery Oak (*Quercus havardii*) Prairie Ecoregion (SSOP) is limited. Dominant vegetation composition in the SSOP consists of sand shinnery oak, sand sagebrush (*Artemisia filifolia*), and tall, mixed, and shortgrass assemblages. Understanding vegetation community response to prescribed fire and post-fire rest regimes can assist in more efficiently and effectively managing areas of SSOP. Our study area was located on an Area of Critical Environmental Concern in Chaves County, New Mexico, managed for LEPC by the Bureau of Land Management. We surveyed plant community response to 5 spring prescribed-fire treatments, performed 2016 – 2021 by the BLM, using point-step transects ( $n = 385$ ), identifying vegetation to species at points ~2 m apart along ~500-m transects.

## **65. Influence of Pesticides on Avian Malaria Prevalence**

**Katelyn Sanchez**, Texas A&M University, College Station, TX, USA

**McKenna Sanchez**, Texas A&M University, College Station, TX, USA

**Gary Voelker**, Department of Ecology and Conservation Biology, Texas A&M University, College Station, TX, USA

**Sergei V. Drovetski**, Research Associate, Vertebrate Division, National Museum of Natural History, Washington, D.C, Washington, DC, DC, USA

**Abstract:** In recent years, anthropogenic impacts, such as extensive agriculture practices, have contributed to an accelerated decline in wildlife populations (Maxwell et al. 2016). Transmitted via Haemosporidian parasites, avian malaria requires an arthropod vector and can cause varying degrees of complications ranging from lower reproductive success (Knowles, Palinauskas, and Sheldon 2009) to extinction of naive species (Warner 1968). Avian malaria is a persistent threat with the global average infection probability of wild birds over 10% for three of the four haemosporidian parasite genera (Fecchio et al. 2021). We hypothesized that birds exposed to pesticides (cotton production areas) will have a higher prevalence of malaria infections than will birds from non-exposed areas. We present data on the relationship between foraging guilds and the prevalence of avian malaria in areas of high pesticide usage (two sites) versus areas of zero pesticide usage (three sites) in samples taken from Texas birds. We used the polymerase chain reaction (PCR) with three primer sets, targeting the mitochondrial cytochrome-b gene, to determine whether samples were positive for malaria. Samples ( $n = 151$ ) came from four orders of birds: Columbiformes, Galliformes, Piciformes, and Passeriformes. Samples were separated into two categories: dietary niche and cotton exposure levels (exposed or unexposed). Within the diet category, birds were classified as either insectivorous or granivorous.

## **66. Cattle and Quail: An Adaptive Management Strategy for Livestock Grazing as a Quail Habitat Management Tool**

**Callie Swaim**, Rolling Plains Quail Research Foundation, Sweetwater, USA

**Rebekah Ruzicka**, Rolling Plains Quail Research Foundation, Ault, CO, USA

**Bradley Kubecka**, Tall Timbers; Rolling Plains Quail Research Foundation, Magnolia, TX, USA

**Jake Bonnell**, Rolling Plains Quail Research Foundation, Rotan, TX, USA

**Abstract:** Land management decisions, including the decision to do nothing, shape wildlife habitats. Chronic overgrazing of rangelands is detrimental to rangeland health and wildlife species, including quail that compete with grazers for screening and nesting cover. However, resting rangelands that evolved with grazers for extended periods of time can also be detrimental by decreasing species richness, increasing bare ground, and proliferating undesirable vegetation. Moderate grazing with domestic livestock improves ecological function of rangelands and is often used as a tool prescribed to mimic natural disturbance patterns. We will use an adaptive management framework to evaluate the long-term habitat effects of integrating a lightly stocked, rotational grazing program with quail management practices. The Rolling Plains Quail Research Ranch includes approximately 1900 ha of rangeland managed exclusively for quail that has not been grazed by livestock in the previous 10 years. Prior to the reintroduction of cattle, we will establish 45 25-m<sup>2</sup> permanent grazing exclosures and 45 paired, grazed locations within 50 m of each exclosure. We will monitor changes in forage production (lbs/ha), bare ground, and species richness and compare to our control pastures. These data will be compared to guide decisions on the stocking rate and frequency of grazing each pasture. We will record weather data, other influential management actions, and revenues and costs of grazing. We anticipate that the results will demonstrate a trend toward an improved habitat and an example for quail managers to implement grazing on their properties.

