



# Celebrating Our Diversity: The People and The Wildlife

24 – 26<sup>th</sup> February 2022

Horseshoe Bay, Texas

### 2021 - 2022 Executive Board

Executive Director President President-elect Vice-President Past President Secretary Treasurer Board Member-at-Large

Archivist

Don Steinbach
Romey Swanson
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Blake Grisham
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John Tomećek
John Purvis
Masi Serna
Maureen Frank

### Program

Andrea Montalvo, Landon Schofield, and Sara Weaver

### Local Arrangements

Mary Pearl Meuth and Yvette Stewart

### Posters

Heather Mathewson

Venue Layout



## **Meeting Schedule**

### Thursday, 24 February 2022

9:00 AM – 12:00 PM	Workshop – Legislative	Live Oak
8:00 AM – 12:00 PM	Workshop – Certification	Cypress
8:00 AM – 12:00 PM	Workshop – Photography	Cedar
8:00 AM – 5:00 PM	Poster Session I Setup	Foyer
8:00 AM – 5:00 PM	Workshop – Plant ID	Travertine
8:00 AM – 5:00 PM	Workshop – Trapping Matters	Post Oak
8:00 AM – 5:00 PM	James G. Teer Leadership Institute	Mesquite
8:00 AM – 5:00 PM	Check-In	Conference Registration
10:00 AM – 12:00 PM	TCTWS Executive Board Meeting	Limestone
11:30 AM – 1:30 PM	Workshop – Wild Game Cooking	Hickory
12:00 PM – 5:00 PM	Art and Photo Contest (Submission)	Conference Registration
12:00 PM – 1:00 PM	Lunch (On Your Own)	
1:00 PM – 2:00 PM	Student Plant ID Contest	Cottonwood
1:30 PM – 3:30 PM	TCTWS Business Meeting	Limestone
3:00 PM – 6:00 PM	Quiz Bowl	Granite Ballroom
6:00 PM – 10:00 PM	Presidents Reception and Student Mentor Mixer	Tower Palm Pavilion
7:00 PM – 10:00 PM	Texas Tech Alumni Reception	Granite Ballroom
7:00 PM – 10:00 PM	Borderlands Research Institute Reception	Granite Ballroom
8:30 PM	Deep In the Heart- Ben Masters	Granite Ballroom

### Friday, 25 February 2022

7:00  AM - 10:00  AM	Art and Photo Contest (Submission)	Conference Registration
7:00  AM - 8:00  AM	Student Breakfast	Tower Palm Pavilion
7:30 AM – 8:30 AM	Coffee and Bagels	Granite Ballroom
8:00 AM – 9:30 AM	Women of Wildlife	Limestone
8:00 AM – 9:30 AM	Poster Session I Judging	Foyer
8:00 AM – 12:00 PM	Poster Session I	Foyer
8:00 AM – 12:00 PM	Professional Plant ID Contest	Cottonwood
$8:00~\mathrm{AM}-5:00~\mathrm{PM}$	Check-In	Conference Registration
$8:00~\mathrm{AM}-5:00~\mathrm{PM}$	Raffle and Silent Auction	Granite Ballroom
$8:00~\mathrm{AM}-5:00~\mathrm{PM}$	James G. Teer Leadership Institute	Mesquite
10:00 AM	Coffee Break Open	Granite Ballroom
9:30 AM – 11:40 AM	Cottam Award Presentations	Granite Ballroom
12:00 PM – 1:30 PM	Lunch (Grab and Go)	Granite Ballroom
12:00 PM – 1:30 PM	Student Chapter Leadership Lunch (Invitation Only)	Tower Palm Pavilion
12:00 PM – 1:30 PM	Past-Presidents Luncheon (Invitation Only)	Yacht Club
12:00 PM – 5:00 PM	Poster Session I Removal and Poster Session II Set-up	Foyer
1:00 PM – 5:00 PM	Art and Photo Contest (Voting)	Granite Ballroom

1:30 PM – 5:00 PM	Conservation Affairs Committee	Limestone
1:30 PM – 3:30 PM	Plenary Session	Granite Ballroom
3:30 PM	Coffee Break Open	
3:45 PM – 5:15 PM	Avian Ecology and Management	Cypress
3:45 PM – 5:15 PM	Big Game Ecology	Post Oak
3:45 PM – 5:15 PM	Humans and Wildlife	Cedar
3:45 PM – 5:15 PM	Amphibian and Reptiles I	Hickory
4:45 PM – 5:45 PM	Wildlife Systems Reception	Travertine
5:00  PM - 6:00  PM	Art and Photo Contest (Pick-up)	Granite Ballroom
6:00 PM – 7:30 PM	Awards Ceremony	Granite Ballroom
7:30 PM – 10:00 PM	Awards Reception and Networking Event	Granite Ballroom
8:30 PM – 10:00 PM	East Foundation Reception	Limestone

## Saturday, 26 February 2022

7:00 AM – 7:30 AM	Fellowship of Christian Conservationists	Travertine
7:30 AM	Coffee and Muffins	Granite Ballroom
8:00 AM – 11:30 AM	Poster Session II	Foyer
8:00 AM – 9:30 AM	Gamebird Ecology and Management	Cypress
8:00 AM – 9:30 AM	Conservation and Ecology of Mammals I	Post Oak
8:00 AM – 9:30 AM	Exotic and Invasive Species	Cedar
8:00 AM – 9:30 AM	Amphibian and Reptiles II	Hickory
8:00 AM – 12:00 PM	James G. Teer Leadership Institute	Mesquite
9:00 AM – 11:00 AM	TCTWS Executive Board Meeting	Limestone
9:30 AM – 10:00 AM	Break	
10:00 AM – 11:30 AM	Wildlife Disease	Cypress
10:00 AM – 11:30 AM	Conservation and Ecology of Mammals II	Post Oak
10:00 AM – 11:30 AM	Natural Resources Management	Cedar
10:00 AM – 11:30 AM	Fire Ecology and Management	Hickory
11:30 AM	Poster Session II Removal	Foyer
11:30 AM	Adjourn	

#### Friday, February 25<sup>th</sup> Cottam Awards Granite Ballroom Moderator: John Young Jr.

- 9:30 Welcome and Introduction, Romey Swanson, President, Texas Chapter of the Wildlife Society
- 9:40: Cottam Competition Introduction, John Young Jr.
- 9:45 **Distribution and Occupancy of The Alligator Snapping Turtle in Texas,** David Rosenbaum; Daniel Saenz; Christopher M. Schalk
- 10:05 Movements and Resource Selection of Wild Pigs in Relation to Crop Growth Stage, Bethany Friesenhahn; Randy W. DeYoung; Humberto L. Perotto-Baldivieso; Michael J. Cherry; Nathan P. Snow; Kurt C. VerCauteren
- 10:25 **Predictors of Occupancy of a Declining Songbird (Bachman's Sparrow) At the Western Extent of Its Range,** Liam G. Wolff; Clifford E. Shackelford; Daniel Saenz; I-Kuai Hung; Christopher M. Schalk
- 10:45 Modeling Pronghorn Behavior and Space-use: Acclimation of Translocated Pronghorn in The Edwards Plateau, Erin C. O'Connell; Justin T. French; Carlos E. Gonzalez; Louis A. Harveson; Shawn S. Gray
- 11:05 Risk of Swainson's Hawks Encountering Wind Turbine Hazards, Katheryn Watson; Clint W. Boal; James D. Ray
- 11:25 Identifying Behavioral States of Ocelots, Bobcats, And Coyotes Using Hidden Markov Models, Maksim Sergeyev; Joseph D. Holbrook; Jason V. Lombardi; Michael E. Tewes; Tyler A. Campbell

#### Plenary Session Pursuing Relevancy in Changing Times Granite Ballroom Moderator: Roel Lopez

- 1:30 Welcome and Introduction, Roel Lopez and Michelle Haggerty
- 1:40 **Pursuing Relevancy in Changing Times**, James G. Teer Conservation Leadership Institute Early Career Professional Program Fellows and Panelist Discussion with Katherine Romans, Hill Country Alliance, David Vela, National Park Service and Neal Wilkins, East Foundation



**Katherine Romans** is the executive director of the Hill Country Alliance, a regional nonprofit working to protect the long-term character of the Texas Hill Country. Katherine's focus at HCA has been on formalizing program areas, growing the organization, and enshrining HCA's collaborative work with partners across the region through a collective impact model.

Katherine brings a decade of nonprofit and legislative experience to the Hill Country Alliance. She worked on national and international wildlife issues as a legislative aide for the Committee on Natural Resources within the U.S. House of Representatives. She has designed and implemented community forestry, green storm water infrastructure, and land conservation programs for local and regional nonprofit organizations.

Katherine holds an undergraduate degree from the University of Virginia and a Master of Environmental Management from Yale's School of Forestry & Environmental Studies. She currently serves on the board of the Hill Country Land Trust and is the chair of the Texas Hill Country Conservation Network, a collaboration of more than 75 nonprofit, academic, and public agencies working to scale conservation impact in Central Texas through collaboration.



A 30-year career veteran of the National Park Service, **David Vela** retired as Deputy Director, Exercising the Authority of the Director of the National Park Service, in August 2020. In this role, he managed over a \$3 billion dollar budget, more than 20,000 employees, and America's 419 national parks. Vela also served as Chair for the Committee for the Preservation of the White House.

Prior to assuming his position, Vela served as Superintendent of Grand Teton National Park and the John D. Rockefeller, Jr. Memorial Parkway; Associate Director for Workforce, Relevancy and Inclusion in the Washington Headquarters; Director of the National Park Service Southeast Region; and Superintendent at Palo Alto Battlefield National Historic Site, Lyndon B. Johnson National Historical Park, and the George Washington Memorial Parkway. Vela also worked in a variety of federal and state posts outside the National Park Service spanning a total of 38 years of public service.

Vela is a graduate of Texas A&M University, with a Bachelor of Science degree in recreation and parks. He is the recent author of *Hola Ranger, My Journey Through The National Parks*. Vela and his wife Melissa have two children, Christina and Anthony, and seven grandchildren.



**Neal Wilkins** is President and CEO of the East Foundation, with a mission of promoting land stewardship through ranching, science, and education. With Headquarters in San Antonio, the East Foundation owns and operates about 218,000 acres of South Texas ranchland where scientists and managers work together to address issues important to wildlife management, rangeland health, and ranch productivity.

Neal has more than 35 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.

Neal is a former Professor at Texas A&M, where he directed the Institute of Renewable Natural Resources and the Texas Water Resources Institute. From 1992-98, he directed wildlife programs for Port Blakely, a 150,000-acre family-owned forestry company headquartered in the US Pacific Northwest. Neal holds a PhD in Wildlife Ecology from the University of Florida, a MS in Wildlife & Fisheries Sciences from Texas A&M University, and a BS in Forestry from Stephen F. Austin State University.

Neal is a director and former Vice-President of Texas Wildlife Association. He is on the Board of Texanby-Nature, the Management Council for the King Ranch® Institute for Ranch Management and is a Professional Member of the Boone & Crockett Club. He and his wife Sandra have two grown children, Ashley and Matt.

#### Session A1: Avian Ecology and Management Cypress Moderator: Madeleine Thornley

- 3:45 Impacts of Woody Plant Removal on Wintering Grassland Bird Communities and Habitat Characteristics in The Marfa Grasslands, Texas, Emily Card; Mieke Titulaer; Carlos E. Gonzalez; Louis A. Harveson
- 4:00 Living at Home: Assessing Inclusive Fitness Benefits Associated with Resource Sharing in A Familial Flocking Songbird, Rebekah Janelle Rylander; Sarah Fritts
- 4:15 No Differences in Body Size and Condition of Purple Martins Along an Urban-rural Gradient in Texas, R. Keith Andringa; Jacquelyn K. Grace
- 4:30 Avian Productivity in South Texas Rangelands, Camryn Kiel
- 4:45 Burrowing Owl Prey Delivery, Lois Balin; Richard Heilbrun; Kelly Norrid; Jon Purvis
- 5:00 Burrowing Owl Nest Site Selection, Lois Balin; Richard Heilbrun; Kelly Norrid; Jon Purvis

#### Session B1: Big Game Ecology Post Oak Moderator: Bryan Spencer

- 3:45 Chronic Limitation of Dietary Energy Cues Trade-off Between Optimum Growth and Reproduction in White-tailed Deer, Levi Heffelfinger; Ryan Reitz; Deanna Pfeffer; David Wester; Randy DeYoung; David Hewitt
- 4:00 Factors Influencing Scaling Relationships of Body and Antler Mass in White-tailed Deer, Willis Sontheimer; Deanna Pfeffer; Floyd Weckerly
- 4:15 Quality or Quantity? Ambient Temperature Influences Selection for Shade Quality in A Large Herbivore, Jacob L. Dykes; Austin K. Killam; Breanna R. Green; Clayton D. Hilton; Evan P. Tanner; Michael J. Cherry; Randy W. DeYoung
- 4:30 Using Mule Deer Movement to Inform Management in A Novel Chronic Wasting Disease Cluster, Calvin C. Ellis; Levi J. Heffelfinger; Shawn S. Gray; David G. Hewitt; Michael J. Cherry
- 4:45 **Sociospatial Organization of Nilgai Antelope in South Texas,** Kathryn M. Sliwa; Jeremy A. Baumgardt; Randy W. DeYoung; J. Alfonso Ortega-S.; David G. Hewitt; John A. Goolsby; Kimberly H. Lohmeyer
- 5:00 Habitat Selection and Movement Behavior of Mule Deer Using an Integrated Step Selection Analysis in Black Gap Wildlife Management Area, Preston L. McKee; Justin T. French; Carlos E. Gonzalez; Louis Harveson; Shawn Gray; Froylan Hernadez

#### C1: Humans and Wildlife Cedar Moderator: Kevin Moczygemba

- 3:45 Transformational Wildlife Funding-Recovering America's Wildlife Act, Richard Heilbrun
- 4:00 Investigating How Relational Values Influence Landowner Participation in An Endangered Species Conservation Program, Jared Messick; Christopher Serenari
- 4:15 **The Long-standing Significance of Genetic Diversity in Conservation,** J. Andrew DeWoody; Avril M. Harder; Samarth Mathur; Janna R. Willoughby
- 4:30 Effects of The Covid-19 Lockdown on The Soundscape of The Wild Basin Wilderness Preserve, Ederéwoma Ohwobete; Darren Proppe
- 4:45 **A Moderated Peer-to-peer Prescribed Fire Outreach Program for Texas Hill Country Landowners,** Kaitlyn Restivo; Dr. Sanford Smith; Dr. Gary Briers; Dr. Maureen Frank
- 5:00 Songbird Behavior and Conservation in the Anthropocene, Darren S. Proppe

#### D1: Amphibians and Reptiles I Hickory Moderator: Kylie Perez

- 3:45 On Understanding Anuran Communities: Sampling Acoustic Data for the Probability of Detection of Species Presence, Teresa Kenny
- 4:00 **Detectability of Spot-Tailed Earless Lizards by Various Methods and Lizard Densities,** Drake Rangel; Christin Moeller; Luke Willard; Scott E. Henke; Cord B. Eversole; Ruby Ayala
- 4:15 Using Museum Collections and Citizen Science to Investigate Changes in Species Distributions in Texas, Toby J. Hibbitts; Danielle K. Walkup; Price Brown; Wade Ryberg
- 4:30 **Mapping Dunes Sagebrush Lizard Habitat,** Danielle K. Walkup; Bret A. Collier; Kevin L. Skow; Wade A. Ryberg; Toby J. Hibbitts; Lee A. Fitzgerald; Roel R. Lopez
- 4:45 **Monitoring Western Massasaugas with Camera Traps on Private Lands in The Trans-Pecos,** Wade A. Ryberg; Danielle Walkup; Corey Fielder; Brandon Bowers; Toby Hibbitts; Paul Crump; Russell Martin; Krysta Demere
- 5:00 **Daily Emergence Behavior of Captive Spot-Tailed Earless Lizards,** Drake Rangel; Christin Moeller; Luke Willard; Scott E. Henke; Cord B. Eversole; Ruby Ayala

#### Saturday, February 26<sup>th</sup> A2: Gamebird Ecology and Management Cypress Moderator: Landon Schofield

#### 8:00 **Open**

- 8:15 Characteristics of Texas Quail Hunting, Jon Purvis; Robert Perez
- 8:30 **Distributional Responses of Northern Bobwhites to Hunting Pressure in South Texas,** Donal A. Woodard; Leonard Brennan; Fidel Hernández; Humberto Perotto-Baldivieso; Neal Wilkins; Andrea Montalvo
- 8:45 **Connecting the Dots: A Social-Ecological Assessment of the Northern Bobwhite Decline in Texas,** Kristyn G. Stewart; Fidel Hernández; Alejandra Olivera-Mendez; Jon S. Horne; Sabrina H. Szeto; Angela M. Guerrero; John W. McLaughlin
- 9:00 Variance in Clutch Size and Egg Morphology of Lesser Prairie-Chickens Across a Climate Gradient, Sophie A. Morris; Clint W. Boal; David A. Haukos; Blake A. Grisham
- 9:15 **Open**

#### B2: Conservation and Ecology of Mammals I Post Oak Moderator: Miranda Hopper

#### 8:00 **Open**

- 8:15 **The Effect of 60 Years of Translocations on Populations of Texas Desert Bighorn Sheep,** Emily A. Wright; Rachael C. Wiedmeier; Emma K. Roberts; Froylan Hernandez; Warren C. Conway; Robert D. Bradley
- 8:30 Species-Specific Effectiveness of An Ultrasonic Acoustic Bat Deterrent: Implications for Wind Energy, Sarah R. Fritts; Brittany Stamps; Emma Guest; Cris Hein; Amanda Hale; Brogan Morton; Sara Weaver
- 8:45 Activity Patterns and Prey Selection by South Texas Bats, Kylie F. Perez
- 9:00 Predictive Occurrence Models for Bat Species in Texas, Natalie M. Hamilton
- 9:15 **Temporal Resource Partitioning of Aoudad, Desert Bighorn Sheep, and Mule Deer in The Trans-Pecos Region, Texas,** Olivia C. Gray; Justin T. French; Carlos E. Gonzalez; Louis A. Harveson; Froylan Hernandez; Shawn Gray

#### C2: Exotic and Invasive Species Cedar Moderator: Andrea Montalvo

- 8:00 Diet Preference in Feral Pigs: Comparing Feed Intake and Visitation Rates Among Different Feeds, Lee Harris Williamson; Justin Foster; John Kinsey; Nathan Snow
- 8:15 **The Influence of Income and Loss on Hunters' Attitudes Towards Wild Pigs and Their Management,** Samantha Jane Leivers; Keith M. Carlisle; Rachel L. Connally; Maureen G. Frank; John M. Tomecek
- 8:30 Patterns of The Introduction and Spread of The Non-native Brown Widow Spider in The Americas, Ashley C. Wahlberg; Reuber Antoniazzi; Christopher M. Schalk
- 8:45 Genetic Variation of Invasive Axis Deer in Texas and Other Introduced Populations Globally, Matthew J. Buchholz; Emily A. Wright; Blake A. Grisham; Robert D. Bradley; Thomas L. Arsuffi; Warren C. Conway
- 9:00 Discrete Climatic Events and Non-native Species: The Effects of Winter Storm Uri on Axis (Axis axis) Deer Mortality and Ecology, Brittany L. Slabach; Matthew J. Buchholz; Warren C. Conway; Blake A. Grisham; Kelly Lyons; Troy Murphy
- 9:15 **Open**

#### D2: Amphibians and Reptiles II Hickory Moderator: Mycha Van Allen

- 8:00 **Repatriation of Illegally Collected Alligator Snapping Turtles into Native Texas Waters,** Connor S. Adams; Paul Crump; Christopher M. Schalk
- 8:15 **Investigating the Phylogenetic Relationships of Sirens in Texas,** Jessica M. Heckman; Peter A. Scott; Richard T. Kazmaier
- 8:30 **Top Predators Drive Community Structure of Tadpole Assemblages,** Tatiana Joaqui; Daniel Saenz; Cory Adams; Toby Hibbitts; Christopher Schalk
- 8:45 **Comparative Calling Phenology of Anurans Across Latitudinal Gradients,** Veda Allen; Daniel Saenz; Christopher Schalk
- 9:00 **Open**
- 9:15 **Open**

#### A3: Wildlife Disease Cypress Moderator: Teresa Kenny

- 10:00 Influence of Cattle Fever Tick Control Methods on Tick Abundance in White-tailed Deer, Jeremy A. Baumgardt; Ashley G. Hodge; Randy W. DeYoung; J. Alfonso Ortega-S; David G. Hewitt; John A. Goolsby; Kimberly H. Lohmeyer
- 10:15 Evaluating the Effects of a Tick Salivary Antigen Cocktail as An Anti-tick Vaccine for White-tailed Deer, Alec Baker; Tammi Johnson; Albert Mulenga; Pia Olafson
- 10:30 Assessing Genetic Susceptibility of Pronghorn (Antilocapra americana) to Prion Diseases Through Prnp Gene Sequencing, Angela M. Grogan; Emily A. Wright; Matthew J. Buchholz; Courtney L. Ramsey; Robert D. Bradley; Warren C. Conway
- 10:45 Monitoring White-tailed Deer Border Crossings Relative to Management Efforts for Cattle Fever Ticks Along the USA- Mexico Border, Ashley G. Hodge; Jeremy A. Baumgardt; Randy W. DeYoung; Michael J. Cherry; Aaron M. Foley; David G. Hewitt; John A. Goolsby; Kim H. Lohmeyer
- 11:00 Respiratory Microbiomes of Aoudad and Desert Bighorn Sheep in Texas, Rachael C.
   Wiedmeier; Emily A. Wright; Bob Dittmar; Robert D. Bradley; Warren C. Conway; Caleb D.
   Phillips
- 11:15 **Open**

#### B3: Conservation and Ecology of Mammals II Post Oak Moderator: Derek Malone

- 10:00 Influence of Fine-scale Landscape and Vegetation Structure on Bobcat Use of Highway Wildlife Crossings in Cameron County, Texas, Thomas J. Yamashita; Humberto L. Perotto-Baldivieso; Zachary M. Wardle; Richard J. Kline; Michael E. Tewes; John H. Young Jr.; Jason V. Lombardi
- 10:15 Are Mountain Lions Really Eating Feral Horses? Pat Jackson; Peter Iacono; David Stoner; Kathryn Schoenecker
- 10:30 Response of Ocelots to Paved and Unpaved Roads in Ranchland and Fragmented Systems in Southern Texas, Jason V. Lombardi; C. Jane Anderson; David B. Wester; Shelby B. Carter; AnnMarie Blackburn; Amanda M. Veals; Humberto L. Perotto-Baldivieso; Landon Schofield; John H. Young; Michael E. Tewes
- 10:45 Habitat Partitioning Between Black-backed And Side-striped Jackals in South Africa, Ian A. Mack II; Thomas W. Schwertner; Hemanta Kafley; Heather Mathewson; Jeff Breeden; Cheyenne Mack; Tiffany Nash
- 11:00 **Open**
- 11:15 **Open**

#### C3: Natural Resources Management Cedar Moderator: Lily Evans

- 10:00 **Disentangling the Competitive Interactions of Cattle and White-tailed Deer,** Bryan D. Spencer; David G. Hewitt; Randy W. DeYoung; J. Alfonso Ortega-S.; Aaron M. Foley; Tyler A. Campbell; Landon R. Schofield; Michael J. Cherry
- 10:15 Evaluating the Use Of the "Rangeland Analysis Platform" in Large-scale Stocking Rate Decisions in South Texas, Andrea Montalvo; Camryn Endler; Jason Sawyer
- 10:30 The Value of Wildlife Biodiversity: A Review and Empirical Study to Quantify and Monetize Wildlife Biodiversity Benefits of Restoring Native Grassland Plant Communities, Mycha Van Allen
- 10:45 **Determining the Effect of Invasive Vegetation on Small Vertebrate Communities,** Andrew Mullaney; Cord Eversole
- 11:00 A Monitoring Program to Evaluate the Coastal Grassland Restoration Incentive Program, Stephen J. DeMaso; WIlliam G. Vermillion; Mark W. Parr
- 11:15 **Can Cropping Rate Variability Reduce the Costs of Antipredator and Social Vigilance?,** Elizabeth Kurpiers; Floyd Weckerly

#### D3: Fire Ecology and Management Hickory Moderator: Lindsey Chiesl

- 10:00 **Effects of Prescribed Burning on Butterfly Populations in Coastal South Texas,** Rebecca Zerlin; Sandra Rideout-Hanzak; David B. Wester; Richard Patrock; Tyler Campbell; Landon Schofield; Juan Elissetche
- 10:15 Prescribed Fire Effects on White-tailed Deer Browse Quality and Herbaceous Forage Production in The Pineywoods of Texas, Wyatt L. Bagwell; Brian P. Oswald; Kathryn R. Kidd; Jessica L. Glasscock
- 10:30 Fire and Mice: The Effects of Prescribed Burns on Rodent Communities, Margaret T. Sinner
- 10:45 Effects of Prescribed Fire on White-tailed Hawk Nesting Locations at El Sauz Ranch, Madeleine A. Thornley
- 11:00 **Open**
- 11:15 **Open**

#### Poster Session I 8:00 AM – 12:00 PM Friday, 25 February (Judging 8:00 AM – 9:30 AM) Foyer Organizer: Heather Mathewson

- 1. Northern Bobwhite Response to Habitat Restoration in Eastern Texas, Trey E. Johnson; Bradley W. Kubecka; C. Brad Dabbert
- Correlates of Singing Phenology of a Declining Songbird: Implications for Monitoring Programs, Liam G. Wolff; Daniel Saenz; Clifford E. Shackelford; I-Kuai Hung; Christopher M. Schalk
- 3. Nest Site Selection and Nest Survival of Avian Communities in Pinyon-juniper Woodlands Undergoing Thinning Prescriptions, Tucker Davidson; Clint Boal; Corrie Borgman
- 4. **Difference in Reproduction Between Two Subspecies of Translocated Northern Bobwhite,** Emily Vincik; John Palarski; Brad Kubečka; Dale Rollins; Heather Mathewson
- 5. **Carnivore Community Interactions in a Brush Managed Landscape,** Aidan B. Branney; Thomas J. Yamshita; Jason V. Lombardi; Michael J. Cherry; Michael E. Tewes
- 6. Avian Diversity at the Urban-wildland Interface in South Texas, Catalina Berry; Cord Eversole
- 7. Population and Parasitism Rate Estimates for Black-capped Vireos in Kickapoo Caverns State Park – 2021, Brendan M. Mulhall; M. Clay Green; James J. Giocomo
- 8. Determining Wildlife Crossing Structure Performance Compared to Wildlife Movement Through Surrounding Habitat, Caitlin K. Brett; John H. Young Jr.; Richard J. Kline
- 9. An Assessment of Prescribed Grazing for Lesser Prairie-chickens on Beef Herd Health and Productivity, Lily Evans; Michael Whitson; Carlos Villalobos; Darren Hudson; Christian Hagen; Blake Grisham
- 10. **Comparison of Traffic and Noise Levels Along Two Highways in Southern Texas,** Anna Rose Mehner; John H. Young Jr; Richard J. Kline
- 11. Modification to Existing Wildlife Guards to Prevent Wildlife Use Along a South Texas Highway, Madison T. Nadler; Kevin Ryer; John Young Jr.; Richard J. Kline
- 12. **Habitat Characteristics of Plains Spotted Skunks on a South Texas Rangeland,** Duston R. Duffie; Scott E. Henke; Andrew J. Mullaney; Cord B. Eversole
- An Assessment of Small Mammal Diversity, Population Demography, Occupancy, and Damage Among Three Irrigation Systems in Row Crops on the Southern High Plains, Annie Braack; Blake Grisham

- 14. **Extreme Weather Effects on Butterflies--it'S Snow Laughing Matter,** Rebecca Zerlin; Sandra Rideout-Hanzak; David B. Wester; Richard Patrock; Tyler Campbell; Landon Schofield; Juan Elissetche
- 15. Understanding Flexibility of Habitat Use by an Apparent Short-grass Specialist in The Texas Gulf Coastal Plain, Tara L. Rodkey; Bart M. Ballard; Richard B. Lanctot
- 16. **Playing 'Hide and Seek' With Texas Tortoises: Value of a Detector Dog,** Christin Moeller; Drake Rangel; Luke Willard; Scott E. Henke; Cord B. Eversole
- 17. An Assessment of Fine Scale Microclimate Conditions in Purple Martin Artificial Housing and its Influence on Nest Survival, Lainey Taylor; Ariana Rivera; James D. Ray; Blake A. Grisham
- Morphometric, Coloration, and Behavioral Differences Between Plateau and Tamaulipan Spot-tailed Earless Lizards, Drake Rangel; Christin Moeller; Luke Willard; Scott E. Henke; Cord B. Eversole; Ruby Ayala; Brian K. Loflin
- 19. **Diet Preferences of Captive Plateau and Tamaulipan Spot-tailed Earless Lizards,** Ruby Ayala; Drake Rangel; Christin Moeller; Luke Willard; Scott E. Henke; Cord B. Eversole
- **20.** Open
- 21. Nest Success and Habitat Selection Response of Lesser Prairie-chicken to Grazing and Prescribed Burning Treatments, Michael D. Whitson; Blake A. Grisham; Christian A. Hagen; Warren C. Conway; David A. Haukos; Carlos Villalobos
- 22. Mercury Contamination in Alligator Snapping Turtles of Texas, David Rosenbaum; Daniel Saenz; Christopher Schalk
- 23. Avian Community Response to Thinning Prescriptions in Pinyon-juniper Woodlands, Ariana Rivera; Lucas J. Schilder; Clint W. Boal
- 24. Body Condition and Relative Abundance of Four Turtle Species Across a Gradient of Ecological Integrity, Tristan Brownjohn; David Rosenbaum; Christopher Schalk
- 25. **Distribution and Co-occurrence of Carnivores in Big Bend National Park,** Caitlin Camp; Sky Stevens; Louis Harveson; Thomas Athens; Patricia Moody Harveson
- 26. **Parental Behavior and Time Budgets of Nesting White-tailed Hawks,** Kaylyn E. Smith; Madeleine A. Thornley; Michael L. Morrison
- 27. The Effects of Investigator Disturbance on Nesting White-Tailed Hawks in South Texas, Brianna L. Simonds; Madeleine A. Thornley; Michael L. Morrison
- 28. **Inventorying Woody Vegetation Using Remote Sensing Techniques in South Texas,** Kaylee L. Lovejoy; Lori D. Massey; Michael T. Paige; Rider C. Combs; Humberto L. Perotto-Baldivieso

- 29. Soil Seed Bank Composition in a Native and a Restored Tallgrass Prairie at Multiple Depths, Emily R. Bishop; Tyler C. Wayland; Keith A. Pawelek; Sandra Rideout-Hanzak; Dustin A. Golembiewski; Brianna M. Slothower; David B. Wester
- 30. Effects of Road Mortality Mitigation Structures on Rodent Community Composition, Rodent Activity, and Predator-prey Dynamics in South Texas, Adam Sanjar; Kevin Ryer; John H. Young Jr.; Richard J. Kline
- 31. **Spatial Ecology and Habitat Use of the Texas Alligator Lizard,** Corey Fielder; Jared Holmes; Toby Hibbitts; Wade Ryberg
- 32. Avian Community Dynamics Within a Riparian Corridor: A 12 Year Perspective, Alejandra S. Martinez; Jessica L. Glasscock; Christopher M. Schalk; Reuber Antoniazzi; Selma N. Glasscock
- 33. Latency to Initial Detection for Mammalian Species in a Mixed Hardwood-pine Forest, Abby C. Buckner; Christopher B. Carter
- 34. Quantifying Increasing Temperatures From 2021-2060 Using Global Climate Models: Potential Implications for Woody Cover Encroachment, Amanda L. Montemayor; Annalysa M. Camacho; Humberto L. Perotto-Baldivieso; Evan P. Tanner; Shad D. Nelson; Dwain Daniels
- 35. Coyote Population Dynamics and Food Habits in the Mojave Desert Region, Danielle C. Deming; Warren C. Conway; Brian T. Henen; Robert T. Bradley; Emily A. Wright; Courtney L. Ramsey
- 36. Effect of Estimated Fecal Age and Sample Storage Techniques on Coyote DNA Amplification in The Mojave Desert Region, Andrew T. Dotray; Danielle C. Deming; Brian T. Henen; Robert D. Bradley; Emily A. Wright; Warren C. Conway
- 37. Can Light to Moderate Cattle Grazing Stocking Rates Improve Bobwhite Habitat?, Jose Silverio Avila Sanchez; Bradley K. Johnston; Humberto L. Perotto Baldivieso; J. Alfonso Ortega-S.; Leonard A. Brennan; Fidel Hernandez; Jason W. Karl
- 38. Correlation Among Demographic Rates and the Influence of Catastrophic Weather Events on Montezuma Quail in the Trans-Pecos of Texas, Maya A. Ressler; Justin French; Fidel Hernández; Ryan Luna
- 39. **Bird-window Collisions Trends on a Central Texas University Campus,** Katelyn Zak; Blakely Eller; Gracie Granados
- 40. **Estimating the Feasibility of Thermal Drones for Wildlife Surveys in South Texas,** Lori D. Massey; Zachary J. Pearson; Aaron Foley; Humberto L. Perotto-Baldivieso; Jeremy Baumgardt
- 41. **Arthropod Biodiversity in Response to Juniper Removal Within Riparian Buffers,** Josef A. Leachman; Kathryn Burton; Darrel B. Murray; Adam B. Mitchell; Heather A. Mathewson

- 42. **Reaction of Nilgai to Motion Activated Sprayer Systems for Cattle Fever Tick Management,** Akari Katsuta; Kathryn M. Sliwa; Jeremy A. Baumgardt; Randy W. DeYoung; J. Alfonso Ortega-S; David G. Hewitt; John A. Goolsby; Kimberly H. Lohmeyer
- **43.** Open
- 44. **Nesting Success of Scissor-tailed Flycatchers in Rural Vs. Urban Habitats,** Lindsey Chiesl ; Heather Mathewson
- 45. **Evaluation of Unmanned Aerial Vehicles (UAV) o Quantify Wild Pig Damage to Corn,** Bethany Friesenhahn; Lori D. Massey; Randy W. DeYoung; Michael J. Cherry; Justin W. Fischer; Nathan P. Snow; Kurt C. VerCauteren; Humberto L. Perotto-Baldivieso
- 46. **Assessment Of Environmental Contaminants in Obligate Avian Scavengers,** Michael A. Kalisek; Ashley M. Tanner; Evan P. Tanner; Clayton D. Hilton; Christine Hoskinson; Richard L. Sramek; Katie Garwood; Michael J. Bodenchuk
- 47. Are Undergraduate Wildlife Students Better Equipped than Their Agricultural Peers in Managing a Complex Agro-ecological Conflict? Initial Results from A Dynamic Role-playing Simulation, Benjamin L. Turner; Lane Michna; Kristyn G. Stewart
- 48. **Population Assessment of Semi Aquatic Turtles in the Cross Timbers Ecoregion, Texas, USA,** Doreen M. Mata; Tiffany C. Nash; Devin R. Erxleben; Cameron Martin; Thomas W. Schwertner; Heather A. Mathewson
- 49. **A Habitat Suitability Index Model for Giraffe (***Giraffa Camelopardalis***) in Southern Africa,** Tiffany C. Nash; Thomas W. Schwertner; Heather A. Mathewson; Hemanta Kafley; Ian A. Mack II
- 50. **Monitoring he Effectiveness of Redesigned Wildlife Exits Along a South Texas Highway,** Jamie Langbein; Kevin Ryer; John Young Jr.; Richard Kline
- 51. Assessing Mammal Diversity in Cross Timbers and Post Oak Savannah Ecoregions, Meghan E. Anderson; Chloe Bates; Humberto L. Perotto-Baldivieso; William P. Kuvlesky Jr.; Daniel J. Ramirez Jr.; Joshua Allison; J. Alfonso Ortega Sr.; Leonard A. Brennan; Jason V. Lombardi; Thomas J. Yamashita; Willis Sontheimer
- 52. Short-term Weather Variables Affect Avian Body Condition, Michael McCloy; Jacquelyn K. Grace
- 53. Herptile Microhabitat Use in the Cross Timbers Ecoregion of Texas, Marshall J. Mills; Kathryn Burton; Josef Leachman; Heather Mathewson
- 54. **Broad-scale Population Trend for the California Quail in California: Inferences from a Cycling Population,** Sarah Jacobson; Leonard Brennan; Humberto Perotto-Baldivieso; Evan Tanner; Katherine Miller
- 55. Utilizing Individual Identification to Evaluate Usage of Bobcats at Wildlife Exits on A South Texas Highway, Victoria Hanley; Zarina Sheikh; John H. Young Jr.; Richard J. Kline

- 56. Characterization of Black-capped Vireo Habitat at Government Canyon State Natural Area, San Antonio, Texas, Clifton Cooper; Thomas Bates; Brittany L. Slabach
- 57. Influence of Woody-plant Diversity and Invasive-grass Cover on Habitat Use of Scaled Quail in South Texas, Tate Scott; Alejandro Bazaldua; Kristyn G. Stewart; Fidel Hernández; David Kitner; Steve Scott
- 58. **Influence of Prescribed Burns on Vegetation in the Edwards Plateau,** Catherine E. Edwards; Deanna Pfeffer; Heather A. Mathewson
- 59. The Effects of Urban Heat Islands on Northeast Texas Anurans, Andrew P. Savage
- 60. **Bobwhite Response to Cattle Grazing in South Texas,** Bradley Kye Johnston; Alfonso Ortega-s; Leonard A. Brennan; Humberto L. Perotto-Baldivieso; Fidel Hernandez
- 61. **Experimental Infestations of White-tailed Deer with Ticks to Study Tick Feeding and Reproductive Parameters,** Alec Baker; Tammi Johnson; Albert Mulenga; Pia Olafson
- 62. **Comparison of Night and Day Road Mortality Detections in South Texas,** Alexa Campos; Adam Sanjar; Caitlin Brett; John Young Jr.; Richard J. Kline
- 63. Open
- 64. **Comparing Acoustic Detection and Thermal Imaging for Wind Energy Tier 3 Bat Risk Assessments,** Robert Tyler; Sarah Fritts; Sara Weaver; Brogan Morton; Nevin Durish
- 65. Quantifying Population Trends and Habitat for he Chestnut-bellied Scaled Quail in South Texas, Dakota Raine Moberg; Lori Massey; Humberto L. Perotto-Baldivieso; Evan P. Tanner; Leonard A. Brennan; Jesus G. Franco-Pizana
- 66. **How Long Do Native Grasses Remain Viable in the Seedbank?,** Brianna M. Slothower; Anthony Falk; Sandra Rideout-Hanzak; Dustin A. Golembiewski; Emily R. Bishop; David B. Wester
- 67. Assessing the Prevalence and Severity of Sarcoptic Mange on Coyotes in South Texas, Krystal A. Ruiz; Kathyrn M. Sliwa; Jeremy A. Baumgardt; Jeremy Baumgardt; Randy W. DeYoung; J. Alfonso Ortega-S; David G. Hewitt; John A. Goolsby; Kimberly H. Lohmeyer
- 68. **Population Density and Breeding Success of American Kestrels in Erath County,** Alyssa Ruth Hurley; Heather Mathewson
- 69. Comparing the Distribution of White-tailed Deer Before and After an Extreme Climate Event: Winter Storm Uri in Texas, Daniel Javier Ramirez; Chloe Bates; Humberto L. Perotto-Baldivieso; William P. Kuvlesky Jr.; Joshua Allison; Meghan Anderson; J. Alfonso Ortega-S; Lenny Brennan; Jason V. Lombardi; Thomas J. Yamashita; Willis Sontheimer
- 70. Like Father, Like Son? Estimating Breeding Values for Antler Size in Male White-tailed Deer, Cole C. Anderson; Randy W. DeYoung; Michael J. Cherry; Charles A. DeYoung; David G. Hewitt; Matthew Moore; Stuart W. Stedman

- 71. **Grazing Pressure Bison Have on Arthropods and Vegetation Community at Caprock Canyons State Park, Texas,** Ty C. Cosper; Heather Mathewson; Molly Koeck; Donald Beard; Adam Mitchell
- 72. **Can Remote Cameras be Used to Access Tick Loads on Nilgai Antelope,** Nadia N. Castanon; Kathryn M. Sliwa; Jeremy A. Baumgardt; Randy W. DeYoung; J. Alfonso Ortega-S; David G. Hewitt; John A. Goolsby; Kimberly H. Lohmeyer
- 73. Population Density of Northern Cottonmouth Snakes (*A. piscivorus*) within Constructed Wetland Complexes, Sarah Jean Morris
- 74. Effect of Microclimate on Nest Selection and Nesting Success in the Black-crested Titmouse, Jamie Liang; Troy G. Murphy
- 75. Using Large Ungulates as Sentinels to Predict Present and Future Distribution of Cattle Fever Ticks in Texas, Ashley Gray Hodge; Jeremy A. Baumgardt; Randy W. DeYoung; Michael J. Cherry; Aaron M. Foley; David G. Hewitt; John A. Goolsby; Kim H. Lohmeyer
- 76. Activity Patterns of Ocelots, Bobcats, and Coyotes on Private Rangelands in South Texas, Zachary M. Wardle; Jason V. Lombardi; Michael E. Tewes
- 77. Niche Divergence of a Drought Deciduous Shrub and its Implications on Range Expansion Under Changing Climate Scenarios, Katie J. Pennartz; Evan P. Tanner; Anthony Falk; Megan K. Clayton; Humberto L. Perotto-Baldivieso
- 78. **A Comparison of Sparrow Diversity in Northeast Texas,** Emily McGhee; Heather Mathewson; Kathryn Burton; John Palarski
- 79. Song Diversity of Bachman's Sparrows in East Texas, Kasey L. Jobe
- 80. Multi-scale Habitat Selection of Breeding Female Northern Pintails in The Prairie Pothole Region, Matti R. Bradshaw; Georgina R. Eccles; James H. Devries; Kevin J. Kraai; Daniel P. Collins; Jay A. Vonbank; J. Dale James; Paul Link; Mason Cline; Bart M. Ballard

#### Poster Session II 8:00 AM – 11:30 AM Saturday, 26 February Foyer Organizer: Heather Mathewson

- 1. **An Evaluation of Western Chicken Turtle Survey and Capture Methods in Texas,** Brandon Bowers; Danielle Walkup; Toby Hibbitts; Paul Crump; Wade Ryberg
- 2. Butcherbirds in the Ballfield Monitoring Urban Loggerhead Shrike Nests Through Community Science, Anna Matthews; Tania Homayoun; James Giocomo; R. Craig Hensley
- 3. Seasonal Variation in Crop Damage of Wild Pigs (*Sus Scrofa*) In Northeast Texas, Matthew Swerdfeger
- 4. **Scavenger Guild Diversity and Carrion Use During a Mass Mortality Event,** Samantha J. Leivers; Anna C. Racey; Gracie Daugherty; Tyler A. Campbell; John M. Tomeček
- 5. **Tree Squirrel Occupancy in Burned and Unburned Pine-dominated Forest Stands on The Sam Houston National Forest,** Richard Schaefer; Howard Williamson; Rusty Plair; Adam Terry; Nancy Koerth
- 6. **Feasibility Of Using Scat in Population Studies of Texas Horned Lizards,** Scott E. Henke; David B. Wester; Cord B. Eversole; Javier O. Huerta
- 7. Decline Of the American Bald Eagle on Lake Buchanan, Texas, Jared Daniel Guidry
- 8. A Comparison of Surface Water Extraction Techniques to Identify Wetland Availability for Wintering Waterfowl in North America, Eve M. Schrader; Georgina R. Eccles; Emily D. Wells; Humberto L. Perotto-Baldivieso; Bart M. Ballard
- 9. **Development Of Habitat Suitability Models to Analyze Rio Grande Wild Turkey Survey Methodologies,** Chloe E. Bates; Humberto L. Perotto-Baldivieso; William P. Kuvlesky; Alfonso Ortega Santos; Leonard A. Brennan; Lori D. Massey; Michael T. Page; Willis Sontheimer
- 10. **Rx Burn Trailers in Texas,** Thomas S. Janke; Heath D. Starns; Derek Wiley
- 11. **Monitoring Arthropod Biodiversity in Erath County Agriculture Fields,** Lark Holland Trainer; Adam B. Mitchell
- 12. **Abundance Of Rio Grande Wild Turkey in Central Texas,** Joshua Allison; Chloe Bates; Humberto Perotto-Baldivieso; William Kuvlesky; Alfonso Ortega Santos; Meghan Anderson; Daniel Ramirez; Lenny Brennan; Jason Lombardi; Thomas Yamashita; Willis Sontheimer
- Trait-isotope Relationships of Snakes in East Texas Pine Forests, Connor S. Adams; Carmen G. Montana; Daniel Saenz; Christopher M. Schalk
- 14. **Assessing Texas Kangaroo Rat Habitat Management and Population Connectivity,** Derek Malone; Clint W. Boal; Russel Martin; Richard Stevens; Carlos Villalobos

- 15. **Doves Slap the S\*\*t Out of Each Other: Morphological Analysis of Weaponized Wings,** Maia Dykstra; Troy G. Murphy
- 16. Evaluating Use of Brush Canopy Cover at White-tailed Deer Birth Sites in South Texas, Rachel Correia; Bryan D. Spencer; Miranda L. Hopper; Michael J. Cherry; Andrea Montalvo
- Use Of Environmental DNA To Identify Semi-Aquatic Turtle Assemblages, Doreen M. Mata; Tiffany C. Nash; Devin R. Erxleben; Jeff Brady; Cameron Martin; Thomas W. Schwertner; Heather A. Mathewson
- Effectiveness Of Environmental DNA to Detect Ringtails, Tiffany C. Nash; Doreen M. Mata; Diego C. Saenz; Colton Nolen; Devin R. Erxleben; Jeff Brady; Heather A. Mathewson; Thomas W. Schwertner
- **19. Soil Texture and Compaction Preferences of Captive Spot-Tailed Earless Lizards,** Christin Moeller; Drake Rangel; Luke Willard; Scott E. Henke; Cord B. Eversole; Ruby Ayala
- 20. Modeling the Relative Effects of Water Availability on Blue Wildebeest: A Kalahari Case Study, Mattityahu Baron; Jennifer Miller; Moses Selebatso

### Abstracts: Cottam Awards Competition

#### 9:45: Distribution and Occupancy of the Alligator Snapping Turtle in Texas

David Rosenbaum, Stephen F. Austin State University, Nacogdoches, TX, USA Daniel Saenz, United States Forest Service, Nacogdoches, TX, USA Christopher M. Schalk, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Texas contains the southwestern range edge of the alligator snapping turtle (*Macrochelys temminckii*). Surveys in other states at the range edge of the species, indicate overall range contraction, providing an impetus to fully understand the distribution of the species in Texas. It is protected as a threatened species in the state, but due to harvest activities, populations have declined, and it has now been proposed for federal listing as a threatened species. We sought to determine habitat covariates that affect its detectability (*p*) and occupancy ( $\Psi$ ), as this information allows estimation of the importance of habitat characteristics to its presence. We conducted hoop trap surveys at 50 sites throughout eastern Texas, allocating 3 consecutive surveys per site to allow estimation of *p* and  $\Psi$  using occupancy models. These surveys confirmed the presence of *M. temminckii* at 61% of sites, and showed that its distribution extends farther than previously known (9 new county records). Across Texas, captured turtles exhibited an even sex ratio (*P* = 0.586), and we captured significantly fewer turtles from sites where trotlines were observed (*P* = 0.015). We developed models with predictors of *p* and  $\Psi$  and ranked them using AIC<sub>c</sub>. The highest ranked model for *p* included flow velocity, trap density, air temperature, and lunar cycle, while increased forest cover was the strongest predictor of  $\Psi$ . The global model was well fit to the data (*P* = 0.376), providing evidence that relatively undeveloped watersheds with high forest cover are important for the species' occurrence and conservation.

#### 10:05: Movements And Resource Selection of Wild Pigs in Relation to Crop Growth Stage

Bethany Friesenhahn, Texas A&M University Kingsville, KINGSVILLE, TX, USA
Randy W. DeYoung, Texas A&M University Kingsville, KINGSVILLE, TX, USA
Humberto L. Perotto-Baldivieso, Texas A&M University Kingsville, KINGSVILLE, TX, USA
Michael J. Cherry, Texas A&M University Kingsville, KINGSVILLE, TX, USA
Nathan P. Snow, USDA, Animal Plant and Health Inspection Service, Wildlife Services, National Wildlife
Research Center, Fort Collins, CO, USA
Kurt C. VerCauteren, USDA, Animal Plant and Health Inspection Service, Wildlife Services, National Wildlife
Research Center, Fort Collins, CO, USA

**Abstract:** One of the most successful invasive species is frequently implicated in wildlife-agriculture conflicts: the wild pig (*Sus scrofa*). Pig damage is a major source of crop loss and is expected to increase as pig populations expand, threatening the food supply and increasing economic costs of food production. An analysis of wild pig movement behaviors and seasonal resource selection would enable producers and landowners to determine how best to alleviate pig damage in an agricultural landscape. The objectives were to determine the movement responses, space use, and selection within home ranges (i.e., third order) relative to resource availability and landscape features that drive wild pig behaviors. We monitored hourly movements of adult wild pigs relative to corn crops using GPS collars during the 2019 and 2020 growing seasons (Feb-Sept) in Delta County, Texas, USA. We conducted separate analyses during 5 primary growth stages of corn: pre-planting, establishment, vegetative, blister-milk, and dent-mature. We calculated movement metrics, dynamic Brownian Bridge movement model home range estimates, and step selection functions, by sex and stage. Overall, males had larger movements and space use than females. Most pigs showed resident movement behaviors. Space use of wild pigs and selection for corn increased with the progression of corn growth stages. Pigs consistently select for sheltered areas and landscape context influenced use of corn. This study provides information of wild pig spatial ecology

and timing of corn use that should aid producers in deciding the best timing and combination of damage mitigation methods for their situation.

## 10:25: Predictors of Occupancy of a Declining Songbird (Bachman's Sparrow) at The Western Extent of its Range

Liam G. Wolff, Stephen F. Austin State University, Nacogdoches, TX, USA Clifford E. Shackelford, Texas Parks and Wildlife Department, Nacogdoches, TX, USA Daniel Saenz, U.S. Department of Agriculture, Nacogdoches, TX, USA I-Kuai Hung, Stephen F. Austin State University, Nacogdoches, TX, USA Christopher M. Schalk, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** The Bachman's Sparrow (*Peucaea aestivalis*) is a savanna specialist that relies on fire-maintained, open woodlands or old fields with a dense, herbaceous understory. Across its range, fire suppression and habitat loss have caused population declines, yet most research has focused on populations east of the Mississippi River. In Texas, this species is at the westernmost fringe of its range where vulnerability to extirpation is heightened. Our research paired detection data with habitat measurements to build statistical models that predict Bachman's Sparrow site occupancy. We placed autonomous recording units (Wildlife Acoustic SM4s and Minis) to detect sparrows at sites of potential occupancy based on a species distribution model and measured local vegetation characteristics and one regional covariate at each plot. We paired measurements with presence/absence using the R package "unmarked" to build hierarchical occupancy models ranked by Akaike Information Criterion (AIC). We detected Bachman's Sparrow at 40 of 240 sites (naïve occupancy estimate = 0.17). The top detection model had one covariate, midstory density, while the top occupancy model included herbaceous ground cover, midstory density, basal area, and canopy height and distance to source population. These results suggests that management for Bachman's Sparrow should focus on practices that minimize midstory and reduce basal area in mature stands to promote herbaceous ground cover growth, especially near source populations.

## 10:45: Modeling Pronghorn Behavior and Space-use: Acclimation of Translocated Pronghorn in the Edwards Plateau

Erin C. O'Connell, Borderlands Research Institute-SRSU, Alpine, Texas, United States Justin T. French, Borderlands Research Institute-SRSU, Alpine, TX, USA Carlos E. Gonzalez, Borderlands Research Institute-SRSU, Alpine, TX, USA Louis A. Harveson, Borderlands Research Institute-SRSU, ALPINE, Texas, United States Shawn S. Gray, Texas Parks and Wildlife Department, 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 challenges, it is essential to define appropriate timescales to assess translocation success. We assessed the post-translocation acclimation period for translocated pronghorn (*Antilocapra americana*). In February 2019, Texas Parks and Wildlife (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. We affixed Global Positioning Systems collars on 44 of the 115 translocated pronghorn. We postulated that residents would maintain a static range size over time, whereas translocated pronghorn would initially have large range sizes that declined as they acclimated. We fit weekly utilization distribution (UD) using a kernel density estimator to understand pronghorn space-use and post-translocation behavior. We used the 75% isopleth of each UD to collate a time series of each individual's weekly range size. We then used generalized linear mixed models to quantify differences between resident and translocated pronghorn behavior through time. We found that the acclimation period for translocated pronghorn is approximately 6 months post-release, much longer than

previously thought. In addition, translocated pronghorn settled into smaller ranges than residents. This supports the notion that memory is a primary factor in pronghorn space use and the success of fence modification efforts and translocations should be evaluated over longer time scales than previously thought.

#### 11:05: Risk of Swainson's Hawks Encountering Wind Turbine Hazards

Katheryn Watson, Texas Tech University, Lubbock, TX, USA Clint W. Boal, U. S. Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, TX, USA James D. Ray, Consolidated Nuclear Security, LLC, USDOE/NNSA Pantex Plant, Amarillo, TX, USA

**Abstract:** Wind energy is a hazard for avian species, with raptors being especially vulnerable due to flight characteristics, low fecundity, and small population sizes. Swainson's hawks (*Buteo swainsoni*) are migratory raptors that inhabit regions of North and South America that may be prime areas for building wind energy facilities. However, little information exists regarding vulnerability of this species to wind turbine mortality, displacement, or other impacts. We equipped 41 adult and juvenile Swainson's hawks with satellite transmitters and tracked them across multiple years; we compared transmitter data to locations of wind facilities to assess risk. We could not find reliable wind facility locations internationally, so we used satellite imagery to identify suspected and confirmable wind turbine locations to model resource selection and resource selection probability functions throughout the global range. We found 26,258 wind turbines that might present a hazard to tracked hawks, with most turbine facilities being located on the breeding range. However, most hawk locations (90%) did not occur in collision-risk buffers, and those that did were also mostly (98%) on the breeding range; models agreed with the result that the breeding range presents the most significant risk from this industry. Swainson's hawks have rarely been found dead at turbine facilities though, perhaps because of their hunting style (i.e., flights low to the ground, perching on the ground, and diving from perches) and adaptability to changing landscape conditions.

## 11:25: Identifying Behavioral States of Ocelots, Bobcats, and Coyotes Using Hidden Markov Models

Maksim Sergeyev, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA Joseph D. Holbrook, Haub School of the Environment and Natural Resources, Laramie, WY, USA Jason V. Lombardi, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA Michael E. Tewes, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA Tyler A. Campbell, East Foundation, San Antonio, TX, USA

**Abstract:** Describing the behavior of carnivores is essential to understanding their ecology. However, it is difficult to obtain accurate field data on behavior of carnivores. Advances in monitoring technology have provided the ability to obtain reliable, high-frequency data on wildlife. From these data, behavioral states can be approximated by analyzing angle and distance between locations. We monitored 12 ocelots (*Leopardus pardalis*), 19 bobcats (*Lynx rufus*), and 5 coyotes (*Canis latrans*) on the East Foundation's El Sauz Ranch and the Yturria Ranch in South Texas, USA, that were fitted with a GPS collar that collected locations every 30 minutes. We characterized behavioral states using hidden Markov models. We assumed low turning angles and longer step lengths to represent patrolling territory, larger turning angles with shorter distances between successive points would represent hunting behavior, and low angles and minimal movement would indicate periods of rest. We predicted 1) each species exhibits three behavioral states: resting, hunting and territory patrolling, 2) ocelots moved further (i.e. territory patrolling) in open areas and rested in dense cover 3) bobcats and coyotes would remain in more open areas than ocelots. We found that ocelots remained closer to heavy cover when resting and

foraging and used open areas more when patrolling territory. Bobcats and coyotes remained closer to open areas when foraging and patrolling and overall used open areas at a greater extent. Identifying behavior in the field improves our understanding of the ecology of these species and can target conservation efforts to manage habitat for various behaviors.

#### **Abstracts: General Sessions**

#### Session A1

## 3:45: Impacts of Woody Plant Removal on Wintering Grassland Bird Communities and Habitat Characteristics in The Marfa Grasslands, Texas

Emily Card, Sul Ross State University, Alpine, TX, USA Mieke Titulaer, Sul Ross State University, Alpine, TX, USA Carlos E. Gonzalez, Sul Ross State University, Alpine, TX, USA Louis A. Harveson, Sul Ross State University, Alpine, TX, USA

Abstract: Grassland birds are one of the most imperiled avian groups in North America, having declined consistently and at higher rates than any other group of birds in the continent over the past seventy years. This loss is primarily attributed to the disappearance of suitable habitat, both on the breeding and wintering grounds. Approximately 90% of migratory grassland bird species that breed on North America's Great Plains spend the winter in the Chihuahuan Desert. However, the encroachment of woody plants into grasslands degrades and changes suitable habitat into desert shrublands, contributing to the decline of grassland bird populations. To evaluate how grassland birds respond to habitat restoration efforts, I conducted bird and vegetation surveys on a ranch in the Marfa grasslands of West Texas. In the summer of 2019, approximately 1,619 ha of this private property was treated with an aerial herbicide spray. The ranch was divided into three stratum types (i.e., grassland, untreated, and herbicide-treated), and bird and vegetation surveys were conducted within each stratum during the winters of 2019-2021. The objectives of this research were to 1) estimate wintering grassland bird abundance in grassland plots, herbicide-treated plots, and untreated shrubland plots over three years of sampling, and 2) assess how treatment for woody plant removal influences habitat characteristics and the structure of wintering bird communities. This information will help us understand if using herbicide to remove woody plants is an effective way to restore grassland ecosystems and threatened grassland bird groups in the Chihuahuan Desert.

## 4:00: Living at Home: Assessing Inclusive Fitness Benefits Associated with Resource Sharing in a Familial Flocking Songbird

Rebekah Janelle Rylander, Texas State University, San Marcos, Texas, United States Sarah Fritts, Texas State University, San Marcos, TX, USA

**Abstract:** Kin-selection theory proposes that survival of related individuals increases indirect fitness through the passing of shared genes. However, in avian populations that congregate with extended relatives, there is debate as to how far kin-selection is favored when the proportion of shared genes decreases. Thus, the ability to examine closely and distantly related individuals could elucidate if inclusive fitness benefits are gained by individuals participating in various social flocks. To understand the benefits (or lack thereof) for members engaging in social flocks with relatives, particularly regarding resource sharing, I studied a passive integrated transponder (PIT) tagged population of black-crested titmice (*Baeolophus atricristatus*, BCTI), a songbird that frequently interacts with close (~50% shared genes) and extended (<50% shared genes) relatives. I PIT-tagged BCTI in San Marcos, Texas and deployed 12 radio frequency identification (RFID) feeder stations between January 2019-April 2020. Of the 451 PIT-tagged BCTI, 61 individuals were recorded at feeding stations, comprising 24 close family groups (male, female, offspring) and 16 lineages (extended relatives). The observed proportion of feeding bouts where extended family shared resources was lower than expected (n = 1,344; p < 0.01). However, the duration of feeding bouts when extended kin were present was significantly longer than

when unrelated individuals were present (n = 1,298; p = 0.02). Therefore, results from this study suggest related BCTI share resources in a "quality over quantity" (time over frequency) manner which may ultimately increase inclusive fitness of participating individuals.

## 4:15: No Differences in Body Size and Condition of Purple Martins Along an Urban-rural Gradient in Texas

**R. Keith Andringa**, Texas A&M University, College Station, TX, USA **Jacquelyn K. Grace**, Texas A&M University, College Station, TX, USA

**Abstract:** Purple Martins (*Progne subis*) are a New World insectivorous passerine species that are in decline across their entire range. The eastern subspecies is almost entirely dependent on human provided nest structures, which are increasingly being provided by "landlords" in urban settings. In response, Purple Martins have expanded their ranges into cities, yet little is known about the physiology of urban populations. Previous studies on avian body condition across urban-rural gradients have been conflicting, and almost always focus on granivorous species. In this study, I captured Purple Martins (*n* = 83) at 12 nesting sites across central Texas. For each bird, I measured mass, muscle and fat score, skull length, wing chord, and tail length. I used these measures to calculate a Scaled Mass Index for each individual, as well as calculating an Urban Land Use Index and Scaled Mass Index, mass, muscle score, fat score, and skull length within sex. I found no significant difference in any measure of body size and condition across an urban-rural gradient, suggesting that urban and rural habitats may provide equal resource opportunities for breeding Purple Martins. These data provide evidence that conservation opportunities for Purple Martins exist within urban habitats, with little physiological impact on individuals.

#### 4:30: Avian Productivity in South Texas Rangelands

Camryn Kiel, Texas A&M University, College Station, TX, USA

Abstract: Declining grassland bird distribution and abundance has raised the need for management efforts. Very little native grassland remains in the United States, and much of it is used for livestock grazing. Cattle affect the local environment and wildlife communities, although studies relating cattle grazing and grassland birds on a multi-species level are lacking. Fewer studies have assessed productivity specifically in relation to grazing. Grazing may affect suitable avian breeding territories through altering vegetation structure, density, and composition. This study assessed the effects of cattle grazing on bird communities by comparing bird productivity and vegetation in a south Texas rangeland. This study was conducted on the East Foundation's San Antonio Viejo Ranch, Jim Hogg County, Texas using data from a multi-species avian productivity monitoring program. Beginning in 2019, observational monitoring of breeding birds was completed in 15 1600 m<sup>2</sup> transects. Overall, species richness was higher on average in 2020 and 2021 than in 2019. Nest success remained steady in 2019 and 2020, and nearly doubled in 2021. Cattle were deferred in 2019 and 2020 due to drought and returned before the 2021 breeding season. This aligns with the increase in nest success, indicating that there may be a relationship between allowing pastures to rest after extreme weather events and higher avian productivity. Gaining a better understanding of the relationship between grazing and the productivity of local bird communities will provide ranchers with more awareness of the land they manage and how to maintain biodiversity, which can be indicative of ecosystem health.

#### 4:45: Burrowing Owl Prey Delivery

Lois Balin, Texas Parks and Wildlife Department, El Paso, TX, USA Richard Heilbrun, Texas Parks and Wildlife Department, San Antonio, TX, USA
Kelly Norrid, Texas Parks and Wildlife Department, Houston, TX, USA Jon Purvis, Texas Parks and Wildlife Department, Austin, TX, USA

**Abstract:** Determining the diet of species that nest underground, such as the Burrowing Owl (*Athene cunicularia*) is challenging. Prey information for Burrowing Owls is often limited to examining prey remains at nest sites and in owl pellets, collecting images from above-ground trail cameras, or directly observing prey acquisition and delivery. We equipped an artificial nest box and burrows at Rio Bosque Wetlands Park in El Paso, Texas with digital video recorders (DVRs) and three underground infrared cameras to document nesting behaviors and prey use. Herein we document the types and frequencies of prey items delivered inside the nest box during the 2019 nesting season as reflected in videos and images collected continuously from 1 April - 5 July. We reviewed 23,039 video files and documented 580 prey deliveries. We identified 463 (80%) prey items to class and 237 (41%) to family. Invertebrates made up 75% and vertebrates 25% of the identifiable prey items by frequency. A majority (55%) of the invertebrates were insects, especially in the orders Orthoptera and Blattodea, with scorpions (Scorpiones spp.) the second most common group (2% of all items). Vertebrate prey were delivered less commonly and mostly consisted of rodents (14% of all prey items), especially heteromyids, followed by squamate reptiles (6%). Results from this project will aid in conservation and management of this species.

### 5:00: Burrowing Owl Nest Site Selection

Lois Balin, Texas Parks and Wildlife Department, El Paso, TX, USA Richard Heilbrun, Texas Parks and Wildlife Department, San Antonio, TX, USA Kelly Norrid, Texas Parks and Wildlife Department, Houston, TX, USA Jon Purvis, Texas Parks and Wildlife Department, Austin, TX, USA

**Abstract:** The burrowing Owl (*Athene cunicularia*) is a small owl found in open landscapes throughout North and South America. They nest and roost in burrows, usually excavated by other species. Prairie dogs are the primary creator of burrows in much of their range, and burrowing owl numbers are often linked to prairie dog numbers. In areas with few natural burrows, they will use artificial nests sites such as drain pipes. Since 2013, artificial nest sites (n = 249) have been provided at Rio Bosque Wetland Park, El Paso, TX; material used in the nest sites have varied through time. Artificial nest sites were found to be used more than natural sites (P=0.005); burrow material (P<0.001) and entrance size (P=0.016) also affected use. Mean number of eggs was affected by burrow material (P=0.024) and shade presence (P=0.038). Mean number of owlets and fledglings were not affected by any design choice.

## Session B1

# 3:45: Chronic Limitation of Dietary Energy Cues Trade-off Between Optimum Growth and Reproduction in White-tailed Deer

Levi Heffelfinger, Texas A&M University - Kingsville, Kingsville, TX, USA Ryan Reitz, Texas Parks and Wildlife Department, Kerrville, TX, USA Deanna Pfeffer, Texas Parks and Wildlife Department, Kerrville, TX, USA David Wester, Texas A&M University - Kingsville, Kingsville, TX, USA Randy DeYoung, Texas A&M University - Kingsville, Kingsville, TX, USA David Hewitt, Texas A&M University - Kingsville, Kingsville, TX, USA

Abstract: Morphology varies regionally within species and may induce trade-offs between ontogeny and reproduction. The specific limitation for variable body sizes and signaling trade-offs is assumed to be nutritional quality of the diet but the specific dietary component is unknown. We test how dietary energy affects development and reproduction in white-tailed deer (Odocoileus virginianus). We raised 3 cohorts (n=309) in captivity for 5 years. Individuals were split into a low digestible energy diet (1.77 kcal/g; LE) and a standard digestible energy diet (2.65 kcal/g; SE), both offered ad libitum. We recorded feed consumption per cohort and measured weight, body condition, skeletal size, and antler size annually for each individual until 5 years of age. We also measured reproductive output of females in each treatment. Adults exhibited lower mass and body condition throughout all ages on the LE diet compared to the SE diet. Male antler size and mass was lower across all ages within the LE diet. LE feed consumption was greater across all cohorts and sexes compared to the SE diet. Litter size and fawn birth mass did not differ between treatments. Deer adjusted body condition, body size, and weaponry growth to reduce energy requirements but maintained the same level of reproductive output. Our results provide experimental confirmation for hypotheses regarding life-history trade-offs between growth and reproduction. Digestible energy concentration in the diet should be investigated as a factor explaining regional differences in morphology, especially in systems where individuals cannot maintain population performance under nutrient limitation.

### 4:00: Factors Influencing Scaling Relationships Of Body and Antler Mass in White-tailed Deer

Willis Sontheimer, Texas State University, San Marcos, TX, USA Deanna Pfeffer, Texas Parks and Wildlife Department, Hunt, TX, USA Floyd Weckerly, Texas State University, San Marcos, TX, USA

**Abstract:** Antlers are a costly trait that require skeletal reserves to grow to a large size. Thus, insight into variation in antler size requires understanding the connection between antler and body size. Maternal condition during gestation influences body size and is speculated to influence antler size. Maternal effects might decline with age as individuals might make up for size deficits through compensatory growth. We sought insight into the influence that maternal attributes and diet had on body-antler size relationships throughout ontogeny and at discrete ages. We also examined whether maternal effects were most apparent in younger-aged individuals. We had access to data on maternal characteristics, body mass, and antler mass from captive white-tailed deer (*Odocoileus virginianus*) that were assigned to either a low energy (1.77 kcal/gm) or standard energy diet (2.67 kcal/gm) from the time they were weaned. We tested if maternal effects from dam age at birth and litter type effected body-antler size relationships. Litter type influenced both intercept (P < 0.001) and slope (P < 0.001) in deer that were 1.5 years old. Our findings show that antler size exhibits a larger percentage increase than body size in deer aged 1.5, 2.5, 3.5, and 4.5 years, both for deer fed a standard energy and low energy diet. Litter type was influential for younger-aged males, thus lending support to the idea that maternal effects diminish with age and that males can likely make up for some of the nutritional deficits early in life through compensatory growth.

# 4:15: Quality or Quantity? Ambient Temperature Influences Selection for Shade Quality in a Large Herbivore

Jacob L. Dykes, CKWRI, Kingsville, TX, USA Austin K. Killam, CKWRI, Kingsville, TX, USA Breanna R. Green, CKWRI, Kingsville, TX, USA Clayton D. Hilton, CKWRI, Kingsville, TX, USA Evan P. Tanner, CKWRI, Kingsville, TX, USA Michael J. Cherry, CKWRI, Kingsville, TX, USA Randy W. DeYoung, CKWRI, Kingsville, TX, USA

Abstract: Heat stress is common in endotherms, and behavioral changes to mitigate heat stress are energetically cheaper than physiological responses. Seeking shade can decrease radiant heat gain by 30%. However, all shade is not equal. We designed a manipulative experiment assessing shade quality's influence on white-tailed deer (Odocoileus virginianus) space use. Our objectives were: 1) quantify deer shade preference and 2) define temperature thresholds at which shade quality was important. We offered captive deer varying qualities of shade in South Texas during summers 2020 and 2021. Two deer were placed in a 7.6-m<sup>2</sup>, open-air research pen with 4 treatment areas: 1) 0% shade, 2) 30% shade, 3) 60% shade, and 4) 90% shade created with commercial shade cloth. Trials consisted of a 3-day acclimation period followed by 3 days of data collection during 14 trials. We recorded ambient temperature and quantified deer space use during solar noon  $\pm 1$  hr with time-lapse cameras. Average ambient temperature during trials was 35.5°C. Generalized linear mixed models indicated preference for greater shade quality as ambient temperature increased. However, predicted deer use was similar for all shade qualities until ambient temperature reached 29°C at which point 90% shade was preferred. Proportional use of shade treatments: 1) 0% shade, 2) 30% shade, 3) 60% shade, and 4) 90% shade was 7%, 6%, 17%, and 70%, respectively. Understanding animal needs is crucial to manage for beneficial resources. Our results indicate shade quality is important to deer. Thus, land managers should consider thermal cover when designing management plans.