## **67. Prevalence of the Raccoon Roundworm (*Baylisascaris procyonis*) in Panhandle and West Texas Raccoons**

**SaraBeth Boggan**, Texas Tech University School of Veterinary Medicine, Amarillo, TX, USA

**Jason Fritzler**, Texas Tech University School of Veterinary Medicine, Amarillo, TX, USA

**Blake Grisham**, Texas Tech University, Lubbock, TX, USA

**Ashley Steuer**, Zoetis, Amarillo, TX, USA

**Abstract:** The raccoon roundworm (*Baylisascaris procyonis*) is a parasitic nematode, found ubiquitously in the small intestine of common raccoons (*Procyon lotor*). With rapid urbanization statewide and the subsequent increased human and wildlife interactions, the raccoon roundworm is a growing One Health concern. *B. procyonis* is a rare, but considered very serious, cause of neurologic and ocular disease in humans. Human infection is more likely to occur when human and wildlife landscape use is overlapped. A previous study conducted in Southern and Central Texas found 5.4% prevalence among raccoons. The objective of this project is to quantify the prevalence of *B. procyonis* in Texas raccoons with special attention to the West and Panhandle regions for which there is virtually no surveillance or epidemiological data. For this project we will collect and evaluate fecal and gastrointestinal (GI) tract samples from raccoons for presence

of *B. procyonis*. Raccoon carcasses will be collected from municipal animal control offices, picking up recently killed (24hr) hit-by-vehicle animals, and hunter-eliminated animals. Fecal samples will be collected from necropsied raccoons and from collaborators with access to fresh raccoon feces. All fecal samples will be examined for presence of *B. procyonis* eggs and GI tract samples will be examined for presence of adult worms. Fecal samples less than 2g will be processed using the fecal sedimentation method. Samples weighing 2g or more will be processed using both Sheather's Sugar and zinc sulfate flotation methods.

#### **68. A novel method on acoustic signal determination for bird conservation using publicly sourced applications.**

**Barbara Kalta**, University of North Texas, Grapevine, TX, USA  
**Andrew Gregory**, Denton, TX, USA

**Abstract:** Agriculture and grazing practices have been shown to reduce wildlife diversity by >18% and abundance by >50%. However, the variability of biodiversity impacts is high and likely linked to the specific grazing practices utilized. We measured bird diversity across four ranches in northeastern Texas that each had a different ranch management tenure and stocking rates. To do this we paired line transect surveys with a novel acoustical monitoring approach to test the efficacy of the Merlin Bird ID app's ability to correctly identify bird richness at a site. Previous acoustic monitoring methods have sought to use machine learning algorithms to identify key focal species. However, this approach can ignore the vast majority of species data available when deploying acoustic monitors. We used the AI in the Merlin Bird ID app with acoustic data that we collected in the field. We then tested the accuracy of bird richness and rarity metrics collected and compared it with line transect surveys that co-occurred at each survey location. Using this acoustic monitoring protocol, we detected 9 species of bird acoustically, and 9 species of birds during the line transect. The acoustic data identified the presence of 3 additional species not observed during transect surveys. In addition, we found that the app had an accuracy of identification of total bird richness and rarity >75% with a false positive rate correctable to <1%. This approach should be useful to future researchers wishing to operationalize acoustic monitors without needing sophisticated, high-end supercomputing resources or training algorithms.

#### **69. The cost of a bun in the oven: using new technology to uncover the role of pregnancy and environmental temperature on heterothermy in white-tailed deer**

**Breanna Green**, CKWRI - Texas A&M Kingsville, Kingsville, TX, USA  
**Evan Tanner**, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA  
**Clayton Hilton**, Texas A&M University-Kingsville, Kingsville, TX, USA  
**Michael Cherry**, CKWRI, Kingsville, TX, USA

**Abstract:** Reproduction is typically the most demanding period of a mammal's life cycle, with late gestation and lactation dramatically increasing energetic demand and fasting metabolic rate. This increase in metabolism creates higher heat loads that may negatively affect the condition and health of the female and her offspring. Additionally, reproduction also affects a mammal's ability to thermoregulate and mitigate external heat stress. Determining the physiological cost of

high environmental temperatures during reproductive periods is key to understanding the possible limits of thermoregulation. Vaginal implant transmitters (VITs) are commonly used for locating white-tailed deer (*Odocoileus virginianus*) birth sites and fawns. We retrofitted VITs with biologging technology including a temperature sensor and data logger to collect high resolution internal temperature data. We collected local environmental temperature data using black-body globes, which account for the influence of solar radiation on ambient temperature. We tested the hypothesis that pregnancy, time of day, and environmental temperatures would influence the internal temperature of white-tailed deer. We analyzed the internal temperature of seven unbred and three bred female deer from March to September 2022. We observed environmental temperatures ranging from -1 to 50°C, and internal temperatures of 33.5-42.5°C. We observed interactive effects of time of day, environmental temperature, and reproductive status on internal temperature. Greatest internal body temperatures occurred in bred females, during the day, at high environmental temperatures. Our approach of integrating novel technology to monitor both environmental temperature and internal body temperature revealed the effects of pregnancy on thermoregulation.