# 4:30: Using Mule Deer Movement to Inform Management in a Novel Chronic Wasting Disease Cluster

Calvin C. Ellis, Texas A&M University - Kingsville, Kingsville, TX, USA Levi J. Heffelfinger, Texas A&M University - Kingsville, Kingsville, TX, USA Shawn S. Gray, Texas Parks & Wildlife, Alpine, TX, USA David G. Hewitt, Texas A&M University - Kingsville, Kingsville, TX, USA Michael J. Cherry, Texas A&M University - Kingsville, Kingsville, TX, USA

**Abstract:** In 2021, the distribution of Chronic Wasting Disease (CWD) dramatically increased in Texas highlighting a need for a deeper understanding of factors that influence the disease spread. Juvenile dispersal is considered an important parameter in CWD epidemiology, but juvenile movement and drivers of dispersal are poorly understood. The Canadian River corridor is adjacent to a recently identified CWD cluster and may facilitate movement connecting regions of New Mexico with unknown CWD prevalence with the Texas Panhandle. We GPS-collared 30 nine-month-old mule deer, located within a newly established CWD containment zone, to study movement and dispersal patterns. To identify movements that may have enhanced disease risk, we first calculated net squared displacement across individuals to assign resident or non-resident status. We then used velocity, duration, distance, and fidelity, to categorize non-residential movement including two dispersals and five exploratory movements. Mean dispersal and exploratory movement lengths were 33.64  $\pm$  26.25 km ( $\bar{x} \pm$  SE) and 83.88  $\pm$  40.80 km, respectively. Resident velocity averaged 80.47  $\pm$  0.49 m/hr compared

to non-residential individuals at 88.31  $\pm$  1.84 m/hr overall but 118.23  $\pm$  43.10 m/hr during non-residential movements. These results demonstrate potential for large-scale movements by juvenile deer facilitating disease spread throughout the region. With CWD becoming an increasing issue across Texas, evident by recently updated management strategies, understanding movement ecology of susceptible species should be of primary concern.

### 4:45: Sociospatial Organization of Nilgai Antelope in South Texas

Kathryn M. Sliwa, Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA
Jeremy A. Baumgardt, Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA
Randy W. DeYoung, Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA
J. Alfonso Ortega-S., Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA
David G. Hewitt, Caesar Kleberg Wildlife Research Institute, TAMUK, Kingsville, TX, USA
John A. Goolsby, USDA Agricultural Research Service, Cattle Fever Tick Research Laboratory, Edinburg, TX, USA

**Kimberly H. Lohmeyer**, USDA Agricultural Research Service, Knipling-Bushland U.S. Livestock Insects Research Laboratory and Veterinary Pest Genomics Center, Kerrville, TX, USA

**Abstract:** Nilgai antelope (*Boselaphus tragocamelus*) are an exotic ungulate species with over 30,000 free-ranging individuals in South Texas. Although nilgai have been present in Texas for almost a century, there is little information on the movements, behaviors, and social interactions of nilgai. Recently, there has been increased interest in nilgai ecology due to their role as a competent host for cattle fever ticks (*Rhipicephalus (Boophilus) microplus* and *R. (B.) annulatus*), which can negatively affect the livestock industry. The social interactions of nilgai can aid in the understanding of population dynamics, space use, and disease transmission. The goals of this study were to: 1) estimate home and core range sizes of nilgai and 2) investigate the spatiotemporal overlap among nilgai dyads. We used hourly locations of 40 GPS-collared nilgai to help understand the interaction of individuals with overlapping ranges. Overall, nilgai had large and highly variable annual home ranges (female range = 105-1,545 ha; male range = 221-1,602 ha). The annual median core range estimate for females was 108 ha (22-225) and for males 205 ha (46-219). We analyzed dynamic interactions of 64 nilgai dyads that had  $\geq 10\%$  overlap of core ranges. We observed dyads interacting closely for several days to weeks, followed by a multi-day or week separation, then interactions resumed. Large home ranges by nilgai challenge the sustainability of CFT eradication efforts in the U.S. Therefore, understanding how individuals interact with one another within their home ranges can provide insight for disease management strategies.

## 5:00: Habitat Selection and Movement Behavior of Mule Deer Using an Integrated Step Selection Analysis in Black Gap Wildlife Management Area

**Preston L. McKee**, Borderlands Research Institute, Alpine, TX, USA **Justin T. French**, Borderlands Research Institute, Alpine, TX, USA **Carlos E. Gonzalez**, Borderlands Research Institute, Alpine, TX, USA **Louis Harveson**, Borderlands Research Institute, Alpine, TX, USA **Shawn Gray**, Texas Parks and Wildlife, Alpine, TX, USA **Froylan Hernadez**, Texas Parks and Wildlife, Alpine, TX, USA

**Abstract:** Mule deer (*Odocoileus hemionus*) populations have declined due to habitat loss or fragmentation. Little is known about the habitat needs of mule deer in the extreme arid environments of their range. This project aims to look at how habitat selection changes for mule deer in more extreme environments. Understanding this will allow managers to adapt practices to these extreme environments. Texas Parks and Wildlife Department

translocated fourteen female mule deer ranging from 1.5 to 8.5 years of age, from Elephant Mountain Wildlife Management Area to Black Gap Wildlife Management Area (BGWMA) as a population reduction effort. The translocated mule deer were fitted with GPS collars programmed to collect a location every three hours. We used an Integrated Step Selection Analysis (iSSA) to examine the effects of habitat conditions on both movement and habitat selection, including slope, aspect, ruggedness, and elevation. Mule deer selected for habitat that was higher in elevation and selected against rugged terrain. Movement rates were lower in rugged terrain. These results suggest that mule deer may prefer higher elevation to avoid extreme heat. Also, mule deer may avoid rugged terrain because it is harder to search for food and more difficult to avoid predators in these areas.

# Session C1

## 3:45: Transformational Wildlife Funding-Recovering America's Wildlife Act

Richard Heilbrun, Texas Parks and Wildlife, San Antonio, TX, USA

**Abstract:** Transformational wildlife funding was last seen in 1937 with the Wildlife Restoration Act (Pittman-Robertson Act). The Recovering America's Wildlife Act (HR 2773; S 2372) now before Congress would bring more than \$50 million to Texas annually. Passage of this bill would provide permanent, dedicated funding to restore sensitive fish and wildlife populations, create and enhance educational programs, and improve nature-based outdoor recreation. The bill is supported by a national alliance of conservation and business groups. This presentation will include details of the funding, the organizations and networks that support and don't support the bill, and how TCTWS, your organization, and biologists can support this national and state-wide initiative, regardless of your employer. Even in "today's politically charged" environment, this effort is getting bipartisan support in Congress. Whatever your interests, be a part of the solution and this historic legislation.

# 4:00: Investigating How Relational Values Influence Landowner Participation in an Endangered Species Conservation Program

Jared Messick, Texas State University, San Marcos, TX, USA Christopher Serenari, Texas State University, San Marcos, TX, USA

Abstract: Research investigating the interface of landowners and endangered species conservation (ESC) identifies environmental stewardship as a cornerstone principle encouraging sustainable human-nature relationships. Stewardship-oriented relationships are complex, however, as they are associated with diverse relational values reflecting a landowner's subjective evaluation of the meanings attached to human-nature relationships. Relational values convey meaning through landowner preferences, principles, and virtues about human-nature relationships and are supported or undermined by policymaking. Thus, relational values must be accounted for by policymakers as institutional ESC strategies, like Voluntary incentive programs (VIPs) espouse values that interfere with or encourage landowner relationships. Value alignment between ESC policymechanisms and relational values are key to enhancing the success of VIPs but research indicates that VIPs often fail to align with landowner values and, thus, fall short in securing adequate levels of ESC. We conducted 24 interviews with Texas landowners to analyze VIP alignment with landowner values. Results revealed that landowners' human-nature relationships were characterized by relational values such as active management, stewardship, and self-determination. VIPs aligned with preferences for stewardship and management but directly conflicted with landowner self-determination. The rules and requirements of VIPs opposed values of autonomy and social responsibility and failed to provide incentives to overcome such value conflicts. Thus, the VIP we investigated exemplifies the rift between hegemonically designed and implemented VIPs and the values motivating voluntary ESC. Bridging this gap requires coordinated efforts between researchers and policymakers

to identify and incorporate landowner values into new incentive structures that enhance and enable diverse, noninstrumental values driving ESC.

### 4:15: The Long-standing Significance of Genetic Diversity in Conservation

J. Andrew DeWoody, Purdue University, West Lafayette, IN, USA Avril M. Harder, Auburn University, Auburn, AL, USA Samarth Mathur, Ohio State University, Columbus, OH, USA Janna R. Willoughby, Auburn University, Auburn, AL, USA

**Abstract:** Since allozymes were first used to assess genetic diversity in the 1960s and 1970s, biologists have attempted to characterize gene pools and conserve the diversity observed in domestic crops, livestock, zoos and (more recently) natural populations. Recently, some authors have claimed that the importance of genetic diversity in conservation biology has been greatly overstated. Here, we argue that a voluminous literature indicates otherwise. We address four main points made by detractors of genetic diversity's role in conservation by using published literature to firmly establish that genetic diversity is intimately tied to evolutionary fitness, and that the associated demographic consequences are of paramount importance to many conservation efforts. We think that responsible management in the Anthropocene should, whenever possible, include the conservation of ecosystems, communities, populations, individuals, and their underlying genomic diversity.

## 4:30: Effects of The Covid-19 Lockdown on the Soundscape of the Wild Basin Wilderness Preserve

Ederéwoma Ohwobete, St. Edwards University, Austin, TX, USA Darren Proppe, St. Edwards University, Austin, TX, USA

**Abstract:** The COVID-19 shutdown provided an opportunity for analysis of the natural world under unusual conditions. The Wild Basin Wilderness Preserve was closed to the public for 6 months during the 2020 shutdown. We hypothesized that reduced human activity during that time would result in a measurable reduction in anthropogenic noise levels and that this in turn may have a quantifiable effect on the soundscape used by many of the native species at Wild Basin. In order to test this hypothesis, we established five acoustic recording locations spread across the preserve and one video location near Texas Highway 360 while working as essential personnel during the 2020 lockdown. We used a handheld recorder and camera to collect acoustic and visual data. When the preserve was reopened to the public in 2021, the study was replicated, with all recordings matched to the 2020 dates and times. Our 11-week analysis in 2020 and 2021 indicated that Wild Basin was significantly quieter during the 2020 shutdown. In addition to being quieter, analysis indicated that the acoustic complexity index of 2020 was greater than 2021. This suggests that a greater variety of sounds could be heard at Wild Basin in the absence of anthropogenic noise (i.e traffic and construction noise). In summary, anthropogenic noise significantly alters the soundscape of the Wild Basin Wilderness Preserve. Protecting the soundscape of Wild Basin, and natural areas more generally, may be a critical element for sustaining our native species.

# 4:45: A Moderated Peer-to-peer Prescribed Fire Outreach Program for Texas Hill Country Landowners

Kaitlyn Restivo, Texas A&M University, College Station, TX, USA Dr. Sanford Smith, Penn State University, University Park, PA, USA Dr. Gary Briers, Texas A&M University, College Station, TX, USA Dr. Maureen Frank, Texas A&M University, College Station, TX, USA **Abstract:** Traditional extension and outreach programs provide information from an expert to participants, but effectively educating today's landowners and land managers may require new methods. This study investigated the Peers and Pros 360° teaching method through designing, conducting, and evaluating 3 workshops for landowners in the Edwards Plateau ecoregion about prescribed fire. Peers and Pros 360° is a moderated peer-to-peer teaching method where participants exchange ideas within a framework prepared by professionals. This framework consists of a designated topic, themes, and statements. Our program consisted of 8 themes, each with 3 associated statements that represented frequent comments heard by fire professionals, regardless of whether those comments are factual. During the program, participants were asked to react to these statements. Landowners with more prescribed fire experience often led the discussions, while those who were not as familiar with the topic could ask questions and learn from their peers. Following the discussion, professionals contributed additional information based on a list of predetermined talking points. Results of the study indicate 93% of participants preferred Peers and Pros 360° over traditional teaching methods, participants at all 3 workshops experienced an increase in knowledge, and 100% of participants enjoyed learning from their peers. These results and this program model will be useful to outreach and extension professionals in designing and conducting relevant programs that effectively encourage long-term, positive change.

### 5:00: Songbird Behavior and Conservation in the Anthropocene

Darren Proppe, St. Edward's University, Austin, TX, USA

**Abstract:** The presence and success of a diverse community of songbird species is frequently used as an indicator of ecosystem quality and health. Conversely, declines in species richness and population sizes often tell us when things are not well. But many of these trends are a result of adaptive or maladaptive behaviors that have evolved over many generations. In some cases, established behavioral response systems no longer facilitate success in altered environments, and may underly poor vital rates and management failures. Thus, a basic understanding of songbird behavior, including the rate at which behavioral changes can occur and the physical and physiological limits to plasticity, is a requirement for anyone interested in maintaining healthy songbird populations. But, our world is changing rapidly, and range-wide declines in many species suggest that behavioral compensation may occur too slowly to avoid negative population-level impacts. To maintain viable populations in many species, our conservation strategies must be broader and more intentional in regards to songbird behavior. For example, focusing on the vegetative quality of habitats may not be enough. We must also manage the sensory landscape to ensure that vital cue-response systems remain intact. Other anthropogenic factors are also altering how birds select mates and habitats, sometimes in ways that decrease fitness. The goal of this talk is to explore the role of behavior in conservation and management, and to introduce a recently published book that takes a deep dive into these topics.

# Session D1

# 3:45: On Understanding Anuran Communities: Sampling Acoustic Data for the Probability of Detection of Species Presence

Teresa Kenny, Texas A&M University, College Station, 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. Frogs call for a variety of reasons, the most important being in attracting a mate and breeding. Occupancy models can be built by allowing for environmental factors to explain the presence or absence of a species during a survey at a specific site. Ten species of anurans have been monitored for seven years in Colorado County, Texas. 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 sphenocephalus), 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 used acoustic data recorded at eleven variable sites to determine the detection probability of each species. I collected weather conditions from the local weather station. There was 127.16 cm of accumulated precipitation during the year, and the air temperature ranged from -3.9 °C to 39.4 °C. I used the acoustic data of frogs calling at these sites coupled with these environmental covariates to build occupancy models. These models demonstrate what influences or prevents frogs calling, and when frogs are most likely to call during the year. The single-season occupancy models demonstrate when and where sampling effort will be most successful.

### 4:00: Detectability of Spot-Tailed Earless Lizards by Various Methods and Lizard Densities

Drake Rangel, Texas A&M University-Kingsville, Kingsville, TX, USA Christin Moeller, Texas A&M University-Kingsville, Kingsville, TX, USA Luke Willard, Texas A&M University-Kingsville, Kingsville, TX, USA Scott E. Henke, Texas A&M University-Kingsville, Kingsville, TX, USA Cord B. Eversole, Texas A&M International University, Laredo, TX, USA Ruby Ayala, Texas A&M International University, Laredo, TX, USA

**Abstract:** Spot-tailed earless lizards (STEL; *Holbrookia lacerata* and *H. subcaudalis*) are an elusive and potentially rare species, which are currently being considered for threatened status by the USFWS. To assist with federal listing, we investigated the best methods to detect STEL when present in an area. Also we determined if a specific density of STEL was needed to reach a threshold for detectability. We wild-caught 20 Plateau and 20 Tamaulipan STEL and held them in captivity until released within a 1-ha outdoor enclosure, which was subdivided into 100, 10 x 10-m quadrats. We randomly selected 45 quadrats and constructed one treatment (i.e., camera traps, light traps, rock piles, cover boards, pitfall array, funnel traps, detector dog, visual search, and road cruising) per quadrat with 5 replications. We placed 5, 10, 20, 30, and 40 STEL into the enclosure and conducted 3 searches per density. STEL's were observed during road cruising and visual searches. STEL's were not observed in funnel traps, camera traps, rock piles, cover boards, and lights. Only one STEL was captured in a pitfall trap, but was killed by fire ants. Detector dog was unsuccessful in locating STEL's; perhaps the lizards do not produce enough scent for dogs to acquire a scent. STEL detectability increased with increasing STEL density but not in a proportional manner. At any time of day, about 42% of STEL were above ground, making only 25% potentially detectable. Therefore, a searcher must look within appropriate habitat and the correct time to locate STEL.

# 4:15: Using Museum Collections and Citizen Science to Investigate Changes in Species Distributions in Texas

Toby J. Hibbitts, Texas A&M University, College Station, Texas, United States Danielle K. Walkup, Texas A&M University, College Station, TX, USA Price Brown, Texas A&M University, College Station, TX, USA Wade Ryberg, Texas A&M University, College Station, TX, USA

**Abstract:** Knowledge of species distributions are fundamental to species conservation. Patterns of distribution can change through time due to dispersal, translocation, and extirpation. Trends in the distribution patterns of wide ranging Texas species can be investigated when both a large historical and large recent dataset are available. The historical dataset of herpetofauna has previously been summarized into county distribution maps for Texas. Recent observations are now available through the citizen science platform called iNaturalist. Using these datasets, both with more than 100,000 specimens/observations, we can now compare the current distributions

of species (2013-2020) to those specimens housed in museum collections (1850-2013). We found that of the 94 species of Texas amphibians and reptiles examined that 40 had a contracting distribution, 42 were stable, and 12 had an expanding distribution. Trends within taxonomic groups indicated that Frogs, Salamanders, and Lizards were contracting while both snakes and turtles were stable. Geographically, the regions with counties that appear to have the biggest change in number of contracting species and therefore have likely lost the most species are within the cross timbers, blackland prairie and post oak savannah ecosystems.

### 4:30: Mapping Dunes Sagebrush Lizard Habitat

Danielle K. Walkup, Natural Resource Institute, Texas A&M University, College Station, TX, USA
Bret A. Collier, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA, USA
Kevin L. Skow, Natural Resource Institute, Texas A&M University, College Station, TX, USA
Wade A. Ryberg, Natural Resource Institute, Texas A&M University, College Station, Texas, United States
Toby J. Hibbitts, Natural Resource Institute, Biodiversity Research and Teaching Collections, Department of
Ecology and Conservation Biology, Texas A&M University, College Station, TX, USA
Lee A. Fitzgerald, Biodiversity Research and Teaching Collections, Department of Ecology and Conservation
Biology, Texas A&M University, College Station, TX, USA
Roel R. Lopez, Natural Resource Institute, Department of Rangeland, Wildlife and Fisheries Management, Texas A&M University, College Station, TX, USA

Abstract: The dunes sagebrush lizard (DSL; Sceloporus arenicolus) is a habitat specialist endemic to the Mescalero-Monahans shinnery-sands ecosystem of west Texas and southeastern New Mexico, over which land-use practices have contributed to fragmentation and loss of habitat. We created a fine-scale, continuous habitat suitability model for the DSL in Texas to support conservation actions. We used generalized linear (GLM) and spatially weighted generalized additive models (GAM) to predict DSL occurrence. We included sand cover, shinnery oak cover, binned rugosity, and mean maximum rugosity as covariates. We replicated our model selection analysis and our spatial prediction analysis across a random sample of pseudo-absence data, then selected the best ranking model, defined as the model having the highest frequency being ranked first across 1,000 replications. Finally, we used the averaged prediction, from the replicated model prediction runs (n=1,000), as our estimate of occurrence for each grid cell. The highest-ranked model was the mean maximum rugosity and percent cover shinnery oak interaction model. The distribution of predicted occurrence captured Winkler County well in the GLM, but Andrews County had a lower predicted probability than expected. The GAM accounted for DSL spatial dynamics; thus, we see a higher occurrence probability in Andrews County and a much lower occurrence probability in Crane County compared to the GLM. The GLM is important for identifying areas of potential DSL habitat, allowing us to identify areas for future surveys. The GAM could determine areas for high-value conservation actions, such as protecting dune habitat from further development.

## 4:45: Monitoring Western Massasaugas with Camera Traps on Private Lands in The Trans-Pecos

Wade A. Ryberg, Texas A&M Natural Resources Institute, College Station, TX, USA
Danielle Walkup, Texas A&M Natural Resources Institute, College Station, TX, USA
Corey Fielder, Texas A&M Natural Resources Institute, College Station, TX, USA
Brandon Bowers, Texas A&M Natural Resources Institute, College Station, TX, USA
Toby Hibbitts, Texas A&M Natural Resources Institute, College Station, TX, USA
Toby Hibbitts, Texas A&M Natural Resources Institute, College Station, TX, USA
Russell Martin, Texas Parks & Wildlife Department, Austin, TX, USA
Krysta Demere, Texas Parks & Wildlife Department, Alpine, TX, USA

**Abstract:** Rare and secretive snake species with low occupancy and detection rates are expensive and difficult to monitor and study using traditional box traps, especially on private lands where daily access to box traps can be a burden to landowners or barrier to their participation. Advancements in camera trap technology have provided wildlife researchers with more efficient techniques to monitor such species, like the federally listed Louisiana Pinesnake (*Pituophis ruthveni*) and Eastern Indigo Snake (*Drymarchon couperi*), without the burden of daily trap checks. Here, we apply those established camera trap monitoring techniques to survey for the Western Massasauga (*Sistrurus tergeminus*) on private lands in a grassland ecosystem. We report results on detection of the target species and summarize insights gained within the context of estimating occupancy parameters of rare and secretive snake species in general. In short, camera trapping was effective at detecting many grassland snake species (n = 13), including the target species, with obvious implications for long-term monitoring of those populations. In addition, spatial patterns of detection appeared to be best explained by a subtle variation in soil type across the survey area, although additional research is needed to confirm this observation. This study demonstrates 1) the utility of these established camera trapping techniques in a different ecosystem (i.e., grasslands), and 2) an increased ability to detect the Western Massasauga on private lands with a small research footprint.

### 5:00: Daily Emergence Behavior of Captive Spot-Tailed Earless Lizards

Drake Rangel, Texas A&M University-Kingsville, Kingsville, TX, USA Christin Moeller, Texas A&M University-Kingsville, Kingsville, TX, USA Luke Willard, Texas A&M University-Kingsville, Kingsville, TX, USA Scott E. Henke, Texas A&M University-Kingsville, Kingsville, TX, USA Cord B. Eversole, Texas A&M International University, Laredo, TX, USA Ruby Ayala, Texas A&M International University, Laredo, TX, USA

**Abstract:** Spot-tailed earless lizards (STEL; *Holbrookia lacerata* and *H. subcaudalis*) are an elusive species that spends much of the diel cycle underground, which makes them even more difficult to locate. In conducting surveys for STEL, we noted that they emerge during daytime after cloud cover clears, temperature increases, and ultraviolent light (UV) and light intensity are near peak levels. Therefore, we tested this theory by controlling each of the above factors in laboratory experiments. Fifteen STEL were wild-caught and individually housed in 38-L aquaria and provided crickets and water *ad libitum*. Aquaria were equipped with heat lamps, UV lights, LED lights, and video cameras. Aquaria received either heat lamp, UV light, LED light, darkness, or combination of UV and LED lights for 3 days, which was turned on at 0730, and time of emergence was recorded. STEL immediately emerged (P < 0.03) with a combination of UV and LED lights, followed by delayed emergence with UV light and LED light only, while emergent behavior became sporadic if provided heat or darkness. In a second experiment, STEL were provided UV and LED light, but the onset of light began at either 8am, 10am, or noon. STEL emerged upon lights turning on (P < 0.02) irrespective of time. STEL emerged upon lights turning on 81% of time, within 30 minutes 11% of time, within 1 hr 6% of time, and only 2% of lizards emerged after 1 hr. STEL react to and became active aboveground with higher light intensity and UV index.

# Session A2

## 8:15: Characteristics of Texas Quail Hunting

Jon Purvis, Texas Parks and Wildlife Department, Austin, Texas, United States Robert Perez, Texas Parks and Wildlife Department, Pleasanton, TX, USA

**Abstract:** Due to declining quail numbers, in 2011 there were public requests for Texas Parks and Wildlife Department (TPWD) to limit the bag or season length in order to reduce the harvest, or to even close the season completely. Limited TPWD data showed that the bag would need to be reduced significantly to have a noticeable effect. This amount of reduction would be unacceptable to an unknown, but possibly high, proportion of hunters. Reducing the season length was a greater unknown, because TPWD did not collect daily harvest data at that time, only seasonal totals, and therefore could not reliably estimate the effects of later starting dates and/or earlier closing dates on harvest. Two projects were created to gather the data necessary to evaluate the potential regulation changes. The first was a survey that looked at February hunting and self-imposed restrictions on hunting activities, while the second was a multi-year study that examined the distribution of bag, and the distribution of hunting effort and harvest across a season. While a majority of hunters reported hunting in February, other months had higher hunter and harvest estimates. Hunters reported restricting themselves more than landowners did. No significant differences were found in hunters from different regions of the state. 13.43% of reported bags had >12 quail. Reducing the daily bag limit to 10 would result in a 11.14% decrease in harvest in an average year; reduction to 8 would give a 25.56% reduction.

## 8:30: Distributional Responses of Northern Bobwhites to Hunting Pressure in South Texas

Donal A. Woodard, East Foundation, Hebbronville, TX, USA

Leonard Brennan, Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, Kingsville, TX, USA

Fidel Hernández, Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, Kingsville, TX, USA

Humberto Perotto-Baldivieso, Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, 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. Coincidently, 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.

# 8:45: Connecting the Dots: A Social-Ecological Assessment of The Northern Bobwhite Decline in Texas

Kristyn G. Stewart, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

Fidel Hernández, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

Alejandra Olivera-Mendez, Colegio de Postgraduados, San Luis Potosí, Mexico

Jon S. Horne, Idaho Department of Fish and Game, Boise, ID, USA

Sabrina H. Szeto, Sabrina Szeto Consulting, Isen, Germany

Angela M. Guerrero, Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden

John W. McLaughlin, Texas Parks and Wildlife Department, Lubbock, TX, USA

**Abstract:** Networks are a universal component of life and occur in a variety of places such as cells, roadways, and communication systems. In ecology, networks occur as habitat patches connected by corridors and as metapopulations connected by dispersal. Networks also occur with stakeholders concerned with these habitats and populations. Thus, conservation could be viewed as a suite of interconnected networks comprised of habitat, wildlife, and people that form a social-ecological system. Northern bobwhite (*Colinus virginianus*) is a species that has experienced long-term population declines across its geographic distribution. Researchers have investigated this decline primarily from a habitat-loss or population-growth perspective, but rarely from a human-dimension perspective and never as a social-ecological system. Our study investigates the bobwhite decline in Texas as a social-ecological system using a network perspective. Our study focuses on northern and southern Texas where we will quantify and interrelate habitat connectivity, bobwhite-population growth, and stakeholder perspectives. Here we present findings of a pilot survey conducted with 3 stakeholder groups (Texas Parks and Wildlife Department biologists, land managers, and quail hunters) in each region (n = 30 respondents/region). We documented notable differences between ecoregions regarding stakeholder perspectives and beliefs of the bobwhite decline. This project represents a first approximation analysis of the bobwhite decline as a social-ecological system and will provide an analytical framework for conservation that can be used with other species.

# 9:00: Variance In Clutch Size and Egg Morphology of Lesser Prairie-chickens Across a Climate Gradient

Sophie A. Morris, Department of Natural Resources, Texas Tech University, Lubbock, TX, USA Clint W. Boal, U.S Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA David A. Haukos, U.S. Geological Survey, Kansas Cooperative Fish and Wildlife Research Unit, Manhattan, KS, USA

Blake A. Grisham, Department of Natural Resources, Texas Tech University, Lubbock, TX, USA

**Abstract:** Lesser prairie-chickens (*Tympanuchus pallidicinctus*) are distributed from southeast New Mexico to southcentral Kansas. This range encompasses a temperature and precipitation gradient that is hotter and drier in the southwest to cooler and wetter in the northeast. We hypothesized lesser prairie-chickens may vary clutch sizes or egg morphology as an adaptation to local environmental conditions. We compared clutch sizes and morphometric characteristics of lesser prairie-chicken eggs among study areas in Texas and Kansas. We used analysis of variance tests to compare clutch sizes, and egg metrics of length, width, volume, surface area, deviation from an ellipse, and mass. We also compared egg coloration and extent of speckling. Lesser prairiechickens in Texas set significantly fewer eggs per clutch (mean  $6.7 \pm 1.75$  SD) compared to those in Kansas (mean  $10.3 \pm 2.36$  SD). We found eggs from the Texas study area were larger, with greater volume than any of the Kansas study areas and had a greater mass than two of three Kansas study areas. Visual appearance also differed; Texas eggs were lighter toned in shell color but had a greater frequency of speckling than Kansas eggs. Our results suggest that lesser prairie-chickens in Texas put greater investment in fewer but larger eggs per clutch. The lower surface to volume ratios of larger eggs translates to reduced evapotranspiration compared to smaller eggs. It appears that lesser prairie-chickens in the southwestern extent of their distribution may be responding to the hotter and drier climate through modification of clutch sizes and egg morphology.

## Session B2

### 8:15: The Effect of 60 Years of Translocations on Populations of Texas Desert Bighorn Sheep

Emily A. Wright, Texas Tech University, Lubbock, TX, USA Rachael C. Wiedmeier, Texas Tech University, Lubbock, TX, USA Emma K. Roberts, Texas Tech University, Lubbock, TX, USA Froylan Hernandez, Texas Parks and Wildlife Department, Alpine, TX, USA Warren C. Conway, Texas Tech University, Lubbock, TX, USA Robert D. Bradley, Texas Tech University, Lubbock, TX, USA

Abstract: In Texas, desert bighorn sheep (DBS, Ovis canadensis) historically occupied 16 mountain ranges in the Trans-Pecos Region. Described as O. c. texianus in 1912, this subspecies of DBS was extirpated in the 1950s due to overharvesting, competition, and diseases. Historical restocking efforts have depended on translocating individuals of O. c. nelsoni and O. c. mexicana from Nevada, Utah, and Arizona, and Mexico and from in-state locations. These efforts reestablished populations from <14 individuals in 1959 to >1,500 individuals across 11 mountain ranges by 2020. The effects of these inter- and intrastate translocations on the genetic and genomic composition of contemporary populations are unknown. Mitochondrial markers (Cytochrome b, Cytb; Displacement loop, D-loop) and double digest restriction site-associated DNA sequencing (ddRADSeq) was used to determine the subspecific status of known pre-extirpated individuals and population structure, genetic variation, and connectivity in contemporary populations, respectively. To date, the Cyth gene has been successfully sequenced from 11 of 23 pre-1960 bone samples, indicating that pre-extirpated DBS represent a 'desert-like' subspecies (O. c. mexicana, O. c. nelsoni, and O. c. texiana) rather than the Rocky Mountain subspecies (O. c. canadensis). From preliminary analyses using ddRADSeq data, DBS west of 104° (Sierra Diablo, Beach, Baylor, and Van Horn Mountains) are similar in the nuclear genome to populations in Arizona whereas DBS east of 104° (Elephant Mountain, Black Gap, Dove, and Bassey Mountains) are similar to populations in Nevada. Consequently, reintroduction efforts from multiple out-of-state sources were successful with evidence of detectable contributions to the nuclear genome.

# 8:30: Species-specific Effectiveness of an Ultrasonic Acoustic Bat Deterrent: Implications for Wind Energy

Sarah R. Fritts, Texas State University, San Marcos, TX, USA Brittany Stamps, Texas State University, San Marcos, TX, USA Emma Guest, Texas State University, San Marcos, TX, USA Cris Hein, National Renewable Energy Laboratory, Golden, CO, USA Amanda Hale, Texas Christian University, Fort Worth, TX, USA Brogan Morton, Wildlife Imaging Systems, Hinesburg, VT, USA Sara Weaver, Bowman, San Marcos, TX, USA **Abstract:** An unintended consequence of wind energy is bat fatalities occurring from strikes with turbine blades. Ultrasonic acoustic deterrents (UADs) have been designed to create an unattractive air space for bats surrounding wind turbines, thus allowing maximization of energy production. Our objective was to maximize species effectiveness of the NRG Systems-manufactured UAD through experimental trials in a 61 m x 10 m x 4.5 m (L x W x H) outdoor flight cage located in San Marcos, Texas, USA. Specifically, we released wild-captured bats within the flight cage and compared flight distances each bat flew from the UAD between three treatments and control periods and assessed several echolocation characteristics using six acoustic detector microphones. The three treatments varied in sound emission frequencies: low (20-32 kHz), high (38-50 kHz), and combined (20-50 kHz), and each was interspersed by four-minute control periods. We focused on four species: Myotis velifer (n = 50), Tadarida brasiliensis (n = 77), red bats (Lasiurus blossevilli, L. borealis; n = 45), and Nycticeius humeralis (n = 77)37) and conducted trials from July-October 2020 and March-May 2021. All species flew greater distances from the UAD during all three UAD emission treatments than during the control periods. Additionally, results suggest that all species altered echolocation during UAD emission. Thus, it may be advantageous to use low frequency emissions for UADs as they attenuate less rapidly and travel further than higher frequencies. We recommend additional testing with a longer flight cage to better understand potential minimum distances various frequencies deter bats.

### 8:45: Activity Patterns and Prey Selection by South Texas Bats

Kylie F. Perez, Texas A&M University, College Station, TX, USA

**Abstract:** Bats have a greater diversity of behavior and diet than any other mammalian order. Therefore, understanding activity patterns and prey selection is imperative in the success of maintaining bat populations in south Texas. The emergence of Pseudogymnoascus destructans, a cold-adapted fungus and the causative agent of white-nose syndrome (WNS), has also led to steep declines in some North American bat populations. In more recent studies, conducted on the San Antonio Viejo Ranch 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. 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 prey 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.

### 9:00: Predictive Occurrence Models for Bat Species in Texas

Natalie M. Hamilton, Texas A&M University, College Station, TX, USA

**Abstract:** Effective conservation and management practices depend on knowledge of species' distributions and habitat preferences. When compared to other vertebrate groups, bat ecology and distributions remain less well-known. Therefore, predicting habitat suitability is a critical first step in bat conservation. The goal of our study was to map the potential distribution of bat species in Texas and determine environmental variables that best predict a species' presence. We utilized occurrence data from the Global Biodiversity Information Facility (GBIF) to create presence-only Maximum Entropy (MaxEnt) species distribution models for bats in Texas. We trimmed data to include only species with more than ten occurrences. We also tested environmental variables for correlation, which left us with ten environmental predictors. The generated models did not predict that any region of Texas was most suitable for bat species, but all models predicted a lack of suitable habitat in the Texas panhandle. The environmental variable that best predicted the most species was annual precipitation, which

discriminated between presence and absence of eight species. Our models show elevation was the most important variable in predicting the occurrence of seven of our study species. Distance from water and isothermality both predicted the occurrence of three different species. The remaining species were best predicted by distance from water and annual temperature range. Knowledge on important environmental factors and the maps resulting from our models provide an important foundation for future studies of bat species in Texas by providing information on potential conservation actions or areas appropriate for surveys and/or protection.

# 9:15: Temporal Resource Partitioning of Aoudad, Desert Bighorn Sheep, And Mule Deer in The Trans-pecos Region, Texas

Olivia C. Gray, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA Justin T. French, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA Carlos E. Gonzalez, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA Louis A. Harveson, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA Froylan Hernandez, Texas Parks and Wildlife Department, Alpine, TX, USA Shawn Gray, Texas Parks and Wildlife Department, 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, percent shrub cover, ruggedness, and escape terrain. Preliminary results 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.

## Session C2

# 8:00: Diet Preference in Feral Pigs: Comparing Feed Intake and Visitation Rates Among Different Feeds

Lee Harris Williamson, Texas Parks and Wildlife, Hunt, TX, USA Justin Foster, Texas Parks and Wildlife, Hunt, TX, USA John Kinsey, Texas Parks and Wildlife, Hunt, TX, USA Nathan Snow, National Wildlife Research Center, Fort Collins, CO, USA

**Abstract:** Damage caused by wild pigs (*Sus scrofa*) to agriculture and natural resources increases annually, and information regarding what feeds are most likely to be visited and consumed by wild pigs may improve population reduction methods. Yet, diet choice is influenced by seasonal forage availability and nutrient demands that may differ by sex and gestational status. Whole corn (*Zea mays*) is widely used as bait for wild pigs. Its effectiveness, however, in attracting pigs can vary seasonally, possibly as different forage options become available. Our goal was to evaluate differences in feed consumption and visitation rates in pigs between corn,

other commercial feeds, and food resources available in the Texas Hill Country. Trials were conducted in spring and fall of 2021 at the Kerr Wildlife Management Area. Each trial consisted of 10 pens where pigs were provided a known mass of corn and a known mass of one test feed. Pigs were left to feed for 5 nights while cameras in each pen captured images every 15 seconds. Remaining feed in each trough was weighed, and the number of images with pigs visiting each trough were counted. Preliminary data for total mass consumed and visitation rate indicate that corn was the preferred food resource across all trials in the spring, but the image data also shows that visitation to some test feeds increased over time. These findings may help wildlife managers make informed decisions about what feed types to use when trying to bait feral hogs across different seasons.

# 8:15: The Influence of Income and Loss on Hunters' Attitudes Towards Wild Pigs and Their Management

Samantha J. Leivers, Texas A&M University, College Station, TX, USA Keith M. Carlisle, Texas A&M University, College Station, TX, USA Rachel L. Connally, Texas A&M University, College Station, TX, USA Maureen G. Frank, Texas A&M University, College Station, TX, USA John M. Tomecek, Texas A&M University, College Station, TX, USA

Abstract: Wild pigs (Sus scrofa) are one of the most pervasive invasive species in North America. Wild pigs pose a threat to crops, livestock, and the environment, but also offer recreational hunting opportunities. At the same time, stakeholders vary in their attitudes towards wild pigs and their management. We investigated whether loss and income due to wild pigs influence attitudes towards wild pigs and their management in Texas in one of these stakeholder groups (hunters). We further examined how land use influenced attitudes towards wild pigs in hunters who own land. We analyzed 22176 responses (8707 landowners, 13469 non-landowners) to the Texas A&M Human Dimensions of Wild Pigs Survey. Landowners who generated income via wild pigs had more positive attitudes towards wild pigs than those who did not generate income. Landowners who received income further considered government or agency hunting to be a less effective or acceptable method of control. Landowners who used their land for agriculture had more negative attitudes towards wild pigs than those who did not, and considered government or agency hunting to be less effective or acceptable. However, effect sizes for our results were small and, across all groups, attitudes towards wild pigs were generally negative. Very few respondents reported generating income from wild pigs (3.91% of landowners, 0.56% of non-landowners) and reported losses were ~4x greater than income. Additional research on differing values among stakeholder groups may be more likely to shed light on disagreements on wild pig management than variation in wild pig-derived income.

# 8:30: Patterns Of The Introduction and Spread of The Non-native Brown Widow Spider in The Americas

Ashley C. Wahlberg, Stephen F. Austin State University, Nacogdoches, TX, USA Reuber Antoniazzi, Stephen F. Austin State University, Nacogdoches, TX, USA Christopher M. Schalk, U.S. Forest Service, Southern Research Station, Nacogdoches, TX, USA

**Abstract:** Introductions of non-native species to novel environments happen often, but a species must overcome multiple biotic and abiotic filters to establish, and eventually spread, in a new region. Focusing on patterns of introductions can provide insights as to underlying mechanisms that facilitate establishment, and in turn, their potential effects on native communities. The brown widow spider (*Latrodectus geometricus*) is likely native to Africa, but now has a cosmopolitan distribution due to introductions via international trade. We reviewed the patterns of brown widow introductions in the Americas to determine if there are any large-scale inferences regarding their patterns, and potential impacts, of their introduction. Over 4,000 records from 30

countries were synthesized and demonstrate their spread to higher latitudes across time and an increase in the number of records in the past two decades. Citizen-science databases (e.g., iNaturalist) have been instrumental in documenting the expansion of the brown widow. On a local scale, we also quantified the niche of brown widows relative to other cobweb-weaving spiders along their habitat, diet, and isotopic niche axes while couching their resource use in the context of their functional traits. We found that brown widows exhibit high overlap in their functional traits with native spiders, which could indicate high overlap in resource use. Results from this research will provide insight as to the mechanisms underlying the establishment of a non-native species into a novel ecosystem.

#### 8:45: Genetic Variation Of Invasive Axis Deer in Texas and Other Introduced Populations Globally

Matthew J. Buchholz, Texas Tech University, Lubbock, TX, USA Emily A. Wright, Texas Tech University, Lubbock, TX, USA Blake A. Grisham, Texas Tech University, Lubbock, TX, USA Robert D. Bradley, Texas Tech University, Lubbock, TX, USA Thomas L. Arsuffi, Texas Tech University -Junction, Junction, TX, USA Warren C. Conway, Texas Tech University, Lubbock, TX, USA

Abstract: Human-mediated introductions and subsequent establishment and spread of nonnative species has the potential to create a pseudo-founder effect on such populations, which typically results in low genetic diversity and inbreeding. However, several exotic invasive species exhibit a 'genetic paradox' in which they thrive, despite inbreeding and low genetic diversity patterns in their introduced range. Axis deer (Axis axis) were introduced to new ranges (Texas, Hawaii, Australia, and Croatia) during the 19th and 20th centuries and successfully established large populations from a few founding individuals. We used mitochondrial (Cytochrome-b, Cytb; Displacement loop, D-loop) and nuclear (10 microsatellites) markers to assess genetic diversity within and between axis deer populations in Texas and Hawaii which were then compared to data from other introduced and native populations. Overall mtDNA divergence was only 0.54% (Cytb) and 1.55% (D-loop) indicating high mitochondrial similarity in the species, with each invasive population composed of only one or two mtDNA haplotypes. Microsatellite allele diversity also was low within and between axis deer populations in Texas and Hawaii with monomorphic loci and multiple violations of Hardy-Weinberg equilibrium in both populations. The low genetic diversity in axis deer globally, as well as within and between invasive populations, suggests that introduced axis deer populations experienced founder effects following introduction, yet have successfully established and expanded. Axis deer appear to be another invasive species exhibiting this genetic paradox, where they are wildly successful in certain regions (Texas and Hawaii) yet exhibit poor genetic profiles that suggest long-term population persistence would not be sustainable.

# 9:00: Discrete Climatic Events and Non-native Species: The Effects of Winter Storm Uri on Axis Deer (*Axis axis*) Mortality and Ecology

Brittany L. Slabach, Trinity University, San Antonio, TX, USA Matthew J. Buchholz, Texas Tech University, Lubbock, TX, USA Warren C. Conway, Texas Tech University, Lubbock, TX, USA Blake A. Grisham, Texas Tech University, Lubbock, TX, USA Kelly Lyons, Trinity University, San Antonio, Texas, United States Troy Murphy, Trinity University, San Antonio, TX, USA

**Abstract:** Discrete extreme climatic events are important drivers of individual space use, survival, and persistence. These events can increase thermal stress and selection pressures on organisms. In February of 2021, winter storm Uri brought an unusually long bout of subfreezing temperatures to the entire state of Texas. As a

result of this storm, a total of 2,227 axis deer (Axis axis) mortalities were reported via iNaturalist observations (N = 129) and anecdotally (n = 2098) across seven counties. Of those identified, 63% (35/55) of all mortalities occurred in fawns compared to 21.8% (12/55) in adult females and 14.5% (8/55) in adult males. Three adult females were either pregnant or lactating, and at least two of the adult males were in velvet. Evidence of frostbite was found on males in velvet. We assessed body size and condition of eleven adults (4M:7F) in Kendall, Gillespie and Edwards County to investigate factors that influenced survival during this climatic event. No measurable fat was found on the rump, heart, or kidneys, and rumen contents were primarily grazed forage. Axis deer are a non-native species, endemic to India, that have thrived since their reintroduction to Texas. Axis deer do not have a defined reproductive season, but nearly 80% of fawns are born between January and March, explaining the fawn mortalities observed. We conclude that individuals suffered from increased thermal stress due to exposure, energetic costs of lactation, and heat loss due to immature antlers. We suspect that mortality was much greater than reported.

# Session D2

## 8:00: Repatriation of Illegally Collected Alligator Snapping Turtles into Native Texas Waters

**Connor S. Adams**, Stephen F. Austin State University, Nacogdoches, TX, USA **Paul Crump**, Texas Parks and Wildlife, Austin, TX, USA **Christopher M. Schalk**, Stephen F. Austin State University, Nacogdoches, 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 may be vulnerable to overharvest or incidental bycatch. These threats to wild populations have led to the USFWS considering *M. temminckii* for listing as federally threatened. Despite having protection from harvest in Texas since the 1970's, *M. temminckii* are still harvested illegally. In 2016, USWFS agents confiscated 30 alligator snapping turtles from Louisiana poachers that transported wild caught turtles from Texas. Then, in 2020, collaborative efforts between federal and state agencies led to the decision to repatriate these individuals back into native Texas waters. As part of these efforts, genetic analyses and preliminary surveys guided the selection of three release sites in respective river drainages (i.e., Cypress, Neches, and Sabine). To understand how these individuals might respond to repatriation, we attached VHF radios to 23 *M. temminckii*, and performed weekly post-release telemetry checks. Here we present preliminary results from these ongoing efforts investigating movement patterns, habitat selection, and survival of repatriated *M. temminckii*.

## 8:15: Investigating the Phylogenetic Relationships of Sirens in Texas

Jessica M. Heckman, West Texas A&M University, Canyon, TX, USA Peter A. Scott, West Texas A&M University, Canyon, TX, USA Richard T. Kazmaier, West Texas A&M University, Canyon, TX, USA

**Abstract:** Sirens in extreme southern Texas are noticeably larger and have subtle morphological differences when compared to more eastern sirens, but the status and taxonomic affinity of these southern populations has been controversial. Some authorities believe these populations are simply large-bodied lesser sirens (*Siren intermedia*) that experience a prolonged growing season. However, other hypotheses have been proposed, such as the existence of a disjunct population of greater sirens (*Siren lacertina*), the possibility that southern Texas sirens are a unique taxa (often designated *Siren texana*), or that more than one species is present in the region. The distinctiveness of this southern population of *Siren* resulted in Texas Parks and Wildlife Department listing it as "state-threatened" under the taxonomic designation of "South Texas siren - large form". This vagueness

obviously complicates management and conservation of the group. We sequenced multiple mitochondrial fragments from sirens collected from several sites in southern Texas and a population in eastern Texas. We combined our data with publicly available siren sequences to produce phylogenies using a maximum likelihood method. All Texas samples were highly divergent from all out of state samples, except for a Louisiana sequence that closely affiliated itself with our southern Texas samples. Sirens from our eastern Texas site were quite distinct from the southern Texas-Louisiana group. This suggests that at least some populations in Texas are divergent, but the divergence might be better described as a coastal versus inland dichotomy instead of a southern (or Rio Grande Valley) versus eastern dichotomy.

### 8:30: Top Predators Drive Community Structure of Tadpole Assemblages

Tatiana Joaqui, Stephen F. Austin State University, Nacogdoches, TX, USA
Daniel Saenz, U.S. Forest Service, Southern Research Station, Nacogdoches, TX, USA
Cory Adams, U.S. Forest Service, Southern Research Station, Nacogdoches, TX, USA
Toby Hibbitts, Biodiversity Research and Teaching Collection, Department of Ecology and Conservation
Biology, Texas A&M University, Nacogdoches, TX, USA
Christopher Schalk, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Predator-prey interactions affect prey morphology, behavior, and persistence in local habitats, affecting community structure and function. In this study, we explored the effect of top predators on anuran diversity patterns in permanent ponds in Texas. We surveyed larval anuran assemblages across four different top predator regimes including 1) *Micropterus salmoides* (Largemouth bass, B), 2) *Lepomis cyanellus* (Green sunfish, G), 3) a combination of both B and G (B+G), and 4) salamander/invertebrate predators (SI). B and G, are considered the dominant top predators in aquatic communities in this region, which affect tadpole communities by feeding directly on tadpoles (i.e. G, SI) or by feeding directly on tadpole predators (i.e. B). Fish sampling was conducted in 2007 using hook and line and dipnetting. and anuran sampling was conducted across two years (2008 -2009), tadpoles and SI sampling was done using dipnetting. In total, 11 species of anuran larvae were collected across 45 ponds. Diversity patterns were calculated using Hill numbers. Ponds where B+G were the maintop predators contained fewest tadpole species (species richness,  $^{0}D = 6$ ) compared to B ( $^{0}D = 10$ ), G ( $^{0}D = 11$ ), and SI ponds ( $^{0}D = 11$ ). Common ( $^{1}D: B=3, G=4, B+G=4, IS=3$ ) and dominant ( $^{2}D: B=3, G=3, B+G=3, IS=2$ ) species showed a similar number of species between treatments. We show that combined predators have strong effects on species richness and that different top predator identity has different effects on anuran tadpole communities which might be likely mediated through both direct and indirect effects in these communities.

### 8:45: Comparative Calling Phenology of Anurans Across Latitudinal Gradients

Veda Allen, Stephen F. Austin State University, Nacogdoches, TX, USA Daniel Saenz, US Forest Service, Nacogdoches, TX, USA Christopher Schalk, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** The reproductive phenology of most amphibians is strongly influenced by abiotic factors (temperature and rainfall). Anurans with wide geographic ranges can exhibit latitudinal variation in their reproductive ecology. To explore patterns in latitudinal variation of their timing, intensity, and abiotic correlates of their reproduction, we quantified the calling phenology for five widespread species of anurans - green tree frog (*Hyla cinerea*), eastern narrow-mouth frog (*Gastrophyrne carolinensis*), southern leopard frog (*Lithobates sphenocephalus*), Blanchard's cricket frog (*Acris blanchardi*), and gulf coast toad (*Incilius nebulifer*) - across two sites: 1) the Davey Crockett National Forest/Stephen F. Austin Experimental Forest (hereafter East Texas sites), and 2) the Attwater Prairie Chicken National Wildlife Refuge. Song Meters were deployed in 2015 to passively record for 6 minutes each night (1 min/hr; 2100 h - 0200 h). The number of males calling per species were counted to calculate the average number

of males calling per pond per night. Three species were prolonged breeders across both sites, while two were explosive breeders. All five species had longer calling windows in Attwater Prairie Chicken NWR and differed in calling intensity across both sites. Differences in calling windows and intensities could be attributed to habitat type and climatic differences across sites. Emergent vegetation was more widespread at Attwater NWR ponds vs. East TX ponds. Moisture regimes and warm temperatures are important cues affecting the start of anuran breeding seasons. Attwater NWR experiences higher temperatures and greater rainfall, which could explain the longer calling windows of species at this site.

# Session A3

## 10:00: Influence of Cattle Fever Tick Control Methods on Tick Abundance in White-tailed Deer

Jeremy A. Baumgardt, Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, Kingsville, TX, USA

Ashley G. Hodge, Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, Kingsville, TX, USA

Randy W. DeYoung, Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, Kingsville, TX, USA

J. Alfonso Ortega-S, Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, Kingsville, TX, USA

David G. Hewitt, Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, Kingsville, TX, USA

John A. Goolsby, USDA Agricultural Research Service, Cattle Fever Tick Research Laboratory, EDINBURG, TX, USA

**Kimberly H. Lohmeyer**, USDA Agricultural Research Service, Knipling-Bushland U.S. Livestock Insects Research Laboratory and Veterinary Pest Genomics Center, Kerville, TX, USA

**Abstract:** Cattle fever ticks (CFT) were eradicated from most of the U.S. in the 1940s, yet these ticks remain common along the Rio Grande and in Mexico. White-tailed deer can carry CFTs and may be responsible for recent outbreaks in South Texas. To reduce infestations, APHIS and Texas Animal Health Commission maintain hundreds of feeders in a quarantine zone that are baited with corn medicated with Ivermectin. Additionally, cattle within the quarantine zone are regularly treated with injectable antiparasitic drugs. It is hypothesized that treating cattle will remove ticks from the immediate environment, which would benefit local deer. Our objectives for this study were to evaluate the effectiveness of these control efforts on white-tailed deer tick burdens. We captured and collared white-tailed deer in February 2020 and recaptured 13 bucks in November 2020 to adjust collars and assess tick loads. We estimated LoCoH-a home ranges for each buck and calculated percent overlap with treated pastures and number of corn feeders for both the 90% home range and 50% core area. We fit a negative binomial regression model to the data and tested for a relationship between their November tick loads and their relative access to CFT control efforts. We found strong support for a relationship between tick loads and the percent of a deer's core area encompassed by a pasture under treatment and weaker support for access to feeders in their core area. These results can be used to determine effective treatment efforts to reduce CFTs on white-tailed deer.

## 10:15: Evaluating the Effects of a Tick Salivary Antigen Cocktail as an Anti-tick Vaccine for Whitetailed Deer

Alec Baker, Texas A&M, Uvalde, TX, USA Tammi Johnson, Texas A&M AgriLife Research, Uvalde, TX, USA Albert Mulenga, Texas A&M, College Station, TX, USA Pia Olafson, United States Department of Agriculture, Kerrville, TX, USA

**Abstract:** White-tailed deer (Odocoileus virginianus) are a main host for adult black-legged ticks (Ixodes scapularis), which transmit nearly half of human tick-borne disease agents. We tested a candidate antigen cocktail containing ten tick-salivary proteins that were proven effective in rabbits. Deer were inoculated with two dosages of the antigen cocktail (low dose ( $100\mu$ g) N = 4, high dose ( $200\mu$ g) N= 4), and a group inoculated with the adjuvant only (control/adjuvant N = 4). Deer were infested with ticks (N = 100 ticks per deer) on three occasions post-inoculation to determine the effects of the antigens on tick feeding and reproductive parameters. There was significant variation amongst treatment groups for weight of replete ticks (P < 0.0001), weight of egg mass (P < 0.0001), bloodmeal conversion to egg mass (P < 0.0001), and percent of larvae that hatched (P < 0.0001). However, no significant variation was detected in vaccinated groups versus the adjuvant-only group. Based on ELISA results deer did develop antibodies to some of the antigens in our candidate cocktail suggesting the methodology was successful and worthy of further endeavors to identify antigenic tick targets. Continued efforts by our group to identify efficacious anti-tick antigens targeting black-legged ticks on white-tailed deer will be discussed. The successful completion of this research will identify key tick-salivary proteins that black-legged ticks utilize to regulate feeding on white-tailed deer and to inform development of a single dose anti-tick vaccine

## 10:30: Assessing Genetic Susceptibility of Pronghorn (*Antilocapra americana*) to Prion Diseases Through Prnp Gene Sequencing

Angela M. Grogan, Texas Tech University, Lubbock, TX, USA
Emily A. Wright, Texas Tech University, Lubbock, TX, USA
Matthew J. Buchholz, Texas Tech University, Lubbock, TX, USA
Courtney L. Ramsey, Texas Tech University, Lubbock, TX, USA
Robert D. Bradley, Texas Tech University, Lubbock, TX, USA
Warren C. Conway, Texas Tech University, Lubbock, Texas, United States

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 continues to expand 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 also raises concerns. Historically, pronghorn (Antilocapra americana) have utilized much of the same habitat as susceptible cervids and occur within the endemic CWD area of Colorado and Wyoming. However, to date, there has been little research on pronghorn susceptibility to prion diseases like CWD. Pronghorn were translocated between 2011-2017 from the Texas Panhandle to the Trans-Pecos region to help offset population declines, where currently both regions contain Texas Parks and Wildlife Department CWD containment and surveillance zones. Our goal is to sequence the prion protein gene, PRNP, exon 3 (the coding region of the prion protein, PrPC) in pronghorn from Texas, New Mexico, Colorado and Wyoming to compare to amino acid sequences of known susceptible cervids and assess if pronghorn may be susceptible to prion diseases. Currently, we are amplifying and sequencing PRNP from individuals from Texas (including translocated individuals) and New Mexico. This research will be useful for evaluating the potential risks associated with sympatric coexistence of pronghorn with Cervids in CWD containment zones in Texas, and to determine if pronghorn are susceptible to prion diseases.

# 10:45: Monitoring White-tailed Deer Border Crossings Relative to Management Efforts for Cattle Fever Ticks Along The USA- Mexico Border

Ashley G. Hodge, Texas A&M University-Kingsville, Kingsville, Texas, United States
Jeremy A. Baumgardt, Texas A&M University-Kingsville, Kingsville, TX, USA
Randy W. DeYoung, Texas A&M University-Kingsville, Kingsville, TX, USA
Michael J. Cherry, Texas A&M University-Kingsville, Kingsville, Texas, United States
Aaron M. Foley, Texas A&M University-Kingsville, Kingsville, TX, USA
David G. Hewitt, Texas A&M University-Kingsville, Kingsville, TX, USA
John A. Goolsby, U.S. Department of Agriculture - Agricultural Research Service, Kerrville, TX, USA
Kim H. Lohmeyer, U.S. Department of Agriculture - Agricultural Research Service, Kerrville, TX, USA

**Abstract:** Ungulates are capable of long-distance movements, a management concern due to the potential to spread disease to livestock and humans. In South Texas, there is growing concern about the increasing presence of the cattle fever tick. This one-host tick can carry a *Babesia* parasite that is fatal to naïve cattle. The tick and *Babesia* are endemic in Mexico, and the USDA and TAHC maintain a permanent quarantine zone to prevent reinfestation of the US. Deer serve as alternative hosts for the tick, and may act as long-distance dispersers across the border or the quarantine zone. We studied movements of deer in a high-density population surrounding Falcon Lake, near Zapata, Texas. We captured 100 deer via net gun and helicopter, and deployed GPS collars that collected hourly locations during February 2020-2021. We identified border crossings using time-based GPS tracks and estimated monthly home ranges using local convex hull estimators. Several individuals made long-distance exploratory movements, all remained within the quarantine zone. We observed 98 crossings from 41 deer from Texas to Mexico throughout the year. We are analyzing the placement of crossings and surrounding land metrics that may influence where and when deer cross. Monthly home ranges, but collectively crossed at multiple different locations along the lake shore. Targeting cattle fever tick treatment or other management actions at crossing sites may help decrease the abundance of ticks in the area.

### 11:00: Respiratory Microbiomes of Aoudad and Desert Bighorn Sheep in Texas

Rachael C. Wiedmeier, Texas Tech University, Lubbock, TX, USA
Emily A. Wright, Texas Tech University, Lubbock, TX, USA
Bob Dittmar, Texas Parks and Wildlife Department, Austin, TX, USA
Robert D. Bradley, Texas Tech University, Lubbock, TX, USA
Warren C. Conway, Texas Tech University, Lubbock, TX, USA
Caleb D. Phillips, Texas Tech University, Lubbock, TX, USA

**Abstract:** Rangewide, bighorn sheep (*Ovis canadensis*) have experienced die-off events caused by bacterial species referred to as the pneumonia complex. Commonly infected by domestic sheep (*Ovis aries*) and goats (*Capra hircus*), transmission may also occur from aoudad (*Ammotragus lervia*) that coexists with desert bighorn sheep (*Ovis canadensis nelsont*) in Texas. Baseline respiratory microbiomes in bighorn sheep and aoudad are poorly known but are important to characterize, to inform diseased state microbiomes if they occur. We performed 16S bacterial sequencing on throat and nasal swabs collected from 278 bighorn sheep and 88 aoudad from 10 mountain ranges in Texas during 2017-2020. Both throat and nasal bacterial community composition was similar between aoudad and bighorn sheep. Perhaps more importantly pneumonia complex bacteria were identified in both respiratory locations in both aoudad and bighorn sheep. Interestingly, microbiome composition at a body site (nasal or throat) was more similar between host species than within species between body sites (nasal compared to throat), suggesting that bighorn sheep and aoudad likely are exchanging multiple bacteria and potential pathogens. Finally, *Mycoplasma ovipneumoniae* was identified in aoudad throat samples, where the 26 sequences found in aoudad were unique from other published sequences, indicating that aoudad may indeed be a host for pneumonia complex bacteria that are fatal to bighorn sheep. Further work needs to identify, and strain type these

Mycoplasma bacteria to more clearly identify how this pathogen may impact bighorn sheep survival and persistence in the Trans Pecos Region.

## Session B3

## 10:00: Influence of Fine-scale Landscape and Vegetation Structure on Bobcat Use of Highway Wildlife Crossings in Cameron County, Texas

Thomas J. Yamashita, Texas A&M University-Kingsville, Kingsville, TX, USA Humberto L. Perotto-Baldivieso, Texas A&M University-Kingsville, Kingsville, TX, USA Zachary M. Wardle, Texas A&M University-Kingsville, Kingsville, Texas, United States Richard J. Kline, University of Texas Rio Grande Valley, Port Isabel, TX, USA Michael E. Tewes, Texas A&M University-Kingsville, Kingsville, TX, USA John H. Young, Texas Department of Transportation, Austin, Texas, United States Jason V. Lombardi, Texas A&M University-Kingsville, Kingsville, TX, USA

Abstract: Globally, wildlife crossing structures (WCS) are constructed to help improve connectivity of wildlife populations and help reduce wildlife-road mortality. The use of WCSs may be affected by structural characteristics of crossings, human disturbance, and the 3D structure of vegetation in the surrounding landscape. We computed seven metrics of horizontal woody cover structure (percent land cover, patch density, edge density, mean patch area, largest patch index, aggregation index, and Euclidean nearest neighbor distance) from a classified 1-m resolution aerial image in 1-km buffers around 14 wildlife crossing structures in Cameron County and 14 random locations in nearby habitat. We estimated vegetation density at five different heights above the ground from classified light detection and ranging (LiDAR) point clouds within each crossing and random buffer. We then used permutational multivariate analysis of variance to compare the vegetation structure around wildlife crossings to the surrounding landscape. To assess how landscape structure affects wildlife crossing use, we used camera traps to identify bobcat (Lynx rufus) presence at each WCS location. We used a generalized linear mixed model to assess how bobcat detections were related to landscape structure and internal vegetation structure. We expect that landscape structure at WCSs will not differ from the surrounding landscape and bobcat use of WCSs will increase with larger, more connected patches that have higher vegetation density. This study will help determine the effectiveness of WCSs by demonstrating the important landscape and vegetation characteristics that influence use.

## 10:15: Are Mountain Lions Really Eating Feral Horses?

Pat Jackson, Nevada Department of Wildlife, Reno, NV, USA
Peter Iacono, Utah State University, Logan, UT, USA
David Stoner, Utah State University, Logan, UT, USA
Kathryn Schoenecker, United States Geological Survey, Ft. Collins, CO, USA

**Abstract:** As of March 1, 2021, the Bureau of Land Management estimated free-roaming feral horse and burro populations exceeding 86,000 on federally managed lands in the West. In May 2018, the New York Times published an article titled, "Let Mountain Lions Eat Horses." The article implies mountain lions (Puma concolor) either currently do or could limit feral horse (Equus caballus) populations across the western United States. This claim, among others in the article, is not well supported by the existing literature. I will briefly cover the evolution, extinction, and reintroduction of domestic horses to North America, their ecological effects, summarize existing peer-reviewed literature, and the political climate of feral horse management. Based on visits to kill sites from 27 radio-marked mountain lions in the arid ranges of southeastern Nevada, approximately 20% of lion diet consists of feral horses. I will also share these preliminary findings.

# 10:30: Response Of Ocelots to Paved and Unpaved Roads in Ranchland and Fragmented Systems in Southern Texas

Jason V. Lombardi, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, Texas, United States

C. Jane Anderson, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

David B. Wester, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, Texas, United States

Shelby B. Carter, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

AnnMarie Blackburn, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, Texas, United States

Amanda M. Veals, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

Humberto L. Perotto-Baldivieso, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, Texas, United States

Landon Schofield, East Foundation, San Antonio, TX, USA

John H. Young, Division of Environmental Affairs, Texas Department of Transportation, Austin, TX, USA Michael E. Tewes, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

**Abstract:** Identifying how different road surfaces impact wildlife species has increasingly become a topic of conservation concern. Understanding the differences between various road surfaces and their impact on road crossing patterns is key to understanding how endangered ocelots (*Leopardus pardalis*) may perceive the contrasting landscapes in South Texas. In this study, we used a historic and contemporary telemetry dataset of 71 ocelots (37 males, 34 females) monitored in fragmented areas from 1982 to 2001 and intact ranchlands from 2011 to 2020 to examine the response of ocelots to unpaved and paved roads. We evaluated how within-home range road density varied by road type, as well as biological and study design factors. We further evaluated how these factors influenced road crossing rates within each study area. In fragmented areas, ocelots crossed dirt and gravel roads more often than paved roads and the crossing rate was positively related to road availability among all road types (p < 0.05). Male ocelots in fragmented areas crossed all road types more often than female ocelots, even though males and females did not differ in road availability within home ranges (p > 0.05). However, in the intact ranchlands, ocelots crossed dirt and gravel roads exclusively and the crossing rate was positively related to road availability related to road availability among road types (p < 0.05). This study provides new insights into how ocelot movements and home ranges are affected by road types, informs recovery efforts on private lands, and road planning efforts to mitigate ocelot-vehicle mortality in the region.

### 10:45: Habitat Partitioning Between Black-backed and Side-striped Jackals in South Africa

Ian A. Mack, Tarleton State University, STEPHENVILLE, TX, USA Thomas W. Schwertner, Tarleton State University, STEPHENVILLE, TX, USA Hemanta Kafley, Tarleton State University, STEPHENVILLE, TX, USA Heather Mathewson, Tarleton State University, STEPHENVILLE, TX, USA Jeff Breeden, Tarleton State University, STEPHENVILLE, TX, USA Cheyenne Mack, Tarleton State University, STEPHENVILLE, TX, USA Tiffany Nash, Tarleton State University, STEPHENVILLE, TX, USA

**Abstract:** Black-backed jackals (BBJ; *Canis mesomelas*) and side-striped jackals (SSJ; *C. adustus*) are widely distributed in southern and east Africa. Range-wide, the distribution of the species overlaps by approximately 26%. In southern Africa, a narrow range distribution overlap zone runs from western Angola to eastern South Africa and southern Mozambique. There is currently little information regarding how these two species partition habitat where they occur sympatrically. We studied jackal activity and habitat use on adjacent reserves located in Limpopo Province, South Africa [Hans Merensky (5,362 ha) and Vygeboom (6,629 ha)]. We deployed 88 camera traps along a two-km × two-km grid network across the study site, each trap consisting of paired infrared game cameras, from mid-December 2019 to mid-February 2020. At each trap site, we collected data on vegetation type and structure. We made 65 observations of BBJ and 159 observations of SSJ across 18 trap sites. Five traps reported BBJ only, seven traps reported SSJ only, and six traps (33%) reported both species. On two occasions, both species were detected at the same trap site during a twenty-four-hour period. This preliminary analysis suggests that BBJ and SSJ may be partitioning habitat spatially and temporally. We will further evaluate spatial use of both species using multi-species occupancy-modeling based on species occurrence and vegetation data. This information will help us better understand the complex interactions between these two species and inform conservation and management decisions, given the dearth of information currently available.

# Session C3

### 10:00: Disentangling the Competitive Interactions of Cattle and White-tailed Deer

Bryan D. Spencer, Texas A&M University - Kingsville, Kingsville, TX, USA David G. Hewitt, Texas A&M University - Kingsville, Kingsville, TX, USA Randy W. DeYoung, Texas A&M University - Kingsville, Kingsville, TX, USA J. Alfonso Ortega-S., Texas A&M University - Kingsville, Kingsville, TX, USA Aaron M. Foley, Texas A&M University - Kingsville, Kingsville, TX, USA Tyler A. Campbell, East Foundation, San Antonio, TX, USA Landon Schofield, East Foundation, San Antonio, TX, USA Michael J. Cherry, Texas A&M University - Kingsville, Kingsville, TX, USA

Abstract: Evaluating competition among species is important to understanding food web dynamics, but it is difficult when niche partitioning has already occurred. We used white-tailed deer movement data associated with experimental cattle stocking to disentangle scrabble competition from interference competition among whitetailed deer and cattle. We assumed scramble competition would result from reduced forage quality, and interference competition would occur if antagonistic interactions alter deer behavior. We used home range area as a proxy for habitat quality, assuming deer maintain the smallest home range required for their dietary needs, and velocity and habitat selection as indicators of deer behavior. We predicted habitat quality would not be affected, and home range area would vary with cattle stocking rates. We predicted velocity would decrease with stocking rates, and deer would select areas of denser brush. We deployed GPS-collars on 19 female white-tailed deer across 10 pastures of the San Antonio Viejo Ranch in South Texas and experimentally stocked cattle at rates ranging from 0-15.7 AU/km2 to previously destocked pastures. Using data collected 30 days before and after the stocking event, we estimated home ranges using dynamic Brownian bridge movement models, calculated velocities, and fit step-selection functions. Stocking rates did not influence home range size, however, deer decreased movement velocity ( $\beta = -1.42$ , P = 0.006) and increased selection for brush ( $\beta = 0.048$ , P<0.001) with increasing stocking rates. This indicates cattle may not immediately influence white-tailed deer forage quality, but suggest interference competition between cattle and deer occurred rapidly.