## **Student Poster Removal and Professional Poster Set-up**

### **Professional Poster Session**

#### **1. Northern Bobwhite Covey Locations on Fed and Unfed Ranches in South Texas**

**Catalina Berry**, East Foundation, Laredo, TX, USA

**Abe Woodard**, East Foundation, Sarita, TX, USA

**Amanda Montemayor**, East Foundation, Kingsville, TX, USA

**Aidan Tautges**, East Foundation, Hebbronville, TX, USA

**Cameron Bright**, East Foundation, Hebbronville, TX, USA

**Abstract:** Supplemental feeding is a common management strategy practiced by landowners and hunters for northern bobwhites (*Colinus virginianus*). In South Texas, most ranches begin feeding in early December at the onset of hunting season. The practice is believed to improve hunting efficiency by decreasing the distance coveys are found from access roads and concentrating bobwhites in areas of lower brush density. In 2021, the East Foundation began a research project to investigate the effects of supplemental feed on bobwhite populations. We designated a 2,111-ha fed site in Jim Hogg County along with 2 unfed sites, a 6,118-ha site in Jim Hogg County and a 2,853-ha site in Kenedy County. We distributed grain sorghum weekly along access roads (i.e., quail lanes) on the fed site by spot-feeding at a rate of 19.4 kg/km. We documented covey locations during the 2021–2022 quail hunting season on all 3 sites using the CoveyIQ mobile application. The mean distance of hunter-covey encounters from access roads was  $21.0 \pm 1.4$ -meters on the fed site and  $56.9 \pm 2.2$ -meters on the unfed sites. The mean brush canopy coverage of covey encounters (~50 m radius) was  $16.7 \pm 0.3\%$  on the fed site and  $14.1 \pm 0.3\%$  on unfed sites. According to our findings, supplemental feeding decreases the distance of covey-encounter locations from access roads but does not concentrate coveys in areas of lower brush densities. We recommend that landowners and hunters consider the use of supplemental feeding when the management objective is to improve hunting efficiency.

## **2. Environmental Conditions and the Efficiency of Northern Bobwhite Hunts in South Texas**

**Amanda Montemayor**, East Foundation, Kingsville, TX, USA

**Abe Woodard**, East Foundation, Sarita, TX, USA

**Catalina Berry**, East Foundation, Laredo, TX, USA

**Aidan Tautges**, East Foundation, Hebbronville, TX, USA

**Cameron Bright**, East Foundation, Hebbronville, TX, USA

**Abstract:** Environmental conditions have a direct impact on the behavioral patterns of northern bobwhites (*Colinus virginianus*). In South Texas, environmental conditions vary considerably throughout the seasons. Three of the environmental factors believed to affect bobwhite hunts are temperature, wind speed, and relative humidity. Managers often schedule hunting trips according to the perceived optimal ranges of these factors, attempting to increase hunting efficiency (i.e., coveys/hour). During the 2021–2022 Texas quail hunting season, we recorded the key environmental factors along with the hunting efficiency of 176 quail hunts. The hunts took place on East Foundation properties located in Jim Hogg and Kenedy Counties, Texas. Hunts began on 6 November 2021 and concluded on 26 February 2022. We found the mean hunting efficiency during 514.9 hours of hunting to be  $3.1 \pm 0.11$  SE coveys per hour (range = 0.7–13.7). The mean daily temperature of hunts ranged between 4.4° and 26.6° C, relative humidity ranged between 26% and 95%, and windspeed ranged between 7 and 36 mph. We found no significant correlations ( $P \leq 0.05$ ) with the environmental conditions we measured, despite dramatic differences in mean daily temperatures, relative humidity, and wind speeds. We assume the lack of significance is due to hourly variations in environmental factors and logistical limitations regarding the total amount of coveys that can be found and hunted per hour. According to our findings, hunters can expect hunting efficiency and harvest to remain constant within the daily ranges of environmental conditions typical for South Texas.

## **3. Correlating Density Surface Models with Trapping Success of Northern Bobwhites**

**Aidan Tautges**, East Foundation, Hebbronville, TX, USA

**Abe Woodard**, East Foundation, Sarita, TX, USA

**Catalina Berry**, East Foundation, Laredo, TX, USA

**Amanda Montemayor**, East Foundation, Kingsville, TX, USA

**Cameron Bright**, East Foundation, Hebbronville, TX, USA

**Abstract:** A growing trend in wildlife research is the use of spatially explicit models to estimate the densities of wildlife species, such as density surface modeling and occupancy modeling. One potential use for these models is to focus trapping efforts on areas that are predicted to have higher densities of target species to increase trapping efficiency (i.e., captures per trap hour). Trapping efficiency is often a critical factor of research efforts due to resource limitations (e.g., manpower, vehicles, equipment). To determine whether densities from spatially explicit models can be used to increase trapping efficiency, we have correlated the outcomes of northern bobwhite (*Colinus virginianus*) trapping efforts with density estimates from density surface models. The research took place on the East Foundation's San Antonio Viejo Ranch located in Jim Hogg County, Texas. The distance sampling survey used to construct the density surface