# 10:15: Evaluating the Use of the "Rangeland Analysis Platform" in Large-scale Stocking Rate Decisions in South Texas

Andrea Montalvo, East Foundation, Hebbronville, TX, USA Camryn Endler, Texas A&M University, College Station, TX, USA Jason Sawyer, East Foundation, San Antonio, TX, USA

**Abstract:** Obtaining reliable estimates of herbaceous biomass on large-scale, heterogenous landscapes can be challenging. Cattle operations use biomass estimates to determine stocking rates and monitor the health of their rangelands. The East Foundation in Jim Hogg County, Texas, manages one of the largest grazing studies in the country and uses herbaceous biomass to make annual adjustments to stocking rates. The current method used for estimating biomass is hand clipping samples spatially stratified by ecological site. Hand clipping grass can be labor intensive and can produce high variability depending on sample size, particularly in large, diverse pastures. A web application called the Rangeland Analysis Platform (RAP) provides estimates of accumulated herbaceous biomass at 16-day intervals for the western United States. In order to determine if we can supplement or replace clipped samples with RAP data, we clipped 4 frames within the RAP pixel scale (30x30m) every 16 days for 48 days. We clipped 24 pixels (n = 96 frames) across 3 pastures within a rotational treatment in the grazing study. The pixels were distributed evenly within the 2 major ecological types within the pasture (Sandy and Loamy Sand). We will compare clipped samples at 3 spatial scales (pixel, acre, pasture). We will also compare these metrics between the grazed and un-grazed pastures. We hope this information will assist managers with supplementing knowledge of their rangelands and stocking rates with remotely sensed data.

# 10:30: The Value of Wildlife Biodiversity: A Review and Empirical Study to Quantify And Monetize Wildlife Biodiversity Benefits of Restoring Native Grassland Plant Communities

Mycha Van Allen, Texas A&M University, College Station, TX, USA

**Abstract:** Wildlife biodiversity is essential and valuable for the environment, society, and the economy. Grasslands have long been a biodiversity hotspot before human activity. In Texas, grasslands made up a large portion of the landscape in its historic range. Today, 99% of native grasslands are lost. Human activity has significantly altered these grasslands by conversion to monocultural pastures, agriculture, invasive species introduction, and development. Conversion and degradation of native grasslands decrease biodiversity and decrease ecosystem functioning. Studies have shown how diverse native grassland communities are monetarily valuable through carbon sequestration, water quality, water quantity, erosion control, and flood prevention. Wildlife biodiversity 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.Here I introduce a study design comparing wildlife biodiversity between a well-managed, restored native grassland and a poorly-managed, nonnative grassland in the Eagle Ford Shale play of south-central Texas. Moreover, I describe a sampling methodology to survey invertebrates and vertebrates, including arthropods, small mammals, reptiles, and birds, to best measure biodiversity. The overall goal of this study is to provide the data necessary to identify the potential monetary, economic value for wildlife biodiversity as a direct benefit from restoring native grassland communities.

### 10:45: Determining the Effect of Invasive Vegetation on Small Vertebrate Communities

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

**Abstract:** Invasive vegetation such as non-native grasses and woody brush species have altered many South Texas rangelands that were once native mixed grass and tallgrass prairie ecosystems. The objectives of this study are to determine how non-native and invasive dominated habitats differ from intermediately invaded and native habitats in composition and habitat structure and determine how small vertebrate species differ in abundance, diversity, and composition across this habitat gradient. We sampled several sites at the Welder Wildlife Refuge to identify community and habitat differences along this gradient of ecosystem change (i.e., native, moderately invaded, invaded). Over the course of two years, we captured 853 unique individual small mammals and 2192 herpetofauna representing 8 and 37 species, respectively. Small mammal diversity was lowest in native habitats but there were no significant differences in herpetofaunal diversity. Species composition did differ between habitat types, with invaded sites consisting mainly of generalist species and native sites hosting more habitat specialists, suggesting that the effects of habitat change on small vertebrates is seen at the species level.

### 11:00: A Monitoring Program to Evaluate the Coastal Grassland Restoration Incentive Program

Stephen J. DeMaso, U.S. Fish and Wildlife Service/Gulf Coast Joint Venture, Lafayette, LA, USA WIlliam G. Vermillion, U.S. Fish and Wildlife Service/Gulf Coast Joint Venture, Lafayette, LA, USA Mark W. Parr, U.S. Fish and Wildlife Service/Gulf Coast Joint Venture, Lafayette, LA, USA

Abstract: The Gulf Coast Joint Venture (GCJV) is a regionally based, biologically driven, landscape-oriented volunteer partnership of private, state, and federal conservation organizations dedicated to the delivery of habitat important to priority bird species. The GCJV partnership's Coastal Grassland Restoration Incentive Program (C-GRIP) provides financial incentives to private landowners for conducting habitat treatments that address the greatest limiting factor(s) to provide suitable grassland bird habitat on their property. The C-GRIP program is a way for the GCJV to deliver bird habitat to meet planning objectives for grassland birds. Our monitoring objective is to evaluate whether or not the C-GRIP program is effective in providing a relative increase in the density (number/acre) of priority grassland bird species over a 10-year period in focal delivery areas versus control areas over a 10-year period. Twenty survey routes (2 within each of 5 focal areas and 2 outside of each area, serving as controls), located on secondary and tertiary roads were designated in the Texas Mid-Coast Initiative Area of the GCJV. Each route measures 24.5 miles in length and the land cover is similar along all survey routes. Each route has  $\geq$  30 point-count stations separated by  $\geq$  0.5 mile. We recognize that some routes will experience increased development over time, especially in counties neighboring large population centers such as Houston and Victoria. The plan is to continue to monitor these routes, as long as safety concerns do not increase. Our paper will include determining the monitoring objective, survey route selection, and survey methodology.

## 11:15: Can Cropping Rate Variability Reduce the Costs of Antipredator and Social Vigilance?

Elizabeth Kurpiers, Texas State University, San Marcos, TX, USA Floyd Weckerly, Texas State University, San Marcos, TX, USA

**Abstract:** Mammalian herbivores spend substantial portions of each day foraging to consume large quantities of nutrient-poor food. Vigilance is a behavior that interrupts foraging and is used by prey species to identify and avoid predators. Despite its antipredator benefits, vigilance imposes a foraging cost: increased time spent vigilant reduces time available to forage. We investigated the possibility that ungulates vary their cropping rate while foraging to increase forage intake and compensate for vigilance costs. We posed the questions: Is cropping rate constant across varying levels of vigilance? If not, what factors drive its variability? To answer these questions, we compared the proportion of time elk spent vigilant (HU) to their cropping rate using data collected from 199 observations of elk (*Cervus canadensis roosevelti*) in Redwood National and State Parks from 2015 to 2016. If cropping rate was constant, a regression of the data would have an absolute value of the slope equal to the y-

intercept. We fit a linear mixed-effect model to the data, and the y-intercept was 24.68 bites, minute<sup>-1</sup> and the slope was -49.90 bites · minute<sup>-1</sup> demonstrating that the slope value differed from the y-intercept value. Additionally, cropping rate was influenced by factors other than HU including length of the focal observation, time of day, and proportion of the foraging bout spent in close proximity to a conspecific. These two findings establish our study as the first to confirm that cropping rate is not constant, and therefore the costs of vigilance can be mitigated in certain circumstances.

# Session D3

## 10:00: Effects of Prescribed Burning on Butterfly Populations in Coastal South Texas

Rebecca Zerlin, Texas A&M University- Kingsville, Kingsville, TX, USA Sandra Rideout-Hanzak, Texas A&M University- Kingsville, Kingsville, TX, USA David B. Wester, Texas A&M University- Kingsville, Kingsville, TX, USA Richard Patrock, Texas A&M University- Kingsville, Kingsville, TX, USA Tyler Campbell, East Foundation, San Antonio, TX, USA Landon Schofield, East Foundation, San Antonio, TX, USA Juan Elissetche, Texas A&M University- Kingsville, Kingsville, TX, USA

**Abstract:** Virtually all the world's seed plants need to be pollinated, and this is most often done via pollinators. Approximately 76% of flowering plants rely on insects for pollination, making insect pollinators such as butterflies or bees vital in any ecosystem. With this knowledge, land managers should look to improve pollinator habitat in their management areas. A method for managing rangeland plants is the use of prescribed fire. Fire can act as a useful tool to reduce dead plant matter and promote new, highly nutritious plant growth. Our objective is to determine effects of varying prescribed burn intervals and seasons on butterfly populations in coastal South Texas. The study site is a private ranch in Willacy and Kenedy Counties, Texas, in the Coastal Marsh and Prairies ecoregion. Plots ranging from 200 to 485 ha (500 to 1200 ac) are treated with either: summer or winter long return intervals, summer or winter short return intervals, or no-burning (control). Beginning in March 2020 monthly butterfly and vegetation surveys were conducted to determine effects of season of burn, return interval, and time since burning on butterfly communities. Early analyses show evidence of fire return interval having an effect on butterfly family richness. These results will help land managers determine optimal burn season and return interval for maximizing butterfly populations.

# 10:15: Prescribed Fire Effects on White-tailed Deer Browse Quality and Herbaceous Forage Production in the Pineywoods of Texas

Wyatt L. Bagwell, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, USA

Brian P. Oswald, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, USA

Kathryn R. Kidd, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, USA

Jessica L. Glasscock, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Fire is an effective tool for managing white-tailed deer (*Odocoileus virginianus*) habitat, affecting browse availability, herbaceous forage production, and nutrient availability. This study utilized 46 plots, plots were located within the Winston 8 Ranch, Nature Conservancy's Roy E. Larsen Sandylands Sanctuary, Davy Crocket

National Forest, Angelina National Forest, and the Sabine National Forest, to assess browse production, utilization, and nutrient availability. Fixed radius (0.2 ha) plots and a modified version of Texas parks and Wildlife (TPWD) stem count index survey method, measured prior to green up, were utilized. Nutrient sampling occurred before green up and any prescribed burns. Preferred browse species were clipped and analyzed for nutrient quality. Forage production was measured during the growing season using a PVC rectangular frame (0.3 meter by 0.6 meter by 1.5 meter) located adjacent to the above plots. The frame base (0.3 meter by 0.6 meter) was used as a Daubenmire frame and all herbaceous material was clipped by species, oven dried, and weighed to nearest 0.01 grams. All new woody plant foliar growth within the frame was also clipped by species, oven dried, and weighed. Preliminary results on the Winston 8 Ranch and Sandylands Sanctuary suggested that % crude protein levels were highest under frequent burn rotations(P<0.05), in agreement with past studies.

### 10:30: Fire and Mice: The Effects of Prescribed Burns on Rodent Communities

#### Margaret T. Sinner, Texas A&M University, College Station, TX, USA

**Abstract:** Prescribed burns are becoming an increasingly popular method for managing rangelands for livestock. In areas like the coastal sand plains ecoregion of Texas, prescribed burns can be effective in removing mature gulf cordgrass (*Spartina spartinae*) and promoting regrowth of vegetation that provides greater nutritional value for livestock. While the long-term benefits of these burns for large herbivores have been shown, the effects on small mammals that use this vegetation for food and shelter, are largely understudied. Small mammal species - in this case, mouse and rat species - can be used as indicators for ecosystem recovery and overall biodiversity of an area. To understand the response and recovery of these species to prescribed burns, a long-term monitoring study is currently being conducted on the East Foundation's El Sauz Ranch. Based on 3 years of data collection following controlled burns, within 60 days of being burned, the number of small mammals captured ~28% of that of non-burned areas that same year. One year post-burn, that recovery is about 75% and 2 years post-burn the number of animals captured reaches 141% of that of the non-burned areas. These findings suggest that small mammal communities recover from prescribed burns within 2-3 years. As we continue this study our goals are to make recommendations towards prescribed burn scheduling that can benefit both the livestock and the wildlife of an area.

#### 10:45: Effects of Prescribed Fire on White-tailed Hawk Nesting Locations at El Sauz Ranch

### Madeleine A. Thornley, Texas A&M University, College Station, TX, USA

**Abstract:** While the white-tailed hawk *(Geranoaetus albicandatus)* is a prevalent raptor throughout its range in Central and South America, it is listed as state-threatened in Texas. The northernmost extent of its range is coastal Texas and only one of the three subspecies, *G. a. hypospodius*, resides in that region. In 2021 we initiated efforts to investigate the breeding ecology of the white-tailed hawk on the East Foundation's El Sauz Ranch, which is over 10,000 ha and located in Port Mansfield, TX. We found 14 active and historical nests on the property throughout the 2021 breeding season. Gulf cordgrass *(Spartina spartinae)* is a native, perennial bunchgrass found throughout the gulf coast of Texas, but the mature growth must be removed to increase nutritional value and enable its use as forage for cattle. Fire is an effective tool to make this possible so the East Foundation conducts prescribed burns in different seasons on the property to stimulate regrowth that is palatable for livestock. Since burning is frequently used as a management tool in south Texas, it is important to understand how its use affects native wildlife species, especially species of concern. Using the information from winter burns, summer burns, and control plots with the 14 known nest locations found on the property, I will present the patterns of these burns as potential effects on white-tailed hawk nest site selection.

## Poster Abstracts: Session I

### Like Father, Like Son? Estimating Breeding Values for Antler Size in Male White-tailed Deer

Cole C. Anderson, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, USA
Randy W. DeYoung, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, USA
Michael J. Cherry, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, USA
Charles A. DeYoung, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, Kingsville, TX, USA
David G. Hewitt, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, USA
David G. Hewitt, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, USA
Matthew Moore, Faith Ranch, Carrizo Springs, TX, USA
Stuart W. Stedman, Faith Ranch, Carrizo Springs, TX, USA

Abstract: Selective harvest has the potential to affect population genetics in species with luxury phenotypic traits (e.g., antlers). Some managers actively practice culling, or selective harvest of individuals with low-quality phenotypes, in an attempt to improve population genetic potential for luxury traits. Others have voiced concern about high-grading, where harvesting the best animals allows low-quality individuals to breed, which may lead to a decrease in trait values. The management of white-tailed deer (Odocoileus virginianus) is tightly intertwined within this debate. The potential for selective harvest to affect population genetic potential for a trait depends on the correlation between phenotypes and genotypes. Our goal was to investigate the relationship between a sire's antler phenotype and that of his male offspring. We analyzed a long-term data set from an ongoing research project that has followed several generations of wild deer and their sons. Eighteen bucks sired 329 buck fawns during temporary confinement in deer management permit (DMP) experimental pens during 2007-2020. Fawns were captured and ear-tagged, then released into a 400-ha game-fenced enclosure. Each autumn, we captured tagged bucks using helicopter net-gunning and recorded antler scores according to the Boone & Crockett system. We calculated the breeding value for each sire as the difference between the average antler score of his sons at >=5.5 years old relative to the population average for that age class. We found a weak relationship (R2 = 0.26) between the antler scores of sires and their breeding value. Our results have important implications for selective harvest plans.

### Assessing Mammal Diversity in Cross Timbers and Post Oak Savannah Ecoregions

Meghan E. Anderson, Texas A&M University- Kingsville, Kingsville, TX, USA
Chloe Bates, Texas A&M University- Kingsville, Kingsville, TX, USA
Humberto L. Perotto-Baldivieso, Texas A&M University- Kingsville, Kingsville, Texas, United States
William P. Kuvlesky, Texas A&M University- Kingsville, Kingsville, TX, USA
Daniel J. Ramirez, Texas A&M University- Kingsville, Kingsville, TX, USA
Joshua Allison, Texas A&M University- Kingsville, Kingsville, TX, USA
Joshua Allison, Texas A&M University- Kingsville, Kingsville, TX, USA
Jafonso Ortega, Texas A&M University- Kingsville, Kingsville, TX, USA
Leonard A. Brennan, Texas A&M University- Kingsville, Kingsville, TX, USA
Jason V. Lombardi, Texas A&M University- Kingsville, Kingsville, Texas, United States
Thomas J. Yamashita, Texas A&M University- Kingsville, Kingsville, TX, USA
Willis Sontheimer, Texas Military Department, Austin, TX, USA

**Abstract:** Mammals are an important part of ecosystems. Presence and abundance of mammal communities can be indicators of habitat quality or structure, community structure and species richness. Mammal diversity on Texas Military Department properties in the Cross Timbers and Post Oak savannah ecoregions is understudied. Our objectives were to quantify the species richness of and community structure of mammals and we hypothesized diversity will provide insights on habitat quality in each study area. Since early 2020, we have conducted camera surveys on Camp Swift Army Base in the Post Oak Savannah Ecoregion and the Camp Bowie Training Center in the Cross Timbers ecoregion. Camera-traps were distributed in a hexagon grid with four stations (of two cameras) per average home range of Rio Grande wild turkeys (12 km<sup>2</sup>) for a concurrent study. Camera trap detection events will be sorted to the species-level, and we will use this information to develop diversity distribution surface models. Further, we will use activity data from camera trap detections to assess trophic level interactions between species. This study will provide valuable information on mammal community dynamics in each eco-region.

### Can Light to Moderate Cattle Grazing Stocking Rates Improve Bobwhite Habitat?

Jose Silverio Avila Sanchez, Texas A&M University-Kingsville, Kingsville, TX, USA Bradley K. Johnston, Texas A&M University-Kingsville, Kingsville, TX, USA Humberto L. Perotto Baldivieso, Texas A&M University-Kingsville, Kingsville, TX, USA J. Alfonso Ortega-S., Texas A&M University-Kingsville, Kingsville, TX, USA Leonard A. Brennan, Texas A&M University-Kingsville, Kingsville, TX, USA Fidel Hernandez, Texas A&M University-Kingsville, Kingsville, TX, USA Jason W. Karl, University of Idaho, Moscow, ID, USA

**Abstract:** Northern bobwhite (*Colinus virginianus*) populations have been affected by dense stands of undisturbed grasses that result in low plant diversity and limited bare ground. Bobwhites require a diverse plant composition and arrangement of woody, herbaceous and bare ground cover for nesting, brooding, feeding, resting, and roosting. Cattle grazing reduces aboveground biomass and in return creates a patch mosaic vegetation structure of different plant successional stages. The objective of this research is to assess habitat for bobwhites under a grazing regime that is flexible with stocking rates to maintain proper stubble height. We will monitor forage height and cattle will be removed to maintain an optimal bunchgrass stubble height of 25 cm for bobwhite nesting. We will deploy 15 GPS collars on cows to follow cattle herd movements and distribution within the pasture. We will deploy ~75 telemetry collars on bobwhites to estimate covey home range. We will use unmanned aerial vehicle imagery from 6 flights to assess vegetation structure and spatial heterogeneity within the pasture. We will focus on the spatial arrangement of the vegetation at the pasture scale, evaluating the abundance of bobwhite under the effects of a proper grazing regime. We will be able to answer if cattle grazing distribution is spread evenly across the pasture, and if quail follow cattle herd movements along the pasture as grazing continues. This will help land managers with the basis to create the spatial and temporal heterogeneity in vegetation structure needed to improve bobwhite habitat while maintaining income from livestock.

## Diet Preferences of Captive Plateau and Tamaulipan Spot-tailed Earless Lizards

Ruby Ayala, Texas A&M International University, Kingsville, TX, USA Drake Rangel, Texas A&M University-Kingsville, Kingsville, TX, USA Christin Moeller, Texas A&M University-Kingsville, Kingsville, TX, USA Luke Willard, Texas A&M University-Kingsville, Kingsville, TX, USA Scott E. Henke, Texas A&M University-Kingsville, Kingsville, TX, USA Cord B. Eversole, Texas A&M International University, Laredo, TX, USA **Abstract:** Conservation knowledge about rare species is difficult because of the lack of information about their ecology and natural history. The lack of information creates difficulties in assessing the status of a species. This is the case with spot-tailed earless lizards (STEL; *Holbrookia lacerata* (Plateau) and *H. subcandalis* (Tamaulipan)), which are currently being considered for federal threatened status. Because STEL are in the Family Phrynosomatidae, it has been assumed that they would have a similar diet as their cousin, the Texas horned lizard (*Phrynosoma cornutum*). We tested this hypothesis by capturing 12 Plateau and 13 Tamaulipan STEL from San Angelo and Bishop, Texas, respectively, and housed them individually in 38-1 aquaria. We provided each lizard with a self-feeder, cafeteria-style choice of 5 crickets (Family Gryllidae), 5 termites (Family Termitoidae), 5 harvester ants (*Pogonomyrmex* spp.), 5 flightless fruit flies (*Drosophilia melanogaster*), and 5 dubia roaches (*Blaptica dubia*) and monitored their daily consumption during a 5-day period. We calculated the area under the consumption curve for each diet item to determine diet preference. No difference in diet selection was observed (*P* >0.95) between species of STEL; however, a treatment\*day interaction occurred (*P* < 0.0001). STEL overwhelmingly selected for crickets and avoided harvester ants. Termites were second choice, followed equally by flies and roaches. Although STEL and Texas horned lizards have overlapping distributional ranges, the two species avoid competition by selecting different diets.

# Experimental Infestations of White-tailed Deer with Ticks to Study Tick Feeding and Reproductive Parameters

Alec Baker, Texas A&M, College Station, TX, USA Tammi Johnson, Texas A&M AgriLife Research, Uvalde, TX, USA Albert Mulenga, Texas A&M, College Station, TX, USA Pia Olafson, United States Department of Agriculture, Kerrville, TX, USA

**Abstract:** White-tailed deer (Odocoileus virginianus) are a main host for black-legged (Ixodes scapularis) and Lone Star ticks (*Amblyomma americanum*). The population increase of white-tailed deer in the twentieth century has correlated with the rise of various tick-borne pathogens that are known to be spread by black-legged, Lone Star, and other species of ticks. To determine tick feeding and reproductive parameters when fed on white-tailed deer we experimentally infested white-tailed deer (N = 6) with black-legged ticks (N = 50 mated pairs of ticks per deer) and will experimentally infest deer (N=5) with Lone Star ticks (N = 50 mated pairs of ticks per deer). One day prior to tick infestations, an area on the back of the deer was shaved and a six-inch cotton stockinette was glued to the area using TORBOT bonding cement. Tick feeding was restricted to the area at the base of the neck and between the shoulders to reduce the probability of the stockinette/ticks being groomed off by the deer. Once infested with ticks, we monitored tick feeding daily; detached fed ticks were removed from the patch, individually weighed, placed in a glass dram, and held in a humidity-controlled incubator. Ticks were monitored daily to quantify baseline feeding and reproductive parameter. The results of this research will help inform future research targeting white-tailed deer for tick control. The methods from this research can also be used to study the interaction of other tick and arthropod species that utilize white-tailed deer as a bloodmeal source.

## Avian Diversity at The Urban-wildland Interface in South Texas

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

**Abstract:** Webb County is a rapidly developing region of south Texas, with increasing urban expansion into the surrounding Tamaulipan thornscrub habitat. This urbanization has implications for the overall biodiversity of the region. Texas A&M International University (TAMIU) is a microcosm of this phenomenon, as it contains an urban campus and an undeveloped Tamaulipan thornscrub habitat of similar area. The objective of this study is to compare the avian species richness and avian diversity between the TAMIU campus and TAMIU bike trails.

We hypothesize that the trails will be more diverse due to the exclusivity of scrub habitat species, as compared to generalist urban birds that may overlap between campus and the trails. We conducted point count surveys along the perimeter of the TAMIU campus and the TAMIU bike trails during the spring and fall migration seasons in 2021. We surveyed 10 points for 5 minutes each and recorded the number and the species of birds seen and heard within the allotted time. The total species richness was 90, with 78 species occurring at the campus and 66 species at the trails. We found a statistically significant difference in Shannon's diversity between the campus and trails during the fall, but not during the spring survey season. During the fall season we found that Shannon's diversity was higher at the trails than it was for the campus sites. This study will provide insight into the effects of urbanization on the local avian biodiversity and help guide local land management.

### Soil Seed Bank Composition in A Native and a Restored Tallgrass Prairie at Multiple Depths

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**Abstract:** The soil seed bank plays an important role in restoration by contributing both desirable and undesirable species and has even been found to contain higher diversity than aboveground vegetation. However, most research into seed bank composition is at only shallow depths (common maximum depth is 20 cm). We collected soil samples on a retired farm 2 years after being seeded with tallgrass prairie species in Fannin County, Texas; soil samples were also collected at a nearby undisturbed tallgrass prairie, Tridens Prairie. At the restoration site, soil samples were collected at a depth classified by the NRCS to be below the anthropogenic layer, ranging from 10-68 cm. In sites where the anthropogenic layer was shallower than plow disturbance (~30 cm), a second sample was collected below the plow layer. At Tridens Prairie, samples were collected below the plow layer and at the deepest depth from the restoration site. We compared species composition across sites and depths to determine if a native seed bank was present under the plow layer in hopes that, under suitable conditions, these seeds would be able to germinate and therefore further restoration efforts.

## An Assessment of Small Mammal Diversity, Population Demography, Occupancy, and Damage Among Three Irrigation Systems in Row Crops on The Southern High Plains

Annie Braack, Texas Tech University, Lubbock, Texas, United States Blake Grisham, Texas Tech University, Lubbock, TX, USA

**Abstract:** The Southern High Plains (SHP) is among the most agricultural intensive landscapes in the world. The region is directly above the Ogallala Aquifer, which provides water for irrigation for row crops that normally would not grow in the semi-arid region. Irrigation options for producers on the SHP range among above-ground systems (e.g., center pivot), underground systems (e.g., subsurface drip irrigation), no irrigation (i.e., dry land), or combination of irrigation methods. The recent addition of subsurface irrigation systems has numerous advantages for producers and water sustainability, yet little to no information exists pertaining to if small mammal populations benefit from, or cause damage to, irrigation systems on the SHP. The goal of our study was to quantify if small mammal population demographics and if small mammal damage to irrigation infrastructure differed among three experimental treatments: 1) dryland (control), 2) subsurface drip irrigation, and 3) center pivot irrigation. We conducted a mark-recapture (population demographics) and camera-trap (damage) field study on 18 unique cropland sites (hereafter "fields") to assess occupancy, abundance, survival, and recapture probabilities, May - August 2021. We captured small mammals using Sherman Live Traps for 9 days within each

season and each field, respectively. Our preliminary results suggested small mammal abundance was higher in both types of irrigated fields compared to the control. Camera trap data is preliminary, but data from the first field season suggests small mammals chose gnawing materials at random, and damage may not be related to their need to gnaw, but rather obtain access to water.

#### Multi-scale Habitat Selection Of Breeding Female Northern Pintails In The Prairie Pothole Region

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J. DALE JAMES, Ducks Unlimited, Inc., Southern Region, Ridgeland, MS, USA
PAUL LINK, Louisiana Department of Wildlife and Fisheries, Grand Chenier, LA, USA
MASON CLINE, New Mexico Department of Game and Fish, Santa Fe, NM, USA
BART M. BALLARD, Texas A&M University- Kingsville, Kingsville, TX, USA

**Abstract:** The northern pintail (*Anas acuta*) is a species of dabbling duck that has experienced population declines in the last 4 decades of which a strong association to nesting in croplands throughout the Prairie Pothole Region is considered a key causal effect. This nesting behavior exposes pintail to higher rates of nest destruction by spring crop cultivation and predators. Our objectives are to 1) investigate habitat selection by northern pintails within the Prairie Pothole Region at multiple spatial scales and 2) estimate breeding effort (e.g., number of eggs laid, nesting attempts) and nesting success as a function of habitat characteristics. We began data collection in January 2020 and will continue into 2022. We deployed GSM-GPS tracking devices on females during winter which is expected to reduce bias in subsequent breeding habitat selection. Device deployment occurred on multiple wintering areas including the Louisiana coast, Texas Coast, Texas Panhandle, Rio Grande Valley of New Mexico, Southwestern Arizona, and the Central Valley of California. To date we have 47,278 non-flight locations from 71 individuals within the Prairie Pothole Region. Average arrival date to the Prairie Pothole Region was March 31st and the average nest initiation date was May 18th. We will use a multi-scale Resource Selection Function (RSF) to evaluate habitat selection by nesting pintails. The results of this project will improve our knowledge about habitat use by northern pintails on breeding areas and provide information for future management strategies.

### Carnivore Community Interactions in A Brush Managed Landscape

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**Abstract:** Carnivore community interactions are driven by predation, competition, and vegetation structure on the landscape. Habitat management strategies can alter resource availability and carnivore distribution on the landscape. South Texas rangelands are heavily managed for brush plant communities through clearing and brush sculpting. This has proven beneficial to native economically valued prey species (e,g., upland game birds and ungulates). However, brush management impacts on native carnivores such as bobcats (*Lynx rufus*), coyotes

(*Canis latrans*), and raccoons (*Procyon lotor*) remain understudied. Since March 2021 we have conducted camera surveys (54 cameras) on the Hixon Ranch, La Salle County, Texas to examine spatial and temporal interactions of these three carnivore species in brush managed management areas. We conducted a preliminary diel overlap activity analysis, indicating that bobcats and coyotes do not exhibit significantly different circadian rhythms (w=1.25, p > 0.05), but raccoon differed from both carnivores (w=7.36, p < 0.05, w= 4.03, p < 0.05). Future analyses include multispecies occupancy modeling to examine behavioral interactions and find environmental drivers of carnivore co-occurrence in the landscape. These analyses will help further the understanding of carnivore community ecology in these managed areas.

### Determining Wildlife Crossing Structure Performance Compared to Wildlife Movement Through Surrounding Habitat

**Caitlin K. Brett**, University of Texas Rio Grande Valley, Brownsville, TX, USA **John H. Young**, Texas Department of Transportation, Austin, TX, USA **Richard J. Kline**, University of Texas Rio Grande Valley, Brownsville, TX, USA

**Abstract:** Wildlife crossing structures (WCS) are often paired with roadside exclusion fencing to mitigate direct (e.g., wildlife-vehicle collisions) and indirect (e.g., constrained movement, habitat fragmentation) effects of roadways on wildlife. These structures may be used differently and at different rates by various taxa, so it is important to assess whether they are accomplishing mitigation goals across the wildlife community. Many studies document WCS usage by local wildlife but fail to compare this to wildlife use of the adjacent habitat which WCS are intended to connect. This can lead to premature conclusions about the relative success of these structures and their designs. Eight WCS were installed on Farm-to-Market Road 106 in Cameron County, TX to mitigate ocelot (*Leopardus pardalis*) road mortalities and to reduce the potential barrier effect of the road for all species. We collected camera trap data on actual WCS use and expected use based on habitat reference sites throughout the study corridor. Reference site and WCS data was then compared for select target species to determine performance differentials (PD) for each WCS. Positive PD indicate that a WCS is used more often than comparable habitat. WCS design factors were then tested to determine their influence on WCS performance differentials, including openness ratio, availability of woody canopy cover, and length of adjacent exclusion fencing. Determining the influence of these factors may help inform future WCS designs to ensure they meet mitigation goals.

# Body Condition and Relative Abundance of Four Turtle Species Across a Gradient of Ecological Integrity

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**Abstract:** Understanding how species respond to land-use changes is vital to predict population trends. Turtles are model taxa to explore questions related to species responses to land-use changes, because they are long-lived ectotherms that are ubiquitous across freshwater ecosystems. Using survey data from 51 sites across eastern Texas, we quantified variation in body condition (BCI) and catch per unit effort (CPUE) across a gradient of ecological integrity for four turtle species: red-eared Slider (*Trachemys scripta*), razorback musk turtle (*Sternotherus carinatus*), alligator snapping turtle (*Macrochelys temminickii*), and spiny softshell (*Apalone spinifera*). We quantified ecological integrity of each site's land cover using the NatureServe Land Condition Model (LCM). Due to broad habitat niche breadth of these focal species, we predicted that there would be no variation in BCI or CPUE
across the land cover gradient. *Trachemys scripta* exhibited higher CPUE at sites with lower ecological integrity, but we observed the opposite trend for its BCI. *Sternotherus carinatus* BCI increased with increasing values of the LCM, and it occurred in a narrow range of high-integrity sites, but we observed no pattern with its CPUE. CPUE decreased and BCI increased with increasing ecological integrity for both *M. temminckii* and *A. spinifera. Macrochelys temminckii* occurred in sites spanning the widest range of the land cover gradient. *Trachemys scripta*'s higher abundance at sites with lower ecological integrity corroborates its ability to utilize urbanized habitat. The occurrence of *S. carinatus* across a narrow range of sites may indicate it has specific habitat requirements not met in lower-integrity sites.

# Latency to Initial Detection for Mammalian Species in a Mixed Hardwood-pine Forest

**Abby C. Buckner**, Stephen F. Austin State University, Nacogdoches, TX, USA **Christopher B. Carter**, Stephen F. Austin State University, Nacogdoches, TX, USA

**Abstract:** Mammals can exhibit a wide array of detection probabilities which can be used in the determination of population size in an area as well as habitat use by the species observed. Latency to initial detection (LTD) is defined as the amount of time to initial detection of a species at a given site. LTD is an important metric to understand the amount of effort needed to detect a species, which in turn, is important in estimating their population size. We sought to quantify the LTD for mammals in the SFA Experimental Forest in October 2021. Twenty-two trail cameras were installed at intervals of 200 meters in the Stephen F. Austin Experimental Forest for 19 days equating to 418 trap nights. Cameras were programmed to take bursts of 5 photographs upon detection of motion with no delay between motion triggers. Species observed include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), feral hog (*Sus scrofa*), nine-banded armadillo (*Dasypus novemcinctus*), coyote (*Canis latrans*), eastern gray/fox squirrel (*Sciurus carolinensis/niger*), and Virginia opossum (*Didelphis virginiana*). Initial detection of each mammal species was recorded for each camera to show movement across sites and summarized to articulate LTD for the species listed. Larger population sizes as well as frequency and distribution of habitat use could explain the earlier initial detection of white-tailed deer and nine-banded armadillo across camera sites. Recent disturbances in the areas surveyed likely also play a role in the delayed or lack of detection of species such as racoon, opossum, and squirrels.

# Distribution And Co-occurrence of Carnivores in Big Bend National Park

Caitlin Camp, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA
Sky Stevens, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA
Louis Harveson, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA
Thomas Athens, Big Bend National Park, Brewster County, TX, USA
Patricia Moody Harveson, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA

Abstract: Carnivores are essential for the structure and function of ecosystems as they have a significant impact on lower trophic levels. Carnivore communities are shaped by habitat and resource availability as well as species interactions, such as intraguild predation and competition. Big Bend National Park is inhabited by 14 carnivore species that include large carnivores and mesocarnivores. Large carnivores include mountain lions (*Puma concolor*) and black bears (*Ursus americanus*). Mesocarnivores include bobcats (*Lynx rufus*), badgers (*Taxidea taxis*), coyotes (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargenteus*), raccoons (*Procyon lotor*), ringtails (*Bascarisscus astutus*), long-tailed weasels (*Mustela frenata*), hooded skunks (*Mephitis macroura*), hog-nosed skunks (*Conepatus lecontei*), spotted skunks (*Spilogale gracilis*), and striped skunks (*Mephitis methitis*). To better understand these species interactions, cameras were placed within and surrounding the Chisos Mountains to monitor detections and further determine habitat characteristics that could influence a species presence, such as human impact, habitat type, tree canopy cover, elevation, and slope. To produce image recognition data, MegaDetector was used on all photos, as well as Timelapse2 to identify and label species. Approximately 1 million photos were collected from 58 camera trap locations within the study area between 2014 to 2019. Our study summarizes the distribution, habitat characteristics, and co-occurrence of carnivores in BBNP.