model was conducted on 5 November 2019, and trapping occurred between 13 December 2019 and 9 January 2020. Northern bobwhites were trapped using standard funnel traps baited with grain sorghum. Trained researchers would check traps every 3 hours, documenting when northern bobwhites were captured and whether traps were disturbed by non-target species. We did not find a significant correlation ( $P \leq 0.05$ ) between trapping success and bobwhite densities, but these results may be influenced by our sample size. We will include the 2020–2021, 2021–2022, and 2022–2023 data sets in our final analysis and make determinations regarding the use of spatially explicit models with targeted trapping efforts.

#### **4. Monitoring the Prevalence of Eyeworms in South Texas Bobwhites**

**Cameron Bright**, East Foundation, Hebbronville, TX, USA

**Abe Woodard**, East Foundation, Sarita, TX, USA

**Andrea Montalvo**, East Foundation, Hebbronville, TX, USA

**Catalina Berry**, East Foundation, Laredo, TX, USA

**Amanda Montemayor**, East Foundation, Kingsville, TX, USA

**Aidan Tautges**, East Foundation, Hebbronville, TX, USA

**Abstract:** The increase of eyeworms (*Oxyspirura petrowi*) in northern bobwhites (*Colinus virginianus*; hereafter, bobwhite) is speculated to be a factor in the decline of bobwhite populations in the Rolling Plains Ecoregion of Texas over the last century. Where eyeworm prevalence in the Rolling plains is estimated to be over 40%, researchers in the South Texas Plains have observed eyeworms in less than 10% of the samples collected. Monitoring eyeworm prevalence so it does not become an increasing concern is important to the conservation of bobwhites in South Texas. In this study, we investigated eyeworm prevalence in bobwhites in South Texas via necropsy of hunter-harvested quail from East Foundation ranches in Jim Hogg and Kenedy Counties, Texas. Bobwhite heads were collected during a large-scale harvest study from 2019–2022. Complete necropsies (eyelids, nictitating membrane, lacrimal ducts, lacrimal glands, and Harderian glands) were conducted on 406 bobwhite heads in South Texas to identify eyeworm prevalence in the area. There is a suspected correlation between the age and the prevalence of eyeworms, therefore, samples consisted of both adult ( $n = 89$ ) and juvenile ( $n = 317$ ) bobwhites. We did not find any evidence of eyeworms in the sample of bobwhites. Continuous monitoring of eyeworms and other potentially pathogenic diseases in bobwhites across Texas helps keep the hunting and research community up to date on the changing conditions of an economically important game species. For this reason, we will continue to necropsy bobwhite heads on East Foundation ranches throughout each harvest season.

#### **5. Prescribed Fire Effects on Northern Bobwhite Nest Site Selection and Survival**

**Adam Vonderschmidt**, Rolling Plains Quail Research Foundation, Rotan, TX, USA

**Rebekah Ruzicka**, Rolling Plains Quail Research Foundation, Ault, CO, USA

**Bradley Kubecka**, Tall Timbers; Rolling Plains Quail Research Foundation, Magnolia, TX, USA

**Abstract:** Research in mesic environments has shown northern bobwhite (*Colinus virginianus*; hereafter, bobwhite) require biennial prescribed fire to create and maintain habitat in optimal

seral communities for survival and reproduction. However, there is a lack of data on the relationship between fire, nest site selection, and nest survival in arid environments, such as the Southern Great Plains, where frequent drought may often delay vegetative response following fire. Lack of quick regrowth could reduce usable space and-or reduce survivability of nests lacking concealment in areas burned but not sufficiently recovered. Our goal is to evaluate nest site selection and nest survival as they relate to prescribed fire to refine management recommendations on the scale and timing of burns in arid regions managed for bobwhite. We will integrate a long term (2010-2022) nest survival ( $n = 472$  nests) and location dataset with past prescribed fire application (1,476 ha) on the Rolling Plains Quail Research Ranch in Fisher County, TX, USA. We will estimate nest site selection and nest survival as a function of proportion of burn surrounding nest, time since burn, and drought intensity. We expect nest survival to be lower for nests surrounded by large areas burned in the current year due to lack of concealment and heightened predation risks. However, we suspect the probability of use of these areas will be lower than areas without fire, especially during below-average rainfall conditions. This research will result in refined prescribed fire prescriptions to enhance reproductive conditions for bobwhite in arid regions.

## **6. Herbicide Resources For Wildlife Biologists**

**Stephen DeMaso**, USFWS - Gulf Coast JV, Lafayette, LA, USA

**Megan Clayton**, Texas A&M AgriLife Extension Service, Uvalde, TX, USA

**Shannon Barron**, TPWD, Victoria, TX, USA

**Abstract:** Abstract: When is it appropriate to use an herbicide in wildlife habitat management? Are the problematic plants resprouting brush or perennial weed species? What herbicides are available? What is the difference between suppression and control? These are some of the questions facing wildlife biologists working on wildlife management areas, national wildlife refuges, and private lands. Luckily there are many sources of information available to answer these questions and many others regarding using herbicides. Novice and veteran wildlife biologists need to become more familiar with using herbicides as a tool for managing wildlife habitats and giving science-based advice to private landowners. Our poster will define common terms associated with herbicide use and identify sources of information when using herbicides for wildlife habitat management.

## **7. Improving detectability of the Tamaulipan Spot-tailed Earless Lizard at Laughlin AFB**

**Danielle Walkup**, Texas A&M University, Bryan, TX, USA

**Kathryn Steffen**, Texas A&M University Natural Resources Institute, College Station, TX, USA

**Teresa Kenny**, Texas A&M University, Bryan, TX, USA

**Toby Hibbitts**, College Station, TX, USA

**Corey Fielder**, College Station, TX, USA

**Mathew Kramm**, Texas A&M University Natural Resources Institute, San Antonio, TX, USA

**Roel Lopez**, Texas A&M University Natural Resources Institute, San Antonio, TX, USA

**Wade Ryberg**, Texas A&M University, College Station, TX, USA

**Abstract:** A robust population of the Tamaulipan Spot-tailed Earless Lizard (*Holbrookia subcaudalis*) persists on the airfield at Laughlin Air Force Base, where up to 375 pilots receive flight training annually. The airfield habitat management designed to support this flight training mission is also beneficial to this species, which is being considered for listing under the Endangered Species Act. Intensive radio-telemetry research in 2017 yielded high numbers of *H. subcaudalis* at LAFB. Since then, monthly monitoring surveys in the same area yielded far fewer individuals than expected, although we have no reason to suspect a reduction in population. This suggests these monitoring surveys are better at detecting presence than estimating abundance for *H. subcaudalis*. To improve surveys for abundance estimation, we tested different survey approaches for detecting *H. subcaudalis* at LAFB by simultaneously employing walking and driving surveys in areas where lizards were fit with radio-telemetry tags. We examined variation in detection success across survey months and times, survey type, and weather conditions. We detected 151 *H. subcaudalis* on the airfield during April-August 2022, and captured and marked 73 individuals (24 females, 48 males; 51 adults, 22 juveniles). We detected five times as many *H. subcaudalis* during driving surveys compared to walking surveys, and we detected more *H. subcaudalis* during sunny afternoons (1600-1800 h) in April-May, with temperatures >30°C. Our research results refine survey approaches for *H. subcaudalis* at LAFB and potentially other populations of the species range-wide.

## **8. Effects of Range Management on the Plateau Spot-tailed Earless Lizard, Year 1 Results**

**Kathryn Steffen**, Texas A&M University Natural Resources Institute, College Station, TX, USA

**Danielle Walkup**, Texas A&M University, Bryan, TX, USA

**Teresa Kenny**, Texas A&M University, Bryan, TX, USA

**Toby Hibbitts**, College Station, TX, USA

**Doug Tolleson**, Department of Rangeland, Wildlife and Fisheries Management, Texas A&M AgriLife Research, Sonora Research Station, Sonora, TX, USA

**Roel Lopez**, Texas A&M University Natural Resources Institute, San Antonio, TX, USA

**Paul Crump**, Texas Parks and Wildlife Department, Austin, TX, USA

**Wade Ryberg**, Texas A&M University, College Station, TX, USA

**Abstract:** The plateau spot-tailed earless lizard (*Holbrookia lacerata*) is endemic to Central Texas semi-desert grasslands of the Edwards Plateau. The species is undergoing a status review for federal listing in the U.S. due to perceived population declines across much of its range. Previous research on *H. lacerata* microhabitat showed they are most often found on bare ground and less likely to be found in brushy areas. Range management practices such as grazing and prescribed fire can produce landscape mosaics with more frequent patches of bare ground which in turn may be better habitat for *H. lacerata*. We are using the long-term control, grazing and fire management treatments at Sonora's Texas A&M AgriLife Research Station in northwestern Edwards County to discern which management practices benefit *H. lacerata*. These treatments reflect range management practices already being implemented in the region, meaning that results from this study can be transferred directly into conservation actions to benefit the species. We have completed the first of 3 survey years for *H. lacerata* using a stratified random sampling design with 34 0.8-ha circular survey plots across the control, experimental grazing and fire treatments on the property. We found 7 *H. lacerata* during surveys in the plots and 6 *H. lacerata*

opportunistically. *Holbrookia lacerata* were found primarily in burned (n=4), grazed (n=3) and burned and grazed areas (n=5), but only one was found (opportunistically) in the control areas. While preliminary results are consistent with expectations for this species, we look forward to continuing surveys in 2023-24.