### Comparison of Night and Day Road Mortality Detections in South Texas

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Adam Sanjar, School of Earth, Environmental, And Marine Sciences University of Texas Rio Grande Valley – Brownville, TX, USA

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John H. Young Jr., Environmental Affairs Division, Texas Department of Transportation, Austin, TX, USA Richard J. Kline, School of Earth, Environmental, and Marine Sciences & Department of Biology, University of Texas Rio Grande Valley – Brownville, TX, USA

**Abstract:** Road mortality surveys serve as an important tool for ecologists to evaluate the effectiveness of road mitigation structures and monitor wildlife road mortalities. The accuracy of road mortality surveys can be inconsistent and may underestimate counts for small vertebrates due to factors such as low carcass persistence and low detectability. Conducting road mortality surveys at night instead of daytime could increase detections by documenting mortalities before the carcass is removed or degraded. In this study, data collection consisted of paired night and day mortality surveys over fifteen weeks on two roads in Cameron County, Texas. Analysis consisted of comparisons of the day and night survey by taxon and by the overall community observed. Results indicated detections of some small vertebrate taxa, especially amphibians, were higher during night surveys. This research could help serve as an assessment of carcass removal rates and how it can be accounted for in road mortality modeling.

### Can Remote Cameras Be Used to Access Tick Loads on Nilgai Antelope

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**Abstract:** Nilgai antelope (Boselaphus tragocamelus) are a free-ranging exotic species in South Texas that are a suitable host of cattle fever ticks. Cattle fever ticks (Rhipicephalus (Boophilus) microplus and R. (B.) annulatus) are a major concern for wildlife and livestock stakeholders. Nilgai have large home range sizes and have the potential to disperse ticks from infested areas. Nilgai prefer to cross under livestock fences rather than jump, and it is important to monitor their movements to neighboring properties. The use of technology, including remote game cameras, to monitor wildlife has become an important tool in wildlife management. The goal of this study was to determine if remote cameras can be used as a tool to assess tick loads on nilgai. Between February 2019 and September 2020, we captured 140 nilgai during 5 capture events held on 3 private ranches located in Cameron County, Texas. We collected ticks from all captured individuals. We also monitored 140 fence crossing sites with remote cameras during this period. We evaluated photos based on how many vital areas were clearly

visible and whether ticks were present. We compared prevalence rates of ticks on captured nilgai to camera data. We found ticks ( $\geq 1$ ) on 83-98% of captured individuals. Using cameras may have limitations such as poor image quality, inability to capture vital areas, and seasonal variations in tick numbers. However, capturing wildlife is not always an option, so use of remote cameras to monitor wildlife health could prove to be a useful tool.

### Nesting Success of Scissor-tailed Flycatchers in Rural Vs. Urban Habitats

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**Abstract:** For avian species, nest site selection can influence their reproductive success through many factors such as predation, shelter from weather, and accessibility of food. Scissor-tailed flycatchers (*Tyrannus forficatus*) nest in urban and rural areas and there is little information on how these different habitats influence their reproductive success. Our objectives are to compare nest survival between urban and rural locations, identify nest site characteristics associated with survival in both locations, and identify the predator assemblages. We will locate and monitor nests in Stephenville, Texas and at rural locations in the surrounding area from March-August 2022. We will place cameras at a selected subset of nests to identify predators. Upon completion of the nest, we will collect vegetation measurements that we hypothesize are characteristic of suburban vs rural areas and those measurements that might influence detection of the nest by predators. This study will contribute to our understanding of the specific habitat needs and resources that influence reproductive success of scissor-tailed flycatchers.

# Characterization Of Black-capped Vireo Habitat at Government Canyon State Natural Area, San Antonio, Texas

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**Abstract:** The Black-capped vireo (Vireo atricapilla) is a migratory songbird found in portions of the southcentral United States and Mexico. This species is considered conservation reliant because it prefers to nest in early-successional shrubland habitats. The species was delisted from the Endangered Species List in 2018, but it remains a species of concern in Texas and is considered vulnerable due to its restricted range and required nesting habitat. In 2021, 74 BCVI males were detected on a 186-hectare parcel at Government Canyon State Natural Area, San Antonio, TX. In 2003, a planned housing development resulted in the removal of 35% of woody vegetation cover on this parcel, and vegetation has subsequently recovered to a successional stage that BCVI prefers. We are working to characterize vegetation structure to ensure the conservation of Black-capped vireos on this site. We sampled a total of 112 points, conducting 448 vegetation transects across a 38.5-hectare area. The most prevalent species found were Juniper (Juniperus ashei), Oak (Quercus spp.), and Texas mountain laurel (Dermatophyllum secundiflorum). Vegetation below three meters averaged 1.91m (SD = 0.47), whereas the bottom height averaged 0.5m (SD = 0.41). Distance to the nearest vegetation was 2.88m (SD = 4.25). This field data is being used alongside remote sensing data (e.g., NDVI and LiDAR) to compare changes in vegetation structure across a twenty-year period to better predict the effect of habitat changes on the presence of Blackcapped vireos.

# Grazing Pressure Bison Have on Arthropods and Vegetation Community at Caprock Canyons State Park, Texas

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**Abstract:** In 1997, Texas Parks and Wildlife Department (TPWD) relocated 36 southern plains bison (*Bison bison bison*) to Caprock Canyon State Park (CCSP), a 6,070-ha state park in Briscoe County, Texas, USA. There are now over 250 bison in the park and to manage the herd and the park, TPWD is interested in knowing about grazing pressure on the land. The objective of this study is to determine what effect the bison have on the vegetation and arthropod community in the park. In summer 2018, TPWD established 18 3-m<sup>2</sup> fenced areas to create grazing-exclusion plots. In Spring 2020, we started monthly surveys of the plant and arthropod community in grazed areas and grazing exclosures. We randomly place 2 Daubenmire frames in the grazing exclosure area and 2 frames 30 m away in a random direction to represent areas available for grazing. For each Daubenmire frame we estimate bare ground, litter, plant diversity, and height. We collected ground-dwelling arthropods using one pitfall trap (0.27 L cup) inside and 30 m away from the exclusion plot. We also collect the color of the bee pan trap inside each exclusion plot and the corresponding 30 m away for every survey. We hope to provide insight on how CCSP can promote coexistence for plant and arthropod communities in areas grazed by bison.

# Nest Site Selection and Nest Survival of Avian Communities in Pinyon-juniper Woodlands Undergoing Thinning Prescriptions

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Abstract: Pinyon-juniper woodlands are among the most diverse and widespread ecological communities in the western United States and provide habitat for a rich diversity of avian species. More than a century of livestock grazing and fire suppression, along with other issues, has resulted in the expansion of pinyon-juniper woodlands into arid and semi-arid grasslands across the Southwest. On the Fort Stanton-Snowy River National Conservation Area in Lincoln County, New Mexico, land managers are using mechanical thinning and prescribed fire to reduce fuel loads, increase forage availability for game species, and return pinyon-juniper woodlands to historic distributions and structure. However, the high proportion of avian pinyon-juniper specialists listed on national and state species of concern lists has created a need to balance thinning targets with conservation of these bird species. Our investigation centers on how these forest management practices influence nest-site selection, nest survival, and productivity of the breeding bird communities. Since 2019, we have found, monitored, and documented over 700 nesting attempts of 30+ species within approximately 1,000 hectares on the Fort Stanton NCA. Data processing and analysis are ongoing, and preliminary results from our research have yielded nest survival rates and basic habitat associations with nest-sites for multiple specialist bird species. Our final results will provide valuable insight into population trends of pinyon-juniper obligate and semi-obligate bird species in south-central New Mexico and provide pertinent feedback for land managers aiming to provide highquality nesting habitat for the avian community while balancing other management needs.

# Coyote Population Dynamics and Food Habits in the Mojave Desert Region

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Abstract: Since the mid-1900s, covotes (*Canis latrans*) have expanded their geographic range throughout North America, due in part to anthropogenic influences. Human subsidized food resources and man-made green spaces have brought covotes into the urban interface, creating more human-covote conflicts. 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. Beyond these human-coyote issues, MCAGCC is also intensely involved with the management and recovery of the threatened, Agassiz's desert tortoise (Gopherus agassizii), an iconic species of the Mojave Desert. In this drought susceptible region, mammalian predators frequently resort to secondary food items. Tortoise depredation by canids, most likely covotes, continues to present wildlife-wildlife conflicts, but very few diet analyses have quantified the frequency of tortoise parts in covote diets. Similarly, no reliable covote 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 non-invasive DNA sampling to (a) develop spatially explicit markrecapture population models using mitochondrial cytochrome-b gene amplification, and (b) analyze food habits, using traditional and molecular techniques. This research will inform us of covote 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.

# Effect of Estimated Fecal Age and Sample Storage Techniques on Coyote DNA Amplification in The Mojave Desert Region

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**Abstract:** Coyote (*Canis latrans*) ecology is poorly understood in portions of the Mojave Desert, where they coexist and prey upon the threatened Agassiz's desert tortoise (*Gopherus agassizii*). In the Twentynine Palms region of the Mojave Desert, coyote population size, connectivity, and dynamics are poorly known, but are important relative to their potential impact on desert tortoise recovery in the region. With the advent of non-invasive genetic techniques, population dynamics can be readily assessed using fecal DNA, which is extracted from epithelial cells on the exterior of their feces. However, fecal DNA extraction and amplification success is highly variable in other coyote studies, likely due to epithelial cell degradation prior to collection. Little work has examined the influence of fecal age and storage technique relative to DNA extraction, amplification, and sequencing success. During 2021, we collected > 2500 fecal samples and divided each in half, where one half was stored frozen and the other half was stored at room temperature. Prior to storage, each sample was aged: as 'fresh' (< 1 week old); 'medium' (1-3 weeks old), and 'old' (> 3 weeks old). To date, DNA has been extracted from >150 fecal samples, and preliminary results show that fresher samples that are stored frozen produce better quality nucleic acids, in turn better chance for successful DNA amplification. As protocols are optimized, this research will prove valuable for developing non-invasively sampled DNA libraries for future spatially explicit mark-recapture population models for coyotes in the region.

### Habitat Characteristics of Plains Spotted Skunks on A South Texas Rangeland

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**Abstract:** Although they were once a common furbearer species, eastern spotted skunks (*Spilogale putorius*) have experienced population declines throughout large portions of its historic range. The species is now considered a species of conservation concern in many states where it occurs. The plains spotted skunk subspecies (*S. p. interrupta*) is currently being considered for federal listing under the Endangered Species Act. Recent research on the current distribution of spotted skunks largely omits areas of South Texas due to a lack of recent records from this area. In 2020, spotted skunks were detected as incidental captures in herpetofaunal arrays at the Welder Wildlife Refuge in Sinton, Texas. Therefore, we included spotted skunks as a part of ongoing research evaluating the effects of invasive vegetation on mammal community composition and species occupancy at the site. During July 2021, we established 24 remote camera stations spaced approximately 1 km apart across the property that will be continuously monitored for the next three years. Since July 2021, we have observed 20 unique detections (>24 hours apart) of spotted skunks at 5 camera trap locations. Generally, camera traps with spotted skunk detections contained dense understories of herbaceous and woody vegetation and canopies of honey mesquite (*Prosopis glandulosa*) and huisache (*Vachellia faresiana*). These results indicate that spotted skunk populations are still present in South Texas and rangelands can provide habitat structure for the species. More research is needed to determine the distribution and spatial connectivity of this species in South Texas.

# Influence Of Prescribed Burns on Vegetation in The Edwards Plateau

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**Abstract:** Historically, fires were set to grassland prairies to increase forage for game species. Today, prescribed burns are used in a similar fashion to regenerate the landscape by promoting native grasses and reducing woody species encroachment. In the Edwards Plateau ecoregion of Texas at the Kerr Wildlife Management Area (WMA), in Kerr County, prescribed burns have been regenerating vegetation since 1978. With any prescribed burn, vegetation frequency, density, and species composition differ from the untouched and surrounding areas. The objective of this study is to evaluate changes in the vegetation of pastures located on the Kerr WMA before and after prescribed burns. Texas Parks and Wildlife Department employees conducted Daubenmire frame surveys for grasses, forbs, and woody species <1.5 m in height at 21 points along a 100-m transect in pastures from 2013-2021. We calculated species frequency of occurrence, percent cover, and species composition of 3 randomly selected pastures across the WMA. We chose live oak (*Quercus virginiana*) and the top 3 occurring species for grasses and forbs in the selected transects and will conduct an analysis of variance to determine the change for each species occurrence and percent cover after 1 treatment of cool season prescribed fire. Once completed, the Kerr WMA will use this information to help reevaluate long term goals in their prescribed burn plan as well as to inform landowners in the Edwards Plateau of the influence that prescribed burns may have on vegetation and the benefits it has on the landscape.

# An Assessment of Prescribed Grazing for Lesser Prairie-chickens On Beef Herd Health and Productivity

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Abstract: The Sand Shinnery Oak (Quercus havardii) Prairie Ecoregion population of lesser prairie-chicken (Tympanuchus pallidicinctus; LEPC) has recently been proposed for listing 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 lesser prairie-chicken occupied range and populations. In New Mexico, an Area of Critical Environmental Concern has been established and is managed by the Bureau of Land Management under their multi-use initiative. Management focuses on providing habitats that meet LEPC annual lifecycle requirements while also providing opportunities for anthropogenic use, such as hunting and cattle grazing. The use of grazing regimes to create vegetation community mosaics is supported in literature and can serve as a viable tool for land managers to create and improve habitats for LEPC populations. Research quantifying productivity and health of cattle herds used for LEPC habitat management is lacking. We used store-on-board Global Positioning System (GPS) collars to monitor daily cattle movements that will be used to estimate cattle home ranges and core use areas by season and pasture, quantify habitat use in relation to water sources and topography, and estimate habitat use overlap with LEPCs. Additionally, quantification of herbaceous biomass, vegetative community response, vegetation nutrient content, cattle fecal nutrient deposition, and pregnancy and calving rates will be used to further evaluate cattle herd health and production in conjunction with LEPC habitat management.

# Spatial Ecology and Habitat Use of The Texas Alligator Lizard

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**Abstract:** Texas Alligator Lizards, *Gerrhonotus infernalis*, continue to be a secretive and relatively understudied species. Due to their cryptic nature and status as a species of least concern, little effort has been made to describe the ecology and life history traits of this species in their natural habitat. Only one study to date has attempted to describe the ecological aspects of Texas Alligator Lizards, and no field research on this species has been conducted in Texas. This study aims to better describe this species ecology by collecting data on their behavior, spatial ecology, and habitat use on a seasonal basis at Selah, Bamberger Ranch Preserve, Blanco County, Texas. To date, we have captured and attempted to radio track 43 lizards (32 adults and 11 sub-adults) resulting in 7 months of overlapping data on movement activities and habitat usage. Here, we present preliminary results on temporal changes in their spatial ecology and habitat use in response to seasonal and behavioral cues, specifically for the Summer and Fall 2021 seasons. The resulting long-term data from this study will provide a necessary baseline study for Texas Hill Country populations and help us understand how stressors such as urbanization, collection (scientific or hobby), or ranch management practices may affect Texas Alligator Lizard populations.

# Evaluation of Unmanned Aerial Vehicles (UAV) to Quantify Wild Pig Damage to Corn

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**Abstract:** Presently, there's an estimated 6.9 million wild pigs (*Sus scrofa*) in the USA, causing about \$1.5 billion in damage to agriculture and the environment annually. There's a need for standardized monitoring of wild pig damage and methods to accurately estimate economic costs of damage to agriculture. The objective of this study was to integrate Unmanned Aerial Vehicles (UAV), harvest data, and crop phenology to quantify pig damage in corn fields. We used UAVs to monitor corn fields at different growth stages in Delta County, Texas, USA during 2019-2020. We flew 36 UAV missions and successfully classified 28 orthomosaics by manually digitizing and fully automated machine learning. We compared damage estimates from UAV imagery to those derived from ground-based transects. Finally, we compared damaged areas of fields to harvest yield maps to determine yield loss. All classified UAV orthomosaics had  $\geq$ 80% overall accuracy, showing the capabilities of UAVs in detection and quantification of pig damage. We found ground surveys underestimated total amount of damage throughout the field by 38.6% when comparing to damage in latter growth stages. Pig damage resulted in a mean loss of 3,416 kg of corn/ha, at a cost to producers of up to \$48.24 per ha. The use of UAV monitoring will allow farmers, landowners, and agencies to accurately assess crop damage, estimate yield loss due to pigs, and ultimately determine the cost-benefit ratio of management actions.

# Temporal Resource Partitioning of Aoudad, Desert Bighorn Sheep, And Mule Deer in The Transpecos Region, Texas

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**Abstract:** Desert bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), and exotic aoudad (*Ammotragus lenvia*) 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, percent shrub cover, ruggedness, and escape terrain. Preliminary results 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.

Utilizing Individual Identification to Evaluate Usage of Bobcats at Wildlife Exits on A South Texas Highway

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**Abstract:** Highways in the Lower Rio Grande Valley of Texas fragment the landscape, resulting in wildlife road mortalities, including for the federally endangered US ocelot (*Leopardus pardalis*). In response to ocelot-vehicle collisions, the Texas Department of Transportation (TxDOT) installed exclusion fencing along State Highway 100 (SH 100) in Cameron County, Texas. In addition, TxDOT installed ten wildlife exits with funnel-like structures to allow felids to safely exit the roadway. Due to the small population size of Texas ocelots, bobcats (*Lynx rufus*) are often used as a surrogate species. After 14 months, 43% of bobcats remaining in the right of way used a wildlife exit, and four exits had been used in the unintended direction of habitat to road, but it was unclear how many individuals this represented. This study uses individual identification of bobcats to determine the usage of wildlife exits, as well as evaluate the frequency of risky behaviors of individual bobcats using the exits to enter the roadway. It is important to identify bobcats to individual to determine how many may be using the mitigation structures successfully and to evaluate the frequency of risky behaviors of bobcats that cause them to enter the roadway.

### Transformational Wildlife Funding-Recovering America's Wildlife Act

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**Abstract:** Transformational wildlife funding was last seen in 1937 with the Wildlife Restoration Act (Pittman-Robertson Act). The Recovering America's Wildlife Act (HR 2773; S 2372) now before Congress would bring more than \$50 million to Texas annually. Passage of this bill would provide permanent, dedicated funding to restore sensitive fish and wildlife populations, create and enhance educational programs, and improve nature-based outdoor recreation. The bill is supported by a national alliance of conservation and business groups. This presentation will include details of the funding, the organizations and networks that support and don't support the bill, and how TCTWS, your organization, and biologists can support this national and state-wide initiative, regardless of your employer. Even in "today's politically charged" environment, this effort is getting bipartisan support in Congress. Whatever your interests, be a part of the solution and this historic legislation.

# Using Large Ungulates as Sentinels to Predict Present and Future Distribution of Cattle Fever Ticks in Texas

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**Abstract:** Cattle fever ticks were introduced into the Americas in the early 1500's by Spanish settlers. The ticks quickly spread throughout both North and South America. These one-host ticks can carry a deadly *Babesia* 

parasite that can be fatal in up to 90% of naïve cattle. It can also cause a reduction in meat and milk production, weight loss, and abortion. Fever ticks were eradicated from the US in the 1940's, but remain endemic in Mexico. Although the fever tick prefers a bovid host, they can use several alternative wildlife hosts, including white-tailed deer. We captured deer in a high-density population surrounding Falcon Lake near Zapata, Texas. The site is located along the US-Mexico border, inside a permanent quarantine zone established to prevent re-emergence of the tick in the US. We fitted 100 deer with GPS collars that collected hourly fixes and removed 298 females from the area to reduce density of host animals; we recorded capture locations and tick loads from all deer. We are using ecological niche models to understand how local site characteristics are associated with abundance of ticks. Home ranges of infested deer will serve as occurrence data, and covariates will include landscape metrics such as ecological site description, land cover, precipitation, distance to Ivermectin feeders maintained to treat deer, temperature, and pasture treatments for cattle. The outputs will further inform us on environmental variables important to ticks at a macro scale, and highlight areas that may be impacted by future northward range expansions of the tick.

### Population Density and Breeding Success Of American Kestrels in Erath County

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**Abstract:** Ever since the DDT scare of the 1960s-1970s, American Kestrels (*Falco sparverius*) have been on scientists' watch lists due to population declines. This study will occur in Erath County, Texas in the Cross Timbers ecoregion. The objectives of this study are to determine the density of kestrels in the county during the breeding season, determine the optimal locations for nest boxes, examine breeding success, and examine competition for use of nest boxes. In spring 2022, we will conduct weekly roadside population surveys of American Kestrels in and around Erath County to estimate density and identify potential breeding locations. In the fall of 2022 and the spring semester of 2023, we will set up nest boxes in areas predicted to be used by breeding kestrels to monitor breeding success and possible use by competing species. This study will help identify possible threats to kestrel breeding populations in Erath County.

# Broad-scale Population Trend for The California Quail in California: Inferences from A Cycling Population

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**Abstract:** The California quail (*Callipepla californica*) is an important upland gamebird for the Pacific region of the United States. During the past half century, large regions in California have become increasingly fragmented and degraded as a result of urban development, altered forest and rangeland management, and large-scale agriculture. These and other factors could threaten the persistence of California quail in some areas. Our goal was to determine the long-term population trend of the California quail at the state extent for California. We used data from the North American Breeding Bird Survey (1968-2019) to create relative abundance maps and developed 5-year-averages to account for annual variability in abundance. We then established 50 spatially balanced random points to calculate mean birds/route from 1970-2017. The California quail population displayed a clear cycle-driven pattern over time, with a small peak in the early 1980s and larger peaks in the mid-1990s and late 2000s. Fitting a time series autocorrelation function indicated that the California quail population was stationary with an endogenously generated periodicity. Possible explanations include broad-scale responses to climatic patterns,

especially widespread drought, and a combination of increasing and decreasing populations at local scales. Currently we are identifying areas with declining and increasing populations and will compare road density, human population density, and land use between them. The information gathered from this study will provide a quantitative basis for wildlife biologists and stakeholders to prioritize areas for quail population and habitat conservation on a state-wide basis for California.

# Song Diversity of Bachman'S Sparrows in East Texas

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**Abstract:** Birds rely heavily on vocalizations to communicate within their. Bachman's Sparrows (*Peucaea aestivalis*) exhibit large song repertoires in the eastern portion of their range. However, categorization of the song repertoires from the western subspecies has not been well documented. We sought to qualify the song repertoire and investigate the frequency of song type use in Bachman's Sparrow in East Texas. We identified and quantified song types from five sites passively monitored with automated sound recorders from February to August 2020 (n = 5 days per month).[SDF1]. We used chi-square to determine if frequency of song type differed from what would be expected by chance. Across our sampling period, we transcribed 5,127 Bachman's Sparrow songs and classified them into 6 different song types. Three song types were used significantly more than expected by chance (overall frequency of occurrence: 28%, 21%, and 20%). The most frequently used song types were similar in their structure and had high frequencies with long trills. A diversity of song types that span the spectrum of acoustic space may enhance opportunities for these signals to be received by potential mates and competitors while minimizing acoustic interference with conspecifics and heterospecifics. The most frequently used songs may be most effective at conveying these signals, but the ecological contexts in which these song types are used need to be examined further.

### Northern Bobwhite Response to Habitat Restoration in Eastern Texas

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**Abstract:** Northern bobwhite (*Colinus virginianus;* bobwhite) once occupied a large portion of the Piney Woods ecoregion of Texas. After decades of land use changes and fire suppression, habitat has become fragmented and bobwhite have all but been extirpated from the region. During 2020, we initiated habitat restoration on a private property in Polk County, TX, USA with a goal of restoring 3,440 ha of bobwhite habitat. Initial timber volume was 21.9 m<sup>2</sup> / ha in May 2021. Timber thinning is ongoing and expected to be complete by December 2023; target basal area is 9 m<sup>2</sup> / ha. Our objectives are to document bobwhite response over time using a robust design occupancy model with a before-after-control-impact approach to evaluate habitat and management factors associated with occupancy, colonization, and extirpation. We completed surveys (n = 98) for the first primary session during 15 May - 15 June 2021 at 14 sites to document initial occupancy; no bobwhite were detected during surveys. Translocation will be used to restore the northern bobwhite population to this fragmented landscape because bobwhite have not responded to habitat management efforts. The results from this study will be used to inform future northern bobwhite restoration efforts in the Piney Woods ecoregion of Texas.

# Bobwhite Response to Cattle Grazing in South Texas

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**Abstract:** Range management practices to improve habitat for wildlife by reducing brush and increasing herbaceous plants, coupled with reduced stocking rates, can lead to dense stands of dominant grasses, such as Four-flower Trichloris (*Trichloris pluriflora*). This monoculture of Four-flower Trichloris creates dense unsuitable vegetation for Northern Bobwhite quail (*Colinus virginianus*). The objectives of this study are to evaluate the use of a proper cattle grazing regime to maintain or improve bobwhite habitat, as well as develop a management guide documenting how cattle grazing can be used as a tool to reduce the density and cover of dominant grasses. The study area is composed of two pastures, totaling about 2,500 hectares, in Duval County, Texas. One pasture will serve as the control while the other will be grazed to maintain a stubble height between 30 and 40 centimeters (optimal for bobwhite habitat) as needed. We placed 10 grazing exclosures as well as 10 (25 meter) transects within each treatment to determine botanical composition and cover. Double sampling is completed monthly to determine forage standing crop, and percent cover is also recorded along each transect at each meter. We have also completed an aerial survey of the study area and the results indicate that quail density on the grazed pasture is roughly 60% higher compared to the non-grazed. The results so far are preliminary however it has the potential to shed light on how bobwhites respond to proper cattle grazing which in turn may be used for managing their habitat across South Texas.

# Assessment of Environmental Contaminants in Obligate Avian Scavengers

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**Abstract:** Obligate scavengers such as turkey vultures (*Cathartes aura*) and black vultures (*Coragyps atratus*) can be indicators of contaminants present in the environment. This is primarily due to their functional dietary role, which may facilitate intraspecific exposure to diseases and environmental toxicants. Moreover, migratory behavior can lead to increased exposure of these contaminants, thus leading to the potential for spatially dynamic exposure frequencies. Our objective was to determine the contaminants present in both species of vultures within the southern region of the Central Migratory Flyway, as well as the antibiotic susceptibility of the bacteria found within individuals. Vultures were captured in March and November, 2021, and cloacal swabs and blood samples were taken from individuals to monitor fungal/bacterial organisms and lead levels in birds, respectively.

Many potentially pathogenic bacteria were found in high frequencies of the vultures. *Escherichia coli* was present in 100% of the black vultures captured in March, while *Salmonella* sp. were found in 60%. Chlamydia was found in 36% of birds tested in November, while *Trichosporon asahii* was found in 6%. Analysis of antibiotic resistance indicated that the *Salmonella* strain present was resistant to many of the tested antibiotics. Blood lead levels varied from below 3.4 micrograms per deciliter to over 56.6 micrograms per deciliter. Our research illustrates the potential zoonotic pathogens and anthropogenic lead toxicants that exist within this important migratory flyway. Given that these species are obligate scavengers, our results may be indicative of broader contaminants that are exposed to wildlife communities within this system.

# Reaction of Nilgai to Motion Activated Sprayer Systems for Cattle Fever Tick Management

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**Abstract:** Domestic livestock are often exposed to pathogens and diseases by wildlife. Nilgai antelope (*Boselaphus tragocamelus*) are an exotic, free-ranging ungulate in South Texas. Nilgai are a competent host of cattle fever ticks (CFT; *Rhipicephalus* (=Boophilus) microplus and R. (B.) annulatus) that can carry Babesia parasites, the cause of bovine babesiosis, a disease detrimental to livestock. There are no viable methods to target nilgai for CFT treatment. The USDA-ARS created a motion-activated sprayer system to spray nilgai with a solution containing entomopathogenic nematodes. The sprayer systems were set up at fence crossing locations as nilgai use gaps in fences to move throughout South Texas. The goals of this study were to 1) determine if nilgai avoided the areas with sprayers, and 2) determine if the presence of sprayers affected how fast a nilgai crossed the fence. The sprayers were deployed in February 2019 and removed from the field in October 2019. We recorded the frequency of nilgai at fence crossings with (4 weeks prior to removal) and without (4 weeks after removal) the sprayers. We also calculated how long nilgai spent around the sprayers prior to crossing. Preliminary results suggest that nilgai appeared at fence crossings more often when there was no sprayer present. Factors that might have influenced the change in crossing behavior are the frequency of human activity at the sprayer sites and time of the year. Sprayer systems may require time for nilgai to become accustomed to their presence to be an effective treatment for CFT on nilgai.

# Monitoring the Effectiveness of Redesigned Wildlife Exits Along a South Texas Highway

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**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, 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. These new wildlife exits will be monitored using camera traps as well as a video camera attached to an infrared trip wire sensor to capture wildlife interactions with the new wildlife exits. Preliminary data will provide insights into wildlife responses to a novel road mitigation structure and help shape any future modifications needed to provide animals with a safe, accessible way to exit dangerous roadside habitat.

### Arthropod Biodiversity in Response to Juniper Removal Within Riparian Buffers

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Abstract: Riparian ecosystems are declining globally due to increased anthropogenic and ecological pressures, including the encroachment of woody vegetation such as Ashe juniper (Juniperus ashe). Presence of Ashe juniper influences inter- and intracommunity dynamics by suppressing understory growth and outcompeting other native herbaceous and woody vegetation, thus affecting arthropod biodiversity. Arthropod communities play a critical role in the environment for their ability to promote or disrupt ecological processes through mechanisms like herbivory, decomposition, pollination, parasitism, or as food sources to other wildlife. Our objectives are to 1) survey arthropod community richness and diversity in response to juniper removal along riparian corridors and 2) monitor for seasonal or structural variation in species using presence-absence data. We surveyed from May to July 2021 during peak arthropod production along intermittent and ephemeral streambeds on a 182-ha property adjacent to Palo Pinto Mountains State Park in Stephens County, TX. We sampled a total of 12 sites within riparian areas with 6 that underwent juniper removal and 6 left undisturbed. To maximize efficiency in sampling across arthropod communities, we use pitfall traps and vacuum sampling. We will compare species richness and focal-species occurrence between removed and undisturbed sites. Developing an understanding of arthropod community structure in response to juniper presence can aid in future research regarding habitat mitigation and restoration. Additionally, by evaluating the impact of juniper removal on arthropod productivity, adaptive management strategies can be implemented for other faunal communities.

### Effect of Microclimate on Nest Selection and Nesting Success in The Black-crested Titmouse

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**Abstract:** Cavity nesting birds choose nest sites non-randomly based on many factors. Hypotheses to explain nest choice include 1) nest-hole orientation, which influences wind exposure; 2) solar radiation, which influences nest temperature; and 3) vegetation density surrounding a nest, which may influence access to food resources and may provide protection from predators. We study how nest-box features affect occupancy and nesting success in the Black-Crested Titmouse (Aves; Baeolophus atricristatus), a secondary cavity-nesting bird found in Texas, Oklahoma, and Mexico. 99 nest boxes were established approximately 30 km north of San Antonio. We recorded nest occupancy and measures of nesting success (number of eggs laid, number of eggs hatched, number of nestlings fledged) in 2019 and 2021. We estimated vegetation density by calculating Normalized Difference Vegetation Index (NDVI) within a radius of 10 meters around each nestbox using ArcMap (ERSI). NDVI analyzes light reflection from vegetation using satellite imagery. Solar radiation was calculated via Gap Light

Analyzer (GLA) based on semi-hemispherical photos taken from above the nest using Google Street View. Each nest box was monitored via weekly checks from February to July. Analyses are ongoing. A finding of nonrandom distribution of nest box occupancy or nesting success would suggest that the Black-Crested Titmouse chooses nest boxes with ideal microclimate conditions or vegetative properties. Results will clarify which environmental factors affect reproductive success of this understudied species, and furthermore, will inform optimal placement of artificial nests.

# Inventorying Woody Vegetation Using Remote Sensing Techniques in South Texas

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**Abstract:** Honey mesquite trees (Prosopis glandulosa) are commonly found in South Texas rangelands and are problematic due to their ability to spread rapidly. Mesquite trees left unmanaged tend to take over and crowd out more desirable vegetation that is important to maintain healthy rangelands, leading to an overall decrease in plant diversity that subsequently also lowers wildlife species diversity. Diversity of both plant and wildlife species is crucial for rangelands in order to prevent serious problems related to brush encroachment such as soil erosion, depleted soil nutrient content, and poor water infiltration. Our specific objectives were 1) Determine if we could use RGB imagery to detect different species of woody vegetation throughout the study site 2) Quantify the species composition across the study site. In this study we used UAV imagery of a 102-ha research facility, South Pasture, in Kleberg County to identify different woody species cover through supervised image classification. We used the regular RGB camera from the UAV along with GPS points collected in the field of different woody species. The ability to classify RGB imagery opens the field of vegetation sampling and inventorying to modern technology. This technique could provide managers with a better understanding of their property to create a management plan based off the species diversity or lack of diversity in an area. It could also increase efficiency spent in the field inventorying species. UAVs paired with GIS could possibly be the next field inventorying method to remotely identify woody vegetation of rangelands in South Texas.

# Avian Community Dynamics within a Riparian Corridor: A 12 Year Perspective

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**Abstract:** North American avifauna has declined nearly 30% due to habitat loss, climatic change, and unidentified factors. Temporal changes in species composition or declining bird populations are critical parameters to evaluate the maintenance of biodiversity. Assessing the temporal changes in bird communities in migratory zones is crucial. We aim to examine the long-term temporal dynamics of an avian community and to identify any observed population trends of the most abundant species. Our study site is located on the edge of

the Central Migratory Flyway on the Welder Wildlife Foundation. Utilizing the Monitoring Avian Productivity and Survivorship (MAPS) protocol, we compared the community dynamics of birds from the Summers of 2007, 2008, 2009, and 2021. Specifically, we compared the species diversity, i.e., the effective number of species, the rank abundance curves, and the species composition among years. We found a similar species diversity over years. From the rank abundance curves we observed consistency over years of the most abundant species, Northern Cardinals (*Cardinalis cardinalis*), however, they exhibited a decrease in abundance. We also observed shifts in the second and third most abundant species in all sampled periods. Despite the similar species diversity and the relative consistency of the most abundant species, we found that the species composition of the community changed over the years. We emphasize that the changes of bird communities over years, with special concern with the declining of avian populations, can be the result of changes in habitat and/or environment conditions locally or regionally.

### Estimating the Feasibility of Thermal Drones for Wildlife Surveys in South Texas

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**Abstract:** Unmanned aerial systems (UASs or drones) and increased availability of thermal infrared imaging provide new opportunities for wildlife surveys. Traditional surveys via manned aircrafts serve as the greatest cause of death for people in the wildlife field. Drones can eliminate the risk that comes with manned aerial surveys as well as being less expensive and have been shown to create a lower disturbance rate. Previous studies have been conducted during daylight or twilight hours due to the regulation of flying after civil twilight hours. Recent changes in Federal Aviation Administration (FAA) drone regulations now allow for nighttime flights when drones are equipped with anti-collision lights. Therefore, there are opportunities to evaluate nighttime flight surveys to determine their viability for estimating wildlife populations. We want to test the effectiveness of using a drone equipped with a thermal camera to survey white-tailed deer (*Odocoileus virginianus*) in South Texas. We will survey a 102-hectare high-fenced property that serves as the South Pasture Research Facility for Texas A&M University-Kingsville. Our specific objectives for this study are 1) assess the feasibility of detecting deer with isotherm gradient technology compared to traditional thermal imagery 2) compare detectability of deer between video footage and still photographs using distance sampling techniques and 3) compare population

#### Population Assessment Of Semi Aquatic Turtles in The Cross Timbers Ecoregion, Texas, USA

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**Abstract:** Turtles make up a large component of vertebrate fauna in the world but populations have been steadily declining in many areas across the globe. Understanding movement patterns and population demographics of semi-aquatic turtles will help inform management and conservation of species. Persistence of some turtle populations depends upon the ability of individual animals to move to more suitable locations during dry periods and this movement might have consequences for survival and recruitment into populations. The

objective of this study is to evaluate population dynamics of semi-aquatic turtles and examine movement and connectivity among isolated water sources. Starting in spring 2021, we began mark-recapture efforts at water sources across the Muse Wildlife Management Area (789 ha) in Brown County, Texas. In summer 2021 we placed VHF radio-telemetry transmitters on red-ear sliders (*Trachemys scripta elegans*), the most common turtle, to document seasonal movement among water sources and identify potential barriers. We have had 58 successful trapping days (of 90 days with traps deployed) and we marked 113 individuals (52 male and 57 female red-eared sliders, 3 common snapping turtle [*Chelydra serpentine*] and 2 yellow mud turtles [*Kinosternon flavescens flavescens*]). We marked approximately 16 juveniles and 93 adults red-eared sliders and have documented movement between locations for 6 red-ear sliders. We will continue to collect data through fall 2022. This study will provide knowledge of semi-aquatic turtle population dynamics and their movements and will assist with management and conservation efforts.

### Short-term Weather Variables Affect Avian Body Condition

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**Abstract:** Understanding how birds respond to shifting weather patterns and acute weather events is critical for effectively understanding broader ecosystem dynamics. However, few studies have investigated how short-term weather variables affect birds at the level of the individual, especially among songbirds (Order: Passeriformes). Here we use body condition, quantified through scaled mass index, to assess the impact of precipitation, daily maximum temperature, and daily minimum temperature on various songbird species and guilds in the Gulf Coast region of the United States. We coupled avian morphometric data from the Monitoring Avian Productivity and Survivorship program with weather data from the nearest corresponding weather station to each site, and used linear mixed models to identify the relative effects of each weather variable (and interactions thereof) on each avian species. Additionally, we grouped a total of 18 avian species into guilds to represent dietary, habitat, and migratory differences between species groups. Preliminary results indicate that monthly and annual precipitation totals more strongly influence body condition of granivorous species, and that precipitation and temperature together influence body condition of species across dietary and habitat guilds. Since changing weather patterns are already widely known to affect birds at the level of the population and the community, it is important to note that effects are also apparent at the level of the individual.

# A Comparison of Sparrow Diversity in Northeast Texas

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**Abstract:** Populations of North American grassland sparrows have dramatically declined over the past decades. Habitat loss and fragmentation continue to occur, which adversely affects sparrow populations and sparrow diversity. In addition, there is little knowledge of wintering sparrow habitat since most research has focused on the breeding grounds. Previous studies suggest that sparrow occurrence highly correlates with vegetation structure. Therefore, the objective of this study is to determine what types of vegetation structure supports higher sparrow diversity on a 2,691-ha military base in Lamar County, Texas. We created 20-m x 100-m transects using a stratified random sampling approach across post oak savanna vegetation communities at 15 sites to survey wintering sparrows from 3 December 2020 - 13 March 2021. We used a double-observer flushing technique and recorded all sparrow species observed. We measured fine-scale vegetation structure and species composition along sparrow survey transects using Daubenmire frames and the line-intercept method in March 2021 along sparrow survey transects. We will calculate the mean vegetation measurements by averaging data collected at all survey transects. We will use the Shannon Diversity Index to measure sparrow species diversity and AIC model selection to determine what vegetation metrics best predict diversity. Our findings will help us better manage grassland ecosystems in a way that supports the specific vegetation components required for greater sparrow use and diversity on their wintering grounds.

### Comparison of Traffic and Noise Levels Along Two Highways in Southern Texas

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**Abstract:** Roads can create a road-effect zone that influences wildlife behavior and survival, which can be expanded by increased traffic volumes. 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 traffic volumes on each road; and 2) describe the noise levels along each road and at each WCS; and 3) determine if traffic and noise levels influence wildlife interactions with WCS. WCS were monitored with camera trap arrays that consisted of four cameras on each side. To monitor traffic volume, two cameras with trip sensors were deployed on FM106 and SH100. Noise levels were monitored with NSRT\_mk3 sound level meters at each WCS and the surrounding area. The traffic volumes between roads were compared with a t-test. An analysis of similarities (ANOSIM) was used to compare average noise levels between WCS, and a t-test was used to compare average noise level between roads. A generalized linear model (GLM) was used to examine if there were associations between noise levels, traffic volume, and frequency of use of WCS by target wildlife species. This study will help establish a baseline noisescape for each highway and contribute to the understanding of how traffic and noise influence the use of wildlife crossing structures by ocelot and other wildlife.

### Herptile Microhabitat Use in The Cross Timbers Ecoregion of Texas

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**Abstract:** Due to its large size, Texas has a multitude of ecoregions that provide habitat for reptiles and amphibians. Herptiles use microhabitats for foraging, escaping weather, and regulating body temperature. The objective of this research is to evaluate the use of microhabitats by herptiles in the Palo Pinto Mountains State Park in Stephens County, Texas. Our study area is a 182-ha property in the Cross Timbers ecoregion. The property comprises 2 ponds, and ephemeral and intermittent streams, and it is dominated by post oak (*Quercus stellata*) and Ashe juniper (*Juniperus ashei*). We selected 15 plots, that vary in size, with rocks, logs, natural or established brush piles, and litter. Starting in June 2021, we conducted morning (0700-1200), mid-day (1200-1600), and evening (1600-2100) surveys that involve flipping rocks and logs, and examining brush piles and litter. For each detection, we measure wind speed, ambient temperature, relative humidity, and soil temperature. Collectively, we had 30 detections (17 morning, 2 mid-day, and 10 evening). We will resume surveys in March of 2022 and will record measurements at unoccupied locations to compare with occupied areas. We will add temperature of the underside of rocks and logs, soil moisture, and soil texture to our microhabitat data. This information will contribute to our knowledge of the community assemblage and habitat requirements for herptiles in the Cross Timbers region of Texas and will assist with the management and conservation of those species.

### Quantifying Population Trends and Habitat for The Chestnut-Bellied Scaled Quail in South Texas

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**Abstract:** The chestnut-bellied scaled quail (*Callipepla squamata castanogastris*; herafter '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 2000s. 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 and urban development that has altered vegetation landscape structure and composition. Our goal was to develop a framework to identify the conservation and management priorities in the South Texas Plains for scaled quail habitat. To achieve our goal, we first identified and quantified spatial trends in scaled quail abundance in the region. Our study area was located in the South Texas Plains ecoregions with a focus on four counties: Jim Hogg, Starr, Zapata, and Webb. We used the Rangeland Analysis Platform (RAP) to evaluate landscape changes between 1984 and 2020. Scaled quail numbers per route have decreased from 16 birds per route in the late 1970s to ~3 birds per route since 2011. Data from RAP shows that tree cover percentage has significantly increased in all four counties. Field data confirmed that tree cover is linked to honey mesquite cover and the presence of invasive herbaceous species may decrease. All these factors negatively affect scaled quail habitat distribution and potentially connectivity.

### Playing 'Hide and Seek' with Texas Tortoises: Value of a Detector Dog

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**Abstract:** Texas tortoises (*Gopherus berlandieri*) were once considered common and abundant throughout southern Texas with densities as high as 16 tortoises per hectare. Today, density estimates are 0.25 tortoises per hectare, which constitutes about a 98% population decline. Thus because of their low numbers and elusive behavior, Texas tortoises can be difficult to find. We demonstrate the value of using a detector dog as a time saving method in locating Texas tortoises. We glued VHF radio transmitters on 9 adult tortoises and released them in a 3 ha plowed and short-grass pasture that contained mesquite mottes. We calculated the Detectability Index (DI) as the detection rate (# tortoises found/minute) x percent tortoises from the known population found within 60 minutes. We compared DI's via telemetry, detector dog, and 'cold' (no equipment or knowledge) searches. We used the time it required to find all tortoises when the searcher had knowledge of locations as the baseline. Our baseline DI was 0.78, followed by telemetry (0.109) and detector dogs (0.106), while 'cold' searches was 0.03. Telemetry, detector dog, and cold searches were 8X, 11X, and nearly 60X slower, respectively, than knowledge of tortoise locations. However, the combination of using detector dogs with telemetry resulted in a 25% time savings. Telemetry was useful is locating an area with a tortoise but a detector dog was 2X faster in locating the tortoise once the area was identified. Therefore, we recommend the use of detector dogs as a time-saving method when conducting research on Texas tortoises.

# Quantifying Increasing Temperatures From 2021-2060 Using Global Climate Models: Potential Implications for Woody Cover Encroachment

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**Abstract:** Temperatures are changing globally in response to external forces, such as solar radiation, atmospheric aerosols, and internal interactions between components of the climate system. This change may create functional habitat loss, and shifts in species distributions for vegetation and wildlife. Predicting temperature changes for rangelands is important because they can experience an increased spread of invasive species, specifically woody plant encroachment. Across the globe, grasslands have been converted to woodlands, affecting ecological processes, species diversity, composition, and habitat structure and function. The objectives of our research is to (1) assess the rate of change in temperature and precipitation across Texas and (2) to identify the potential areas subject to woody cover encroachment based on climate parameters. To achieve this, we plan to use ensemble maps of coupled climate models to simulate mean monthly temperature and precipitation global climate data. We acquired temperature and precipitation projected a one to six degree increase in temperature (°C) and a decrease of 71mm to an increase of 93mm in rainfall over the next 40 years. This research will identify the least resilient areas subject to woody cover encroachment based on temperature and precipitation changes projected across Texas which can then assist in improved management decision processes.

# Population Density of Northern Cottonmouth Snakes (*A.piscivorus*) Within Constructed Wetland Complexes

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**Abstract:** Northern cottonmouth snakes (Agkistrodon piscivorus) have been found across the south-central United States up to the Atlantic coastal plain. They can be found in semi-aquatic habitats such as swamps, ponds, lakes, and even in wetland complexes and are indicator species. At Texas A&M University-Commerce, there is a constructed artificial wetland complex with many types of species. This research aimed to observe the population density of the cottonmouth snakes in the wetland complexes to understand the role A. piscivorus provides in this habitat using distance sampling. The snakes were located from transects and tagged using Biomark PIT tags to collect data for the population model. Using Program R, the data was analyzed using the distance package to provide the detectability of A. piscivorus and the estimated population abundance. The results for the detectability showed that the data collected wasn't conclusive to distance sampling. It says that we perfectly detect all cottonmouths out to the maximum detection distance. The density of the snakes was 4.899624 per ha, multiplied by 45 ha, producing an estimate of 220 with a confidence interval ranging from 115 to 423 individuals that possibly occupy these constructed wetlands, which follows with the original hypothesis. Further research can be done to understand the genetic diversity within these snakes from different wetland locations to develop more information on them. Since they're an indicator species, this information can be used for habitat management as well.

#### Population And Parasitism Rate Estimates for Black-capped Vireos in Kickapoo Caverns State Park - 2021

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**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, population surveys and brown-headed cowbird parasitism rate estimates were undertaken to estimate current population size (i.e. territories) to compare with population estimates prior to 2018. We performed point count surveys at 41 randomly selected points within Kickapoo Caverns State Park to determine a density estimate that served as our population estimate. Point counts were performed periodically between May 13, 2021 to June 30, 2021. We also performed nest searching and monitoring of black-capped vireo nests to examine how many nests were being parasitized throughout the park. Nest monitoring occurred throughout the entire field season, May 3, 2021 to July 13, 2021. We detected a total of 32 singing males at 15 of our 41 survey locations (36.59% of points). An end of season count of territories visited throughout the season provided an estimate of 134 black-capped vireo territories found within park boundaries. A total of 22 black-capped vireo nests were located and monitored throughout the season, 4 (18%) of these nests were parasitized. A total of 10 (45%) of the 22 nests succeeded to fledging. This is the first year of a multi-year study on black-capped vireo populations on Texas Parks and Wildlife Department managed lands in the Western Edwards Plateau. This study will help inform management decisions for black-capped vireo populations.

# Modification to Existing Wildlife Guards to Prevent Wildlife Use Along a South Texas Highway

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**Abstract:** To mitigate ocelot (*Leopardus pardalis*) road mortalities, the Texas Department of Transportation installed continuous fencing, 16 wildlife guards (WG), and five wildlife crossing structures (WCS) along an 11.9 km stretch of State Highway 100 in Cameron County, Texas. Fencing and WGs were intended to prevent wildlife from accessing the road and WCSs provided a way for wildlife to safely cross under the road. While these measures prevent some wildlife species from accessing the road, species such as coyote and bobcat are only partially deterred by WGs, raising concerns that ocelots may also not be deterred and use WGs to enter the road. Two types of WG have been deployed: bridge-grate (BGWG) and pipe (PWG). Our main objective is to determine the effectiveness of WG modifications in preventing bobcats, and by extension ocelots, from accessing the road. Modifications to WGs include 1) a vehicle gate and 2) adding deterrent spike strips (Shark Teeth<sup>TM</sup>) along the edges of the WGs and on the underlying support beam. Three PWGs and four BGWGs will be modified with Shark Teeth and two PWGs will be gated; the remaining seven unmodified WGs will continue to be monitored. Differences in wildlife use of WGs with and without the deterrents will be compared. The results of this study will be used to determine if vehicle gates and Shark Teeth are effective deterrents or if additional deterrent methods should be considered to prevent bobcat, coyote, and possibly ocelot from accessing the road.

# A Habitat Suitability Index Model for Giraffe (Giraffa Camelopardalis) in Southern Africa

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Abstract: In 2018, the IUCN listed giraffes (Giraffa camelopardalis) as vulnerable with a decreasing trend in abundance and estimated 68,000 remaining individuals. Throughout much of southern Africa, giraffes exist as a metapopulation confined to reserves, with an intervening matrix dominated by agriculture and other development. Significantly expanding the existing population will rely on establishing additional giraffe herds in currently unoccupied reserves. The goal of our project was to develop a hierarchical habitat suitability index model for giraffes, for use by conservation planners to estimate the success of potential reintroductions. Our model utilizes landscape-level habitat variables and local-level vegetation variables to predict habitat suitability. We deployed cameras and measured local-level field data at two fenced-in reserves currently supporting giraffe populations - Hans Merensky Nature Reserve (5,362 ha) and Vygeboom Nature Reserve (6,629 ha), adjacent reserves located in Limpopo Province, South Africa. During Dec 2019 - Feb 2020, we deployed 88 camera traps across a two-km × two-km grid across the study sites, each trap consisted of paired infrared game cameras. At each trap site, we collected data on vegetation type and structure, including tree species composition, canopy cover, density, height, and diameter at breast height. We detected giraffes at 28 traps. We will evaluate habitat use of giraffe using an occupancy-modeling approach based on species occurrence and vegetation data. Our results will allow conservation planners to make better-informed and more efficient decisions when expanding the existing giraffe reserve network.

# Niche Divergence of a Drought Deciduous Shrub and Its Implications on Range Expansion Under Changing Climate Scenarios

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Abstract: Niche divergence is an ecological pattern that favors adaptive plasticity in species to persist in variable environments. Whitebrush (Aloysia gratissima) is a shrub species with two geographically distinct populations occurring in Central and South America that is currently expanding its distribution and exists in areas with a variety of environmental conditions. This species' tolerance can be explained in part by its drought deciduous nature and resilient reproductive traits. Our goal was to explore the environmental variables that constrain distribution spread and how they vary in importance between the two distinct populations. We constructed ecological niche models using MaxEnt to compare relationships between populations and their abiotic environment. We created a model for the entire known species' distribution and then compared it to model performance metrics and variable contributions from models focused on the northern and southern populations. We then modeled the northern and southern populations independently and assessed model transferability across disparate populations. Finally, distribution shifts were modeled under future climate scenarios. Individual population models outperformed the overall species model suggesting niche divergence is occurring between the two populations. Differences in the top performing variables across disparate population models suggested the northern population is limited by minimum temperature extremes while the southern population is limited by moisture availability. Predicting species behavior and identifying driving interactions will allow for adaptive management strategies in current and future climate scenarios.

### Comparing the Distribution of White-tailed Deer Before and After an Extreme Climate Event: Winter Storm Uri in Texas

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**Abstract:** Extreme climatic events can cause high intensity and low-frequency disturbances which can cause changes in population abundance, distribution, and changes in habitat structure and composition. In February 2021, Winter Storm Uri brought bands of light-heavy snow, ice, and subzero temperatures (0°C) across Texas. White-tailed deer (*Odocoileus virginianus*) is a common, economically valuable, and native large game species in Texas. Extreme climatic events have been linked to ungulate survival, habitat use, and movement; Our objective is to analyze the distribution of white-tailed deer before, during, and after the winter outbreak of 2021. During the storm, we had two large camera trap arrays deployed across two military sites: Camp Bowie (Brownwood, TX) and Camp Swift (Bastrop, TX). The cameras on each site are distributed in a grid pattern based on a concurrent upland bird study, collecting the time and temperature of when a deer detection event occurred. The images that the camera traps collected, will be to identify bucks, does, or fawns and document the number of individuals observed in the photograph. A database will be created with locations, kept date and time, temperature, developing a spatially explicit occupancy model during and after the winter outbreak of 2021. This research should provide new insights into how extreme thermal dynamics drive white-tailed deer distribution.

### Morphometric, Coloration, and Behavioral Differences Between Plateau and Tamaulipan Spottailed Earless Lizards

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**Abstract:** Spot-tailed earless lizard (STEL; *Holbrookia lacerata*) originally was a single species that was separated into 2 subspecies, the Plateau (*H. l. lacerata*) and the Tamaulipan (*H. l. subcaudalis*) subspecies. Today, the lizards are considered two distinct species because of genetic differences (Maldonado et al. 2020), with the Balcones Escarpment fault line separating the northern (*H. lacerata*) from the southern (*H. subcaudalis*) populations. Herein, we offer morphometric, coloration, and behavioral differences as additional evidence to maintain the 2 species of STEL as distinct species. Tamaulipan STEL are larger (P < 0.01) by snout-vent length (SVL) and weight in both males and females (Tamaulipan males:  $9.9 \pm 0.7$  cm and  $61.9 \pm 1.2$  g, respectively, versus Plateau males:  $7.5 \pm 0.4$  cm and  $55.3 \pm 1.2$  g, respectively; Tamaulipan females:  $10.7 \pm 0.5$  cm and  $66.2 \pm 0.9$  g, respectively, versus

Plateau females:  $8.4 \pm 0.4$  cm and  $58.8 \pm 1.2$  g, respectively). Within species, sexes were similar in size (P > 0.10), except Tamaulipan females were heavier (P < 0.02) than males. In addition, Tamaulipan STEL were gray in color compared to a tan brown color of Plateau STEL. The RGB quantification for Tamaulipan STEL was greater (Red:  $186 \pm 4$  vs.  $154 \pm 4$ ; Green:  $169 \pm 4$  vs.  $142 \pm 4$ ; Blue:  $149 \pm 5$  vs.  $127 \pm 5$ ; P < 001) than Plateau STEL. Lastly, Tamaulipan STEL appeared faster, ran further, and behaved more skittishly than Plateau STEL. Evidence warrants maintaining the separation of these species.

# Correlation Among Demographic Rates and the Influence of Catastrophic Weather Events on Montezuma Quail in The Trans-Pecos Of Texas

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**Abstract:** Montezuma quail (*Cyrtonyx montezumae*) are a cryptic species inhabiting the pinon-juniper woodlands of the southwestern United States and much of Mexico. Little is known about Montezuma quail population demography and life history, but precipitation and its timing are likely key factors driving Montezuma quail reproduction. In the Trans-Pecos region of Texas, 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 are 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 population outcomes, local abundances, and extinction probability of Montezuma quail populations. We found that stabilizing dynamics were possible when demographic rates were independent, but destabilizing dynamics, which may lead to local extirpations, when tail-specific correlations were considered. This suggests extreme weather events prevent stage-related rescue effects and may destabilize Montezuma quail populations.

### Avian Community Response to Thinning Prescriptions in Pinyon-Juniper Woodlands

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**Abstract:** Pinyon-juniper woodlands are an extensive vegetation community found throughout 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. In New Mexico, efforts are ongoing to restore the pinyon-juniper woodlands to a historic stand structure and reduce fuel loads. As the vegetation community changes, so will avian communities. Of concern are the number of avian species that specialize on pinyon-juniper woodlands. Therefore, 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 conducted point count surveys during the breeding seasons of 2018 - 2021 among plots thinned by fire and mechanical treatments and among untreated plots at the Fort Stanton-Snowy River National Conservation Area in Lincoln County, New Mexico. We are supplementing surveys with survival and site fidelity studies of juniper titmice (*Baeolophus ridgwayi*) and gray flycatchers (*Empidonax wrightii*), two species dependent on pinyon-juniper but with different foraging and nesting habits. Our goal is to estimate and compare abundances of key species among treated and untreated plots and evaluate the influence of woodland management on avian community structure. 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.

# Understanding Flexibility of Habitat Use by an Apparent Short-grass Specialist in The Texas Gulf Coastal Plain

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**Abstract:** Migratory shorebirds are one of the fastest declining groups of North American avifauna, suffering an estimated decline of 40% since 1970. An obligate grassland shorebird and long-distance, Arctic-breeding migrant, the buff-breasted sandpiper (*Calidris subruficollis*) has been identified as a flagship species for other grassland birds by the Arctic Migratory Bird Initiative and the Midcontinent Shorebird Conservation Initiative. A recent range-wide tracking study revealed that this species uses the Texas Gulf Coastal Plain during south and north migrations, with all but one of over 120 tracked birds stopping in the region. We will estimate habitat selection by the species at this critically important site by building a species distribution model using nested hierarchical resource selection analyses at two orders of selection and a random forest classification of Sentinel-2 imagery in concert with cropland data. To do this, we tracked 52 adult buff-breasted sandpipers in the region with GPS satellite devices during spring and fall migrations in 2021; 50 more birds will be tracked in the spring and fall of 2022. Tags were programmed to transmit 11 GPS locations each day per bird. Additionally, we visited the GPS locations within a 5-day window to obtain detailed habitat information, such as vegetation height, that could not be verified reliably from images. Because of their small declining population and their apparent reliance on short stature grassland habitats (e.g., turf farms), a greater understanding of the species reliance on novel habitats at this critical stopover site is imperative for effective conservation of the species.

### Mercury Contamination in Alligator Snapping Turtles of Texas

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**Abstract:** Rivers and lakes throughout Texas have been contaminated by mercury (Hg), resulting in consumption advisories for fish that accumulate the teratogenic compound. Aquatic organisms are prone to Hg contamination because it is readily converted into a bioaccumulative form in aquatic ecosystems. *Macrochelys temminckii* (alligator snapping turtle) is an aquatic inhabitant of Texas that is proposed for federal protection under the Endangered Species Act. Due to its high trophic position and longevity, it potentially faces high exposure to Hg, which could negatively affect populations through embryotoxicity. We sampled muscle from 82 individuals of the species across four major Texas watersheds, and analyzed their Hg concentrations using a direct Hg analyzer. Wet weight concentrations of Hg ranged between 0.033 mg/kg and 0.910 mg/kg, with an average of 0.297 mg/kg (SD  $\pm$  0.162 mg/kg). Muscle Hg concentrations correlated weakly with carapace length (r = 0.18), corroborating studies on related turtles that have indicated non-significant increase in Hg concentration with body size. Concentrations did vary by drainage. Results confirm that *M. temminckii* is assimilating mercury in Texas waters, and exhibits a range of concentrations similar to those observed in a close relative (*Chelydra serpentina*) in other states. Concentrations we observed are within the range of those that result in lowered reproductive success in *C. serpentina*, as well. Assuming Hg has similar effects on both species, exposure may be negatively affecting reproductive output in *M. temminckii*.

#### Assessing The Prevalence and Severity Of Sarcoptic Mange on Coyotes in South Texas

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**Abstract:** Sarcoptic mange is a skin disease caused by tiny mites that affects over 100 species of domestic and wild animals. The mites, *Sarcoptes scabiei*, are transmitted through either direct or indirect contact with an infected host. A female mite will burrow into the skin of the host and lay eggs inside the skin, causing itchiness. Clinical signs of mange include hair loss, thickening of skin, skin lesions, and infections. Coyotes (*Canis latrans*) are susceptible to sarcoptic mange infections. In this study, we assessed the prevalence and severity of sarcoptic mange in coyotes on 3 separate ranches in Cameron County, Texas from January 2019 to October 2020. We examined photos of coyotes from 140 remote cameras set up at fence crossing locations. Through examining the camera footage, it is clear that coyotes frequent these fence crossings. We measured the level of severity of mange by assessing body condition. We ranked all coyote photos from 0-3. A "0" showed no signs of infection, hair loss or scabs. A "1" displayed early signs of infection with some hair loss around the tail and bottom area of the animal. A "2" described animals with moderate hair loss or scabbing, covering 30-50% of the animal's surface area. A "3" showed severe signs of infection including 51-100% of hair loss, signs of emaciation, and severe skin scabbing. Assessing the prevalence of sarcoptic mange is important for livestock and other wildlife as the disease impacts the quality of harvest from the animals.

# Effects of Road Mortality Mitigation Structures on Rodent Community Composition, Rodent Activity, and Predator-prey Dynamics in South Texas

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**Abstract:** Due to consistent road mortalities of federally endangered ocelots (*Leopardus pardalis*) in south Texas, wildlife crossing structures (WCS), wildlife guards (WG), and exclusionary/guide fences were constructed along State Highway 100 and Farm-to-Market Road 106 with the intention of mitigating wildlife road mortalities and reducing habitat fragmentation. The effects of road mortality mitigation structures on rodent activity and rodent community composition is not fully understood, both on the regional scale of south Texas and in the broader field of road ecology. This is primarily due to the low conservation priority of most rodent species and the difficulty of noninvasively surveying for rodents effectively. In this study we evaluate whether rodent communities observed around road mortality mitigation structures are different from those observed at habitat and exclusionary fence reference sites. Data was gathered using small mammal photo booths deployed at WCS, WG, mitigation fencing, and habitat reference sites. The collected data was analyzed utilizing a PERMANOVA test to determine if significant differences in rodent communities and activity exist between site categories while

accounting for other factors. This research contributes to furthering the understanding of rodent road ecology, and may also have implications for how rodent predators, including ocelot, interact with WCSs and WGs.

# The Effects of Urban Heat Islands on Northeast Texas Anurans

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**Abstract:** Amphibians are a vulnerable group that has been in decline for decades. Many ectotherms including anurans are affected by the environment around them. In a comfortable temperature, anurans can be found to be active. The presence of urban heat islands could have an effect on anuran populations present. We have been capturing anuran species at 3 different locations using drift fences and pitfall and funnel traps. Captured specimens are measured by their snout-vent length (SVL). A record of both temperature and humidity is taken every 10 minutes with a data logger kept at each site. Night call surveys are conducted once a week between 10pm and 230am with each survey being given a rank between 0 and 4 to quantify activity. A total of 10 species have been captured between the three sites. The average SVL decreases in the more urban sites with a .36 cm difference between the most rural site and most urban. Nocturnal calling activity has been highest between the times of 23:30 and 00:59 both in average call level and occurrence. The site with the most might time activity in both call level and frequency is our sub-urban site. When activity is influenced by environmental conditions, changes in these conditions can lead to the differences between population activity. These changes could create rifts between populations on a temporal scale. Environmental conditions influence anuran activity and understanding the degree it of influence is important to anuran conservation as towns and cities grow and climate change progresses.

# Influence of Woody-plant Diversity and Invasive-grass Cover on Habitat Use of Scaled Quail in South Texas

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**Abstract:** Scaled quail (*Callipepla squamata*) are an upland game bird species that has experienced significant population decline. In South Texas, scaled quail favor divers shrub communities with sparse understories. However, rangeland disturbances such as root plowing, cattle grazing, and other management practices have simplified woody-plant communities and allowed invasive grasses species to dominate. Such changes in vegetation composition and structure have reduced habitat for scaled quail in South Texas. The objective of our study was to identify the habitat-suitability bounds of scaled quail for woody-plant diversity and invasive grass cover. This study occurred on a private ranch in Duval County, Texas during November 2021-January 2022. We collected vegetation data at both used and available points (n &gt 20 points/type) along a woody-plant diversity and invasive-grass cover gradients ranging from low to high. We analyzed this data using continuous selection functions and logistic regression to identify habitat-suitability bounds of scaled quail in South Texas and provide valuable information for management of their habitat.

#### The Effects of Investigator Disturbance on Nesting White-tailed Hawks in South Texas

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**Abstract:** The white-tailed hawk (*Geranoaetus albicaudatus*) is one of the least studied birds of prey. We initiated research in spring 2021 by placing nest cameras at active white-tailed hawk nests containing hatchlings throughout south Texas, including ranch properties of the East Foundation. Previous studies suggest that the white-tailed hawk is sensitive to nesting disturbance and will quickly flee when approached. Our study aims to quantify the nesting sensitivity and investigate the effects of research-induced disturbance of the white-tailed hawk during the breeding season in south Texas. While disturbance can be calculated using varying definitions, our methods measure disturbance by using the tolerance and reaction of the individual bird (Nisbet 2000) demonstrating flight off of the nest. We present other consequential results of nesting disturbance related to nesting health, our methods to create a buffer zone for nesting white-tailed hawks, as well as other preliminary findings from this disturbance study.

### How Long Do Native Grasses Remain Viable in The Seedbank?

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**Abstract:** What are the benefits of seeding native grasses in rangelands? Seeding a diverse, locally-adapted, native grass mix contributes to wildlife forage and habitat. Also, native grasses, once established, can increase water infiltration, tolerate drought conditions, and decrease soil erosion. Because native grasses provide many benefits to rangeland landscapes, one may choose to take advantage of a recently disturbed system by seeding native grasses. In south Texas, a pipeline was recently installed, leaving the ground surface bare and susceptible to invasive grass encroachment. After the project was completed, we seeded a native grasses, we also want know the fate of native grass seeds in the soil by monitoring germination and viability over time. We selected grass species by three classes of successional stages and two morphology types; in total we are monitoring six different species. For each species one hundred homogeneous seeds were enclosed in a mesh envelope and buried at approximately 10 cm depth. We created 25 seed pouches for each species Five seed envelopes of each species were collected at 1, 2, 6, 9, and 12 months after burial. We found that seed coats without appendages had higher field germination success when compared to seed coats with appendages. Also, we found most native grasses reached peak field germination near six months after seeding.

### Parental Behavior and Time Budgets of Nesting White-tailed Hawks

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**Abstract:** The white-tailed hawk (Geranoaetus albicaudatus) is one of North America's least studied birds of prey. Our goal was to investigate their breeding ecology in spring 2021 by placing nest cameras at active white-tailed hawk nests containing hatchlings throughout south Texas and East Foundation ranch properties. Little is known about parental care in the white-tailed hawk during the breeding season and knowledge of parental behavior is needed for successful monitoring. Raptors are known for sexually divided parental roles covering specific activities such as females contributing more to nestling care and males providing more territory defense or hunting. Our study aims to describe the sexual differences in parental investment and behavioral time budgets of nesting white-tailed hawks. Analysis is ongoing and we will present our methods for a quantitative assessment of the parental behavior and the sex-specific pattern of variation in parental investment of nesting white-tailed hawks in south Texas during the 2021 breeding season.

# Are Undergraduate Wildlife Students Better Equipped Than Their Agricultural Peers in Managing A Complex Agro-ecological Conflict? Initial Results from a Dynamic Role-playing Simulation

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Abstract: Ecosystem management problems in systems with both agricultural and natural environments (e.g., land conservation, watershed health, human-wildlife conflict) can be perplexing for many students due to the feedback-driven dynamics across natural and social spheres. Much research has found deficiencies in students' abilities to reason about such complexity because their mental models tend to be simple, visual, or lack the interrelated characteristics needed to understand nonlinear change over time. To test how well students' disciplinary education prepares them for complex problem-solving situations, we designed a role-playing simulation capable of evaluating student performance in a complex system. The simulation involves three stakeholder groups: irrigators, indigenous communities, and conservation NGO's, who must manage surface water allocations in an arid watershed over a 30-year period. The goal is to achieve above financial breakeven in the agricultural sector without collapsing a wildlife population dependent on the river source. Undergraduate students representing 2 departments, wildlife and range management (n = 20 students) and agricultural science (n= 12 students), played the game independently. Annual allocation decisions were recorded in real-time with the simulation. After gameplay, all students completed a questionnaire asking each to describe their strategic intentions behind the decisions they made. Results indicated that students prioritized low-leverage strategies in their respective domain (conservation or agriculture) and did not adequately explore strategies outside their domain that would yield higher leverage and therefore success. Further game play will allow testing alternative pedagogical interventions aimed at improving student reasoning and therefore performance in complex problemsolving situations.

# An Assessment of Fine Scale Microclimate Conditions in Purple Martin Artificial Housing and Its Influence on Nest Survival

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**Abstract:** The eastern subspecies of Purple Martin (Progne subis subis) are almost entirely dependent on provisioned nesting. Raleigh et al. (2019) found no variation in nest survival across 7 styles of housing, but with projected climate change forecasts, an evaluation of the microclimate conditions within artificial housing is an important component for the declining species. The goal of this study was to assess microclimate conditions of artificial housing types and if microclimate conditions (i.e., temperature and vapor pressure deficit; hereafter VPD) influenced nest survival of eastern Purple Martins. We deployed ibuttons among 4 types of artificial houses, in an active Purple Martin colony, Canyon TX, 20 Feb-15 Jul 2020-2021. We monitored nest status on a weekly basis. We used a one-way Kuiper statistic to assess if temperature and VPD empirical distribution functions (EMP) were different and if they influenced nest survival. We collected >500,000 temperature and VPD measurements among 40 purple martin nests, and our major findings were 1) EMPs varied by all factors, 2) Chirpy<sup>TM</sup> houses and artificial gourds had more favorable microclimates, 3) EMPs in metal boxes had the highest standard errors whereas wood boxes had the lowest standard errors, 4) microclimate was a marginal predictor of nest survival and 5) nest survival was >88%. Our preliminary data suggested Chirpy<sup>TM</sup> houses and artificial gourds may be beneficial for the species in 1) areas in hot, dry climates found on the periphery of their distribution 2) extreme weather events and 3) the future, given climate change forecasts.