## **9. Texas Statewide Summary of Red Crossbill Location Records by Ecoregion From 2017 to 2021**

**Richard Schaefer**, USDA, Southern Research Station, Nacogdoches, TX, USA  
**Matthew Young**, Finch Research Network, Cortland, NY, USA

**Abstract:** The Red Crossbill RECR (*Loxia curvirostra*) is a Holarctic seed-eating finch with considerable vocal and morphological variation. The complex biology and wanderings of the species made attempts to delineate subspecies difficult. Instead, researchers began to identify RECR based on the structure of their flight calls. In North America, eleven distinctive forms have been identified based primarily on “call type” and bill morphology. Bill size and palate structure differ among some forms, and correspond to the species of conifer seed most efficiently foraged upon. Different call types may represent cryptic species with vocal differences great enough to provide the basis for reproductive isolation. RECR breeding and movements are erratic, and appear to be dependent on conifer seed crops. During times of poor seed production within their core range, crossbills may wander widely in search of food. Here we present a Texas statewide summary of a major RECR invasion that began in Fall 2017. Most RECR reports (97.6 %) were obtained from online eBird checklists. A statewide total of 374 reports from 115 locations are included. The species persisted in Texas into March 2021, but the majority (88%) of reported locations were from October 2017 through May 2018. Seven of the ten Gould ecoregions of Texas reported RECR. The Trans Pecos ecoregion had the most locations (39.1%) followed by the High Plains (19.1%). RECR call type was confirmed for only 28 (7.5%) of the 374 reports with the most common being Type 2 (ponderosa pine) followed by Type 4 (Douglas-fir).

## **10. Free-ranging Domestic Cat Management on Conservation Lands: A Partnership Opportunity**

**Grant Sizemore**, American Bird Conservancy, New Braunfels, TX, USA

**Abstract:** Domestic cats (*Felis catus*) are among the most harmful invasive species globally and are the top source of direct, anthropogenic bird mortality in North America. In addition to their predatory impact, domestic cats are also a source for the transmission of a variety of parasites and diseases to wildlife and people. Domestic cat management, however, is complicated by the species’ close association with people as pets, as well as the compassionate, but often misguided, behavior of individuals tending to unowned domestic cats. This poster focuses on the need for and best practices regarding domestic cat management, including a response framework, technical guidance, and relevant policies, as well as an opportunity for partnership with American Bird Conservancy to implement free-ranging domestic cat management.

## 11. Unexpected Allies: Woodrats and Rabbits Provide Escape Cover for Quail

**Clint Boal**, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

**Abstract:** Habitat management is considered of key importance for conservation of quail species, but some aspects, such as predator-specific escape cover use is poorly understood. We assessed types of escape cover used by scaled quail (*Callipepla squamata*) and Gambel's quail (*C. gambelii*) pursued by trained birds of prey. We collected escape cover data for 68 quail pursued by falconry birds in winter 2021-2022. Quail pursued were Gambel's quail (*Callipepla gambelii*) and scaled quail (*C. squamata*). All pursuits were by either a northern goshawk (*Accipiter gentilis*) or a Eurasian sparrowhawk (*A. nisus*) in the vicinities of Albuquerque or Deming NM. Landcovers of the pursuits were described as Chihuahuan Grassland (26.5%), Cholla-Grassland (19.1%), Sage-Grassland (25.0%), or High Desert (29.4%). The dominant escape cover chosen by quail were woodrat (*Neotoma* spp.) middens (62.5%) associated with prickly pear (*Opuntia* spp.; 27.1%), woody shrubs (22.9%), or cholla (*Cylindropuntia* spp.; 12.5%). Fewer rabbit (*Sylvilagus* spp.) burrows (4.2%) were used but may have been underestimated due to concealment in cover. Prickly pear patches accounted for 14.6% of the standing vegetation used as escape cover, followed by woody shrubs or yucca (6.3%). Preliminarily, our evidence suggests 66.7% of quail escape cover was provided by woodrats and rabbits. Thus, these two species may be important to consider in a community context when managing for quail habitat. We are collecting a second year of data with more falconry birds and sample areas and are including northern bobwhite (*Colinus virginianus*) in the field trials.

## 12. Effectiveness of Using eDNA to Detect Alligator Snapping Turtles

**Cory Adams**, USDA Forest Service, Southern Research Station, Nacogdoches, TX, USA

**Daniel Saenz**, USDA Forest Service, Southern Research Station, Nacogdoches, TX, USA

**Christopher Schalk**, Southern Research Station, USDA Forest Service, Nacogdoches, TX, USA

**David Rosenbaum**, Arthur Temple College of Forestry, Nacogdoches, TX, USA

**Joseph Apodaca**, Tangled Bank Conservation, Asheville, NC, USA

**Abstract:** The alligator snapping turtle (*Macrochelys temminckii*) is being proposed for federal listing as threatened under the Endangered Species Act. Current information on the status, distribution, and abundance of alligator snapping turtles is lacking, which makes development of a comprehensive conservation plan difficult. Development of these management actions is dependent on reliable methodologies that can quantify the presence of alligator snapping turtles. Traditional survey methods (hoop traps) have been proven to successfully capture alligator snapping turtles; however, they can pose a threat to target and non-target species. We sought to evaluate the efficacy of using environmental DNA (eDNA) to determine the presence of alligator snapping turtles. To test this, we surveyed 38 sites by collecting 3L of water per site to test for eDNA. Each site was concurrently surveyed using traditional hoop traps. At 21 sites (55%), we had congruence in detection outcomes of alligator snapping turtles with both eDNA and trapping efforts. At 4 sites (11%) alligator snapping turtles were potentially detected with eDNA and successfully captured in traps, at 11 sites (29%) alligator snapping turtles were captured in traps and eDNA failed to detect presence and at 2 sites (1 potential eDNA and 1 positive eDNA; 5%

combined) alligator snapping turtles were detected with eDNA but no turtles were captured in traps. We successfully used eDNA techniques to detect alligator snapping turtles, however understanding the variability in detection outcomes in the context of habitat covariates would further refine this technique to be used more broadly by natural resource managers.

### **13. Reintroduction of the Louisiana Pinesnake (*Pituophis ruthveni*) in Grant Parish, Louisiana**

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**Abstract:** Ongoing surveys suggest that populations of the Louisiana Pinesnake (*Pituophis ruthveni*) are restricted to a few small blocks of degraded and highly fragmented habitat. The species requires frequently burned sites with a well-developed herbaceous understory capable of supporting populations of its primary prey, Baird's Pocket Gopher (*Geomys breviceps*). Recent changes in management practices on U. S. Forest Service lands have resulted in restoration of substantial blocks of suitable habitat, which are now available for reintroduction. A captive population has been established from wild-caught snakes from Bienville Parish, LA. The reintroduction site is located on the Catahoula District of the Kisatchie National Forest. Two hundred ninety-one individuals have been released to date. Currently, automated pit tag readers and trapping are the primary monitoring techniques. To date, 51 snakes have been detected the year following release, or later. Four of those snakes have been detected 7 or more years following release. Monitoring results suggest that growth and health of released snakes are adequate, and survival is encouraging. Production of neonates in the zoos and release of young will be repeated annually until a viable population is established, or it is concluded that further releases are not likely to result in establishment of a population.

### **14. Finding a GEM: An Integrated and Tiered Approach to Grassland Habitat Treatment Assessment Using the Grassland Effectiveness Monitoring (GEM) Protocols**

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**Daniel Bunting**, Science Applications, U.S. Fish and Wildlife Service, Southwest Region, Austin, TX, USA

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**James Giocomo**, American Bird Conservancy, Durand, IL, USA

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**Adriana Leiva**, Gulf Restoration Program, U.S. Fish and Wildlife Service, Corpus Christi, TX, USA

**Robert Perez**, OPJV/ABC, La Vernia, TX, USA

**Kourtney Stonehouse**, Partners for Fish and Wildlife Program, U.S. Fish and Wildlife Service, Falls Church, VA, USA

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**Abstract:** In recent years, there have been many successful voluntary conservation programs, such as the USFWS Partners Program and the Grassland Restoration Incentive Program (GRIP), that work with private landowners to restore critically declining grassland habitat in Texas (98% privately owned). Though the success of these restoration and conservation programs are a step in the right direction to slow grassland habitat degradation and loss, few monitoring protocols exist that scientifically evaluate the extent to which habitat is successfully restored and if best management practices were used. Therefore, members of the USFWS, USGS, Oaks and Prairies Joint Venture, Texas Parks and Wildlife, and Rio Grande Joint Venture developed the Grassland Effectiveness Monitoring (GEM) protocols which are modified from the Bureau of Land Management Assessment, Inventory, and Monitoring (AIM) strategy, and are compatible with data collected by the Natural Resources Conservation Service National Resource Inventory rangeland on-site survey. Thus, GEM is a statistically robust, user-friendly option to assess the effectiveness of best management practices used in restoring grassland habitat. After two years of pilot field work, GEM is proving to be scientifically sound in its ability to detect changes in vegetation structure post-management. GEM allows users to choose between three different tiered approaches, with each protocol having varying levels of complexity, catering to expertise level, monitoring goals, budget, and project timelines. Therefore, by creating a standardized protocol that can be widely used in grassland restoration across North America, we may be better prepared to understand how management practices are influencing restoration efforts.

## **15. Movement and Habitat Selection of Repatriated Alligator Snapping Turtles in Eastern Texas**

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**Jessica Glasscock**, Stephen F. Austin State University, Nacogdoches, TX, USA

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**Paul Crump**, Texas Parks and Wildlife Department, Austin, TX, USA

**Abstract:** The alligator snapping turtle (*Macrochelys temminckii*) is the largest freshwater turtle in North America. Although *M. temminckii* occur in a variety of riverine habitats, they possess a life history characterized by high juvenile mortality and longer maturation periods. Therefore, mortalities associated with illegal harvest or bycatch may exacerbate local population declines. Knowledge of their spatial ecology in the wild is limited, and only a few translocation studies are known. Here, we investigated the movement and habitat use (i.e., macro- and microhabitat selection) of repatriated *M. temminckii* to explore the feasibility of repatriation efforts. Twenty-three *M. temminckii*, confiscated by federal agents, were released at three sites in east Texas. Turtles were fitted with VHF radios and tracked weekly from June 2021 to July 2022. Microhabitat variables were collected at turtle localities and paired random points. Macrohabitat use was determined in ArcGIS with data from the National Land Cover Database. We performed hierarchical modeling to assess habitat selection with site and seasonal effects as predictors. We found that movement distances decreased in winter months, though seasonal movement varied

across sites. Turtles selected similar microhabitats across sites. However, we found macrohabitat selection was influenced by both seasonal and site effects. This suggests that site characteristics (i.e., hydrological regimes, habitat patch size) on the landscape may affect how individuals respond post-repatriation. More in-depth studies are needed to determine if these efforts may help bolster wild populations. If so, repatriation could be a useful tool for future conservation efforts of *M. temminckii*.

## **16. Behavioral Response of Wild Pigs to Aerial Gunning**

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**Abstract:** Wild pigs are a destructive invasive species, and their population continues to increase. The U.S. government spends \$30.5 million annually to control the wild pig problem. The increase in research on wild pigs has improved the effectiveness of control efforts, but additional work is needed to assess cost:benefit ratio of management techniques. Our objectives were to analyze short-term movement responses and resource selection of wild pigs to aerial gunning pressure. In January and February 2020, we trapped 29 adult wild pigs in an agricultural matrix in Delta County, Texas and fitted each with a GPS collar that collected a location at 1-hr intervals. Texas Wildlife Services carried out aerial gunning of wild pigs from a helicopter platform as part of ongoing management efforts throughout our study area during February 17-27 and March 25-26, 2020. We analyzed GPS locations in 3 stages: two weeks pre-gunning, during gunning, and two weeks post-gunning. We calculated 95% utilization distribution based on biased random bridges, step lengths, and step selection functions to assess resource selection. We used a Before-After-Control-Impact (BACI) design, grouping the wild pigs by helicopter contact status and stage. Wild pigs that had closer contact with the helicopter had higher movement rates and displayed stronger selection for woody cover, but none left the area in response to gunning. Our results will help managers with future decisions on removal efforts and to consider aerial gunning as a practical tool for damage reduction from local pigs.

## **17. Scaled Quail Food Preference in West Texas**

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**Abstract:** The proper management of quail or any wildlife species requires the knowledge of habitat preferences and diet selection. Prior literature investigating diet selection of scaled quail (*Callipepla squamata*) has been performed in Arizona and New Mexico, however, but few have been reported in Texas. Identifying specific food preference can allow proper management of this species in West Texas where scaled quail once flourished but have declined due to poor land use practices. The objective of this project will be to determine food preference by identifying food contents found within the crops of hunter harvested scaled quail in 2014 and 2015 from Presidio County, TX. Each crop will be individually assessed by separating the contents by seed, mast, vegetative, and insect. All contents will be weighed by species to provide an approximate unit of mass. The goal is to develop preference indices based on data collected from each individual crop and prior vegetation sampling that was conducted in 2015 where quail were harvested. The results can assist landowners and agencies with the knowledge of plants that provide valuable habitat and potential nutritional value to improve the sustainability for future scaled quail populations.