# Comparing Acoustic Detection and Thermal Imaging for Wind Energy Tier 3 Bat Risk Assessments

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Abstract: In recent years, wind energy development has increased but not without unintended environmental impacts, such as high bat fatality rates. Current pre-construction minimization strategies monitor bat acoustic activity at potential wind energy facilities to predict fatality and improve siting. However, there is high variation between pre-construction models and post-construction fatalities, reducing reliability. Thus, new methodologies need investigating to maximize investments and predictivity. Our study focuses on using thermal cameras to supplement existing pre-construction acoustic surveys. Thermal cameras record the infrared radiation produced by bats, thus are ideal for nocturnal monitoring. Our objective is to determine if monitoring with thermal cameras provides improved accuracy to pre-construction bat activity estimates. Using AXIS Q1942-E thermal cameras, we are recording nightly bat activity in parallel with Song Meter 4 BAT-FS detectors at three sites under consideration for wind energy development using meteorological (MET) towers within the South Texas Plains. To monitor bats we mounted detector microphones 48 m above ground on each MET tower and positioned a camera 48 m from the tower, with its view centrally focused on the microphone. We are using Kaleidoscope Pro 5 to acoustically identify bats and a machine learning algorithm in Python 3.8.5 to distinguish bats from other thermal sources in the videos. We are using a generalized linear mixed-effects model to examine relationships between method-specific counts of bats and to determine relationships among seasonal and environmental covariates. Results have the potential to improve the accuracy of bat risk assessments and better inform wind farm siting.

### Difference in Reproduction Between Two Subspecies of Translocated Northern Bobwhite

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**Abstract:** The gradual decline of northern bobwhite (*Colinus virginianus*; hereafter bobwhite) has resulted in remnant populations throughout their historic range. Translocation of bobwhite has emerged as a conservation tool to revitalize and augment existing populations. Despite success of previous efforts, our understanding of the effects of source population on translocation success is limited. Our objective was to compare reproduction between two source populations of bobwhite in Texas. In March 2019-2021, we translocated a total of 665 bobwhite from two different regions of Texas: northwest Texas (*C.v. taylori*, n = 253) and south Texas (*C.v. texanus*, n = 412) to a 1,011-ha private ranch in northcentral Texas within the geographic distribution of the northwest subspecies. We monitored 82 nests (2019: n = 9, 2020: n = 52, 2021: n = 21). We documented a difference in nest initiation rate between source populations (northwest: 0.83 nests/female, SE = 0.06, n = 53 females; south: 0.56 nests/female, SE = 0.08, n = 68 females). We estimated that hens from northwest Texas produced almost 50% more chicks per 100 hens than south Texas hens based on reproductive estimates. There was little difference in apparent nest success, clutch size, and egg hatchability. Based on our results, managers should be aware of potential reductions in reproductive effort for bobwhite sourced from a different subspecies.

### Mapping Dunes Sagebrush Lizard Habitat

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**Abstract:** The dunes sagebrush lizard (DSL; *Sceloporus arenicolus*) is a habitat specialist endemic to the Mescalero-Monahans shinnery-sands ecosystem of west Texas and southeastern New Mexico, over which land-use practices have contributed to fragmentation and loss of habitat. We created a fine-scale, continuous habitat suitability model for the DSL in Texas to support conservation actions. We used generalized linear (GLM) and spatially weighted generalized additive models (GAM) to predict DSL occurrence. We included sand cover, shinnery oak cover, binned rugosity, and mean maximum rugosity as covariates. We replicated our model selection analysis and our spatial prediction analysis across a random sample of pseudo-absence data, then selected the best ranking model, defined as the model having the highest frequency being ranked first across 1,000 replications. Finally, we used the averaged prediction, from the replicated model prediction runs (n=1,000), as our estimate of occurrence for each grid cell. The highest-ranked model was the mean maximum rugosity and percent cover shinnery oak interaction model. The distribution of predicted occurrence captured Winkler County well in the GLM, but Andrews County had a lower predicted probability than expected. The GAM accounted for DSL spatial dynamics; thus, we see a higher occurrence probability in Andrews County and a much lower occurrence probability in Crane County compared to the GLM. The GLM is important for identifying areas of potential DSL habitat, allowing us to identify areas for future surveys. The GAM could determine areas for high-value conservation actions, such as protecting dune habitat from further development.

### Activity Patterns Of Ocelots, Bobcats, And Coyotes on Private Rangelands in South Texas

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**Abstract:** The ocelot (*Leopardus pardalis*) is endangered in the United States, occurring in low abundance across a limited distribution in southern Texas. Bobcats (*Lynx rufus*) and coyotes (*Canis latrans*) are sympatric with ocelots in the region and are potential competitors due to overlap in body size and diet. Previous research has suggested these mesocarnivores co-occur without spatial exclusion on private rangelands, but further study is needed to assess temporal partitioning of space. To analyze diel activity of the three species, we used camera traps on two private ranches in Kenedy and Willacy counties from 2020 to 2021. Activity levels were quantified using circular kernel distributions based on the number and 24-hr timing of photo-detections, and coefficients of diel activity overlap were calculated. Bobcats and coyotes exhibited the highest degree of temporal overlap (0.870), while ocelots and coyotes demonstrated the least (0.675) and ocelots and bobcats showed moderate amounts (0.716) of temporal overlap of the species pairs. Bobcats showed greater nocturnal activity at camera stations without ocelot detections, and coyotes to ocelot use of the site. These preliminary findings provide insight into apparent temporal niche partitioning between ocelots, bobcats, and coyotes in South Texas and how it might potentially mediate spatial coexistence on private rangelands.

# Nest Success and Habitat Selection Response Of Lesser Prairie-chicken To Grazing and Prescribed Burning Treatments

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**Abstract:** The lesser prairie-chicken (*Tympanuchus pallidicinctus*) is an iconic endemic species of the North American Great Plains. Wildfire events and grazing by free-ranging herbivores historically directed plant community composition and created heterogeneous habitat mosaics at scales that met the annual lifecycle needs of lesser prairie-chickens (LEPC). Anthropogenic alteration of these natural disturbances through row-crop agricultural expansion, continuous domestic livestock grazing regimes, fire suppression, wind-energy development, hydrocarbon exploration, urban expansion, coupled with natural influences, such as invasive species encroachment and severe droughts, have contributed to fragment and degrade historic LEPC habitats. Severe declines of LEPC occupied range and population levels have increased the importance of improving habitat management efficacy and efficiency to optimize remaining available habitats and sustain existing populations. In eastern New Mexico, LEPC populations occupy the Sand Shinnery Oak (*Quercus havardii*) Prairie Ecoregion; dominant vegetation consists of sand shinnery oak, sand sagebrush (*Artemisia filifola*), and mixed- and shortgrass assemblages. While habitat selection and nesting success of LEPC in eastern New Mexico have been documented; vegetation community composition and LEPC response to variation in prescribed-fire and grazing regimes have not been quantified. We used GPS satellite telemetry transmitters to monitor nesting success and habitat selection response of 32 female LEPCs to 5 spring prescribed-fire and 2 post-fire grazing treatments

performed 2016-2022. Additionally, quantification of plant community composition, invertebrate biomass and assemblages, and modeling of standing herbaceous biomass response to prescribed-fire treatments and post-fire grazing treatments are being conducted to further analyze LEPC habitat selection and nest success response.

### Correlates of Singing Phenology of a Declining Songbird: Implications for Monitoring Programs

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Abstract: The Bachman's Sparrow (Peucaea aestivalis) is a declining songbird of the southeastern United States and a Species of Greatest Conservation Need in Texas. Although it has a distinct song and can be easily recognized by voice, little information exists on its singing phenology and therefore its detectability. Understanding the detectability of this species has important implications for conservation efforts and monitoring programs. We used autonomous recording units (ARUs, Wildlife Acoustics SM4s and Minis) to detect Bachman's Sparrows singing behavior at nine sites of known occupancy in Angelina National Forest, Texas. ARUs remained on site from 7 February 2020 to 17 October 2021, recording 30 minutes daily during a three-hour window starting at sunrise. We scanned recordings for Bachman's Sparrow singing detections at each site and recorded presence or absence of singing behavior for each day. In addition to recording Julian date, we collected wind speed, precipitation, and temperature data from the nearest weather station and averaged values across the three-hour window. Additionally, we calculated the proportion of sites with singing detections across Julian date to determine singing phenology. Infrequent singing began in mid-January, increased in regularity through March, and remained consistent until mid-September, when singing ceased. No singing was detected between mid-September and the following mid-January. Logistic regression suggested that Julian date had a stronger influence on singing behavior than environmental factors. These results indicate that Bachman's Sparrow are best detected between March and August; monitoring efforts for the species should survey during these months to maximize detections.

### Bird-window Collisions Trends on A Central Texas University Campus

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**Abstract:** Collisions with man-made structures are a direct source of bird mortality that affects multiple bird species. We examined the composition of bird species affected by window impacts from September 2020 through January 2022 on the Abilene Christian University (ACU) campus. We selected windows facing the four cardinal directions on five buildings around ACU. We collected bird carcasses through an adapted collection schedule, in which students searched and recorded found remains with the date and time. During Fall 2020, we scheduled collections for every morning Monday, Wednesday, and Friday from September through November. When collections resumed in Spring 2021 (January to April) we collected more intensively for a shorter period of time by picking a week in each month to collect every day, both in the morning and in the afternoon. With an increase of catch per unit effort, we decided to continue this method of collection in the Fall of 2021. A total of 43 carcasses of 13 different bird species were collected. Among those species, Nashville warblers (*Leiothypis ruficapilla*) were only found from late September to early November. American Robins (*Turdus migratorius*), Whitewinged Doves (*Zenaida asiatica*), and Mourning Doves (*Zenaida macroura*) are all-year-round residents that see a migratory peak in the winter. The American Robin is the only one that had an increase in impacts during that

peak. We recognized seasonal shifts in the composition of birds that can be correlated to the known migration patterns. Due to the migration patterns, we are more able to predict impact frequency.

# Extreme Weather Effects on Butterflies--it'S Snow Laughing Matter

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**Abstract:** With climate change leading to more extreme weather occurrences such as droughts, extreme winter weather, and hurricanes, it is important to examine the impact that these events will have on flora and fauna in impacted areas. The changes in temperature and other weather events can lead to habitat being unsustainable for many species. In Texas, expected impacts of climate change include warmer summers, more extreme winter weather, coastal land loss coupled with increased inland flooding, and increased impact from hurricanes. Because of their relatively short lifecycles, arthropods are ideal species to examine for responses to extreme weather events. Our study, examining the effects of prescribed burning on butterfly populations in coastal South Texas, began in March 2020. Over the course of the study, our field site was directly hit by Hurricane Hanna in July 2020 and received extreme below-freezing temperatures during Winter Storm Uri in February 2020. Early results show there was no change in butterfly abundance from two months before Hurricane Hanna made landfall to two months post-landfall, but there is evidence for declines in butterfly abundance in the three months following Winter Storm Uri when compared to the same months in 2020. These results indicate a direct hit during summer by a Category 1 hurricane are not necessarily harmful to butterfly species along the southern Texas coast, but sustained temperatures well below winter low averages can result in reductions in butterfly abundance.

# Poster Abstracts: Session II

# An Evaluation of Western Chicken Turtle Survey and Capture Methods in Texas

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

Wade Ryberg, Natural Resources Institute, Texas A&M University, College Station, TX, USA

**Abstract:** The behaviors and activity season of the Western Chicken Turtle (WCT; *Deirochelys reticularia miaria*) are poorly understood in Texas. Though its distribution within the state is widespread, turtle assemblage studies conducted within the WCT's Texas range have seldom documented presence. Past research suggests it is potentially rare in the state with a patchy distribution. There is a lack of formal protection for the subspecies and its habitat, and remaining habitat is under threat from increasing urbanization. For these reasons, the U.S. Fish and Wildlife Service issued a 90-day finding that states listing the subspecies as threatened or endangered may be warranted. Here, we recommend an ideal survey season for the WCT in Texas, review survey techniques from the literature, evaluate nine methods implemented in the state between 2015 and 2019, and recommend potential trap improvements for testing. Capture recommendations are inconsistent species-wide in prior publications, with bait attraction and basking behaviors being key points of contention. In our field study, we tested road

surveys, spotting scope/binocular surveys, dip net surveys, seine surveys, baited hoop nets, two types of unbaited fyke net, and camera traps. Fyke nets and wading surveys yielded the highest number of captures per personhour, while camera traps provided the most efficient visual detection method. Utilizing proper survey protocols and understanding the activity season are crucial for performing effective studies on this subspecies.

# Butcherbirds in the Ballfield - Monitoring Urban Loggerhead Shrike Nests Through Community Science

Anna Matthews, Oaks and Prairies Joint Venture, American Bird Conservancy, San Marcos, TX, USA Tania Homayoun, Texas Nature Trackers, Texas Parks and Wildlife, Austin, TX, USA James Giocomo, American Bird Conservancy, Durand, IL, USA R. Craig Hensley, Texas Nature Trackers, Texas Parks and Wildlife, Boerne, TX, USA

**Abstract:** Recent research suggests North America has lost 3 billion birds since 1970, with some of the steepest declines occurring in grassland birds such as the Loggerhead Shrike (*Lanius Indovicianus*). This predatory songbird has declined 76% across its range and is a Species of Greatest Conservation Need in Texas, which hosts 6% of North America's breeding shrikes and 22% of wintering shrikes. Currently, we understand little about drivers of shrike declines, and a range-wide coordinated effort is needed to evaluate nesting and productivity. In Central Texas, Texas Parks and Wildlife and the Oaks and Prairies Joint Venture have partnered to study a population of shrikes that inhabit year-round and breed within Old Settlers Park, a public park in Round Rock, TX that is subject to intensive recreational use. This location is ideal for collecting valuable information about productivity and also presents an opportunity to involve community scientists in a project that integrates into larger-scale coordinated research and monitoring. The Urban Loggerhead Shrike Nest Monitoring Project launched its pilot season in April 2021, during which 13 local volunteers engaged in protocol-driven nest monitoring via Esri's Survey123 and Field Maps data collection apps. Of 35 shrike nests tracked, 37.1% fledged at least one bird, 42.9% failed, and the fate of 20% was undetermined. We hope lessons learned from this project will contribute to Loggerhead Shrike conservation efforts and that project protocols and survey form development may inform other coordinated efforts to involve community scientists in data collection for priority species.

# Seasonal Variation in Crop Damage of Wild Pigs (Sus Scrofa) In Northeast Texas

### Matthew Swerdfeger, Texas A&M University-Commerce, Greenville, TX, USA

**Abstract:** Wild pigs are of concern to agriculture as they destroy crops and property during their foraging activity. Two common foraging methods for wild pigs are rooting for buried food sources, and trampling taller crops like corn and wheat. These foraging tactics cause extensive damage to crops and incurs costs to restore farm land. The purpose of this study is to analyze seasonal changes in crop damage among wild pigs in Northeast Texas. Crop damage data will be collected through the use of unmanned aerial vehicle (UAV) photography and analyzed with automated algorithms. The proximity to habitat types and resources of the study area will be collected while in the field and through UAV imagery. The data collected from the study sites will be used to determine the amount of damage sustained to crops by wild pigs depending on the season and proximity to forested areas, roads, crop edges, crop height, and water sources. Information can be used to analyze seasonal crop damage relative to crop availability, proximity to habitat types, and weather patterns. This information can be used to develop crop and wildlife management techniques to reduce crop destruction. Future research on the effectiveness of wild pig deterrents, and selective planting of crops based on proximity to wild pig habitats could be conducted using the same areas and methods.

### Scavenger Guild Diversity and Carrion Use During a Mass Mortality Event

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Abstract: Carrion acts as an energetically low-cost nutrient source in the environment for variety of species across taxa. Through scavenging behavior, these species provide benefits to the ecosystem and human populations by removing decaying animal matter from the environment. A special case of carrion deposition is the occurrence of a mass mortality event, which may be due to extreme weather events, disease, or caused by human actions (e.g., wildlife management and eradication efforts). We examine scavenger guild diversity and factors influencing carrier discovery and consumption during a human-induced mass mortality event. We placed remote cameras at 28 carrion sites created by aerial shooting wild pig (Sus scrofa) at San Antonio Viejo Ranch in South Texas in Nov 2020 and May 2021. We recorded 1) the first species/taxa to discover carrion, 2) the first species/taxa to consume carrion, 3) time to carrion discovery, and 4) time to carrion consumption. We conducted regression analyses to determine environmental factors that influenced these variables. We recorded three mammal species and three bird species to first discover or consume carrion: bobcat (Lynx rufus), coyote (Canis latrans), wild pig, black vulture (Coragyps atratus), crested caracara (Caracara cherinvay), and turkey vulture (Cathartes aura). Scavengers took longer to discover and consume carrion as the distance to the nearest road increased and as the distance to the nearest water source decreased. We plan to continue data collection and further examine how environmental factors influence the time taken until carrion depletion, and relative activity at carrion sites by species.

# Tree Squirrel Occupancy in Burned and Unburned Pine-dominated Forest Stands on The Sam Houston National Forest

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**Abstract:** Eastern fox squirrels (*Sciurus niger*) and eastern gray squirrels (*Sciurus carolinensis*) have both declined in the southeastern United States as a result of forest clearance and alteration. Fox squirrels prefer more open forested habitats, historically maintained by wildfires, and may face increased competition from gray squirrels in fire-suppressed forest stands. We used camera trapping to determine occupancy for both species within burned and unburned mature, pine-dominated forest stands on the Sam Houston National Forest in southeastern Texas. We established 12 (6 burned, 6 unburned) 3x3 camera grids at randomly selected sites on the forest. Camera points were 100 m apart and cameras were activated for 8 consecutive days. Each point was baited with cracked pecans to increase detection probability. We used the program PRESENCE to determine the probability of occupancy ( $\psi$ ) for both species at the grid and camera-point levels. Gray squirrels were detected at all six unburned grids ( $\psi = 1.0$ ) and two burned grids and 0.36 at burned grids. Fox squirrels were detected at five of six burned grids ( $\psi = 0.83$ ) and one of six unburned grids ( $\psi = 0.17$ ). At the camera point level, probability of occupancy for fox squirrels was 0.84 at burned grids and 0.17 at unburned grids. These results suggest fire is important for maintaining the open forest conditions favored by eastern fox squirrels.

### Feasibility of Using Scat in Population Studies of Texas Horned Lizards
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**Abstract:** We tested the feasibility of using scat morphometrics to estimate age class ratios, body size, and population estimates for Texas horned lizards (*Phrynosoma cornutum*). Scats were collected daily for 6 days from 6 hatchling, 10 juvenile, and 10 adult horned lizards collected from southern Texas. Texas horned lizards were measured for snout-to-vent (SVL, mm) and categorized as either hatchling, juvenile, or adults based on previous literature. Scats were measured for length and width (mm) and placed in direct sunlight for 90 days, submerged in water for 2 days, and placed in typical summer weather conditions of southern Texas. Scat length and width increased as lizard size (i.e., snout-vent length) increased with each age class. Scat size of each age class of horned lizard was consistent between days. On average, horned lizards produced 1 scat/day, typically in the morning. Only hatchling and small juvenile horned lizards produced a second scat during a 24-hour period, which both scats from the same lizard were of similar sizes. Horned lizard scat did not shrink or swell in size or decay due to environmental conditions, at least during the 90-day experiment. Therefore, scat from Texas horned lizards reliably can be used to estimate population age class structure, body size, and population estimates.

## Decline of the American Bald Eagle on Lake Buchanan, Texas

#### Jared Daniel Guidry, Concordia University Texas, Austin, TX, USA

**Abstract:** Prior to 2015, midwinter survey numbers for American bald eagles (*Haliaeetus leucocephalus*) at Lake Buchanan, Texas, averaged 13 individuals. Between 2015 and 2019, the surveys resulted in four eagles on average. Because the population has been strong in the past and habitat has changed negligibly during the population's decline, we believe the cause of the decline is noise pollution caused by recreational boats and by firearms during waterfowl season. This is consistent with McGhee et al. (2019), who established noise tolerances for *H. leucocephalus* between frequencies of 2 kHz and 5.7 kHz at 80 decibels, as the average shotgun used in bird hunting produces a sound of 155 decibels (Ben Findley, 2018). It is believed that the location of the shots allows for sound to be amplified up the canyon walls and to roosting habitat where it exceeds the upper limits of eagle noise tolerance, effectively deterring them from the area. Two teams will conduct a sound study in *H. leucocephalus* roosting habitat outside of roosting season to determine sensitivity to shotgun noise. While one team discharges shotguns on the lake, another will measure sound levels near roosting habitat using a sound meter. The recorded ranges will be compared to the upper limits of *H. leucocephalus* tolerances to determine if sound meets the criteria as a deterrent.

## A Comparison of Surface Water Extraction Techniques to Identify Wetland Availability for Wintering Waterfowl in North America

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**Abstract:** Wetlands serve as important ecosystems of diversity and productivity, providing essential wintering habitat for numerous waterfowl species. Wetlands have experienced steep declines, therefore monitoring spatiotemporal changes in wetland availability is of importance for future waterfowl management efforts. Within the last decade, monitoring and mapping of wetlands have improved with the development of remote sensing

techniques. Here, we assessed the performance of different techniques to identify wetlands. Our objectives were to: (1) Compare the performance of water indices and image classifications for two commonly used remote sensing platforms and (2) validate the accuracy of these techniques with the application of northern pintail (Anas acuta) GPS location data. Two study areas were selected from an ongoing northern pintail tracking study, the lower Texas Coast and Cibola National Wildlife Refuge, Arizona. Supervised classifications utilized five water indices, (1) Modified Normalized Difference Water Index (MNDWI), (2) Land Surface Water Index (LSWI), (3) WI2015, and (4 & 5) two Automated Water Extraction Indices (AWEISH and AWEINSH). Indices were classified into water or non-water. Unsupervised classifications were conducted, classifying in a binary system (water and non-water). GPS location data of northern pintails were used to assess the accuracy of resulting imagery. The performance of each method in quantifying the amount and distribution of water was assessed with a confusion matrix and Kappa statistic. This project will help select the approach that provides the best precision to quantify the spatial distribution of wetlands in Texas and Arizona that can aid in monitoring wetland availability for wintering waterfowl.

## Development of Habitat Suitability Models to Analyze Rio Grande Wild Turkey Survey Methodologies

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**Abstract:** Managing and identifying ideal habitat is crucial for species management. Habitat suitability models can help quantify the amount and spatial distribution of land cover that provides food, water, and cover for a specific species. The goal of this study is to develop habitat suitability models for Rio Grande wild turkey on two sites, Camp Swift (Post Oak Savannah ecoregion), and Camp Bowie (Cross Timbers ecoregion). Our specific goals are to: 1) develop habitat suitability models that the Texas Military Department can use to determine which habitats are ideal for harboring turkey; 2) cross-validate survey methods with habitat suitability models to determine the most precise survey method. For each site, models will be developed to identify food, water, and cover types for turkey. We used high-resolution satellite imagery and classified them into 5 cover types: woody, water, herbaceous, bare ground, and infrastructure. We are using a moving window analysis to quantify landscape metrics that describe turkey habitat: woody cover patch density, mean patch area, edge density, and percent cover. The landscape metrics will be then classified as either 1, suitable areas for turkey habitat, or 0, not suitable areas for turkey habitat. Once we have food, water, and cover suitability models, we will combine them to show an overall habitat suitability model for Rio Grande wild turkeys. The model will be validated using field GPS points. Results from road and roost surveys conducted in the winter season will be compared to the habitat suitability models and model precision will be assessed.

#### **Rx Burn Trailers in Texas**

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**Abstract:** Prescribed (Rx) fire can be one of the most cost-efficient and ecologically beneficial tools within our stewardship toolbox; but for those with limited Rx fire knowledge or experience, it can also be one of the most intimidating and least understood management tools. In addition to the need for properly preparing a Rx burn plan and constructing appropriate fire breaks, having access to adequate equipment and personnel to implement the burn plan can determine the difference between a successful and a detrimental Rx fire experience. Rx burn trailers (i.e., mobile units equipped with assorted equipment) are an available resource to many private landowners, managers, Prescribed Burn Association members, and conservation professionals across Texas. Contents of trailers can include any combination of personal protective gear, ignition tools, communication devices, suppression equipment, public awareness signage, etc. The entity responsible for maintenance and inventory of each trailer determines usage guidelines and costs. Rx burn trailers generally operate on a first-come, first-serve basis. This poster will showcase the Rx burn trailers we are aware of across Texas, their contents, and the points of contact for each, respectively. Ultimately, by knowing the details of available Rx burn trailers, we will all be able to better equip ourselves, and each other, with necessary tools for safely and effectively implementing Rx fire for the stewardship and conservation of our natural resources.

## Monitoring Arthropod Biodiversity in Erath County Agriculture Fields

Lark Holland Trainer, Tarleton State University, Stephenville, TX, USA Adam B. Mitchell, Tarleton State University, Stephenville, TX, USA

Abstract: Arthropods make up approximately 84 percent of all described species, and contribute to efforts in pollination, decomposition, pest control, and a major food resource for other species of wildlife. Recent longterm studies have shown arthropod populations in decline and an 'Insect Apocalypse' has been of concern with an estimated 82 percent decline in flying insects over the last 27 years alone. Due to the concern of arthropod decline more research is needed to monitor long-term changes in arthropod communities at local scales. There is little research done investigating arthropod community diversity in Erath County, Texas, with the exception of agriculture and veterinary pests. The purpose of this project is to establish a long-term monitoring plant measuring arthropod biodiversity in Erath County and serve as baseline data for further research and natural history. This project will specifically address the relationship between arthropods and vegetation present in agricultural fields. For sampling ground-dwelling arthropods, we set a series of pit-fall traps along 8, 30-meter transects at 5-meter intervals (6 pitfalls/transect). We sampled vegetation at the beginning, middle, and end of each transect using Daubenmire frames to measure cover class and height for each plant species or cover type. We will analyze relationships between arthropod richness per unit effort and plant species richness, as well as measurements of community diversity and evenness among arthropods and plants. We hope our findings will enhance natural history records and contribute to management decisions on maintaining biodiversity on agricultural landscapes.

## Abundance of Rio Grande Wild Turkey in Central Texas

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**Abstract:** Rio Grande Wild Turkey (*Meleagris intermedia*) populations across the state have been on decline. Currently, there is a need for precise methods to survey Rio Grande Wild Turkey populations, particularly where abundance seems to be low. Therefore, the goal of our research is to evaluate the use of camera-traps to estimate Rio Grande wild turkey occupancy. We are conducting this study on the Camp Swift Training Center in Bastrop, Texas (Post Oak Savannah Ecoregion) and the Camp Bowie Training Center in Brownwood, Texas (Cross Timbers ecoregion). The study areas are 21,043 ha (Camp Swift) and 884 ha (Camp Bowie). We placed four camera-traps (each composed of two cameras) per average wild turkey home range (12 km<sup>2</sup>). We collected data for each camera-trap between November 2020 and March 2021. We are currently sorting the imagery for individual detections. Once we complete the selection, we will create a database with: locations, observed date and time, and number of individuals; and we will pool this data weekly. We will then develop a spatially explicit occupancy model. We believe this information will provide additional opportunities to generate estimates for population density in areas where estimates are considered low. We hope to have a better understanding of what actions will be needed in order to better conserve and manage the Rio Grande Turkey in these two ecoregions.

#### Trait-isotope Relationships of Snakes in East Texas Pine Forests

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Abstract: Body size is often considered an important determinant of resource use in a species. Therefore, it may also contribute to how food webs are structured as predators may shift their resource use during ontogeny. However, few studies have explored the isotopic niches of snakes in the context of their functional traits, especially within disturbance-prone pine forests. Here we examine the relationships between body size and trophic position within snake assemblages in two pine forests under different management regimes. To capture snakes, we deployed 10 box traps in each treatment during the summer months from 2018-2020, measuring snout-to-vent length (SVL) and body mass upon capture. Stable isotope analysis, based on the isotopic values of basal resources and scale clippings, was then used to obtain values of  $\delta 13C$  and  $\delta 15N$  and estimate trophic position of individuals. Performing regression analyses, we observed that trophic position generally increased with body size. However, the strength of this relationship was dependent on species foraging modes and habitat use. Describing the isotopic niches of species, couched within their functional traits, can provide insight on food-web structure, and in turn, affect ecosystem stability in managed systems.

#### Assessing Texas Kangaroo Rat Habitat Management and Population Connectivity

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**Abstract:** The Texas kangaroo rat (*Dipodomys elator*) is rare nocturnal species with a geographic distribution that spans across two ecoregions in north-central Texas: the Central Great Plains and the Southwest Tablelands. It has been listed as threatened in the state of Texas and petitioned for federal protection under the Endangered Species Act. Historically, the Texas kangaroo rats geographic distribution encompassed only 11 counties in north central Texas and 2 counties in southern Oklahoma. However, due to habitat fragmentation from urbanization and conversion to agriculture, in conjunction with the disruption of the historic disturbance regimes, they are now found only within 5 counties in Texas. This significant reduction in their distribution could also be a result of a declining population. There are three important objectives we are hoping to address with this study to inform the conservation of this species. First, is to determine habitat use and dispersal distance of Texas kangaroo rats for both adults and juveniles. Second, we want to determine Texas kangaroo rat response to experimental vegetation manipulation using grazing and prescribed fire in an attempt to create suitable habitat. Third is to develop a functional connectivity model, using Circuitscape and related programs, that is informed by the first and second objectives as well as expert opinion in order to identify potential choke points, stepping-stones, and areas of conservation importance to maintain population connectivity.

## Doves Slap the S\*\*t Out of Each Other: Morphological Analysis of Weaponized Wings

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**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 sometimes take the form of skeletal projections such as spurs or clubs. However, wing weaponization can be less obvious and may include increased bone thickness and density, as well as modification of the extensor process of the carpometacarpus at the tip of the wrist. Bone modification is predicted to be more pronounced in groups where competition and fighting are more common: males are expected to have greater weaponization than females, adults more than juveniles, and highly social species more than less social species. We studied size, shape, and density of wing bones in adults and juveniles of both sexes of the colonially breeding WWDO and the less social MODO. We collected linear measures of cleaned bones using photographs in ImageJ and standardized for individual body size with a linear measure of the tarsus bone. Additionally, we are processing multiple wings (n=5) from each category (age, sex, species) using a MicroCT scanner. With CT scans, we will analyze bone length with greater accuracy, as well as measure bone shape and density. Our findings will indicate whether these species have evolved modifications to their wing bones to support the substantial striking force that is likely to result from wing-slapping.

## Evaluating Use of Brush Canopy Cover at White-tailed Deer Birth Sites in South Texas

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**Abstract:** Many abiotic and biotic factors surrounding birth site selection can influence white-tailed deer (*Odocoileus virginianus*) fawn survival and recruitment. As a part of a large-scale, long-term study seeking to understand white-tailed deer fawn mortality, we evaluated canopy cover at fawn birth sites on native rangelands on the East Foundation's San Antonio Viejo Ranch. The East Foundation does not permit predator control or deer hunting on the ranch. We determined birth sites from pregnant doe's fit with GPS collars and Vaginal Implant Transmitters. We paired known birth sites (n=40) with 2 random sites (n=80) and evaluated overhead canopy cover using a convex densitometer. We took readings at 4 cardinal directions at each point. Deer selected birth sites with 27% more canopy cover than available. Additionally, we will use a web application called the Rangeland Analysis Platform to compare estimates of brush canopy cover derived from remotely sensed data to our field data. This data will supplement a large-scale study seeking to understand fawn survival within complex semi-arid systems.

## Use Of Environmental DNA to Identify Semi-aquatic Turtle Assemblages

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Abstract: Environmental DNA (eDNA) is genomic DNA from an organism found in environmental samples such as soil and water. As eDNA technology improves, the ability to monitor for difficult to detect organisms, especially elusive or endangered species, emerges without the need to physically handle individuals. Understanding the community of semi-aquatic turtles is logistically intensive when relying upon trapping, marking, and monitoring individual turtles across broad spatial and long-term scales. Analysis of eDNA extracted from water sources may provide a relatively quick and inexpensive method to investigate semi-aquatic turtle community assemblage; this method is also extendable to other aquatic vertebrate communities. The eDNA process involves using a polymerase chain reaction assay to detect and quantify the DNA specific to a species of interest. We will compare eDNA results from water sources to tissue samples from 7 different semi-aquatic turtle species to determine presence in a water source. Our study area is the McGillivray and Leona McKie Muse Wildlife Management area (789 ha) in Brown County, TX in the Cross Timbers ecoregion. Our focal species are Red-eared slider (Trachemys scripta elegans), Yellow mud turtle (Kinosternon flavescens flavescens), Common snapping turtle (Chelydra serpentina), Common musk turtle (Sternotherus odoratus), Texas river cooter (Pseudemys texana), Spiny softshell (Apalone spinifera), and Pallid spiny softshell (Apalone spinifera pallida). This study will act as a proof of concept and validation of several outstanding questions on the use and reliability of eDNA, validating this methodology contributes to our ability to conserve and manage turtle species.

## Effectiveness Of Environmental DNA to Detect Ringtails

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Abstract: Ringtails (Bassariscus astutus) are small, solitary terrestrial carnivores found across much of the southwestern United States extending into southern Mexico. Although not rare, their nocturnal habits combined with a proclivity for occupying rough, densely wooded terrain make them an elusive species even during targeted survey efforts. Environmental DNA (eDNA) is genomic DNA found in environmental samples (e.g., soil, water, sediment, and feces) that originates from an organism that encounters the environmental medium. The capability of eDNA is evolving to not only perform population genetics analyses on animals, but also extend presenceabsence analysis to terrestrial vertebrates occurring upslope from a water source. The objective of this study was to evaluate the efficacy of using eDNA from water sources to detect ringtail presence and compare against detections from game cameras. During Jun-Aug 2021, we deployed 13 camera traps and collected 72 water samples from 13 sites across the Fawcett Wildlife Management Area (2,209 ha), Palo Pinto County, Texas in the Cross Timbers ecoregion. We selected camera placement to maximize likelihood of detection around water sample locations and we captured ringtails on 19 days over the study. Using a polymerase chain reaction assay, we will compare eDNA metabarcoding results from water samples to tissue samples of ringtail to identify presence in a watershed. We will then compare detection locations from cameras to detections in water samples. Successful results may provide a powerful tool for landowners to analyze biodiversity and researchers to survey for elusive species in a temporally and financially feasible manner.

#### Soil Texture and Compaction Preferences of Captive Spot-Tailed Earless Lizards

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**Abstract:** Plateau and Tamaulipan spot-tailed earless lizards (STEL; *Holbrookia lacerata* and *H. subcaudalis*, respectively) are seemingly rare species that are being considered for federal threatened status. Little is known about the habitat preferences for these two species. Past research believed the species' used compacted clay soils; however, recent iNaturalist accounts find the species in sandier soil textures. Therefore, our objective was to experimentally test soil texture and soil compaction preferences of both the Plateau and Tamaulipan STEL. We captured 10 Plateau STEL and 10 Tamaulipan STEL from San Angelo and Bishop, Texas, respectively, and maintained them in captivity at CKWRI Wildlife Research Park. We constructed 3 interconnected 0.5 x 1 x 0.5-m plastic boxes, which contained 10 cm depth of sand, clay, and silt loam soils, respectively. Three experiments were conducted: 1) each soil texture was ground into a fine loose powder, 2) soils were exposed to environment for 2 weeks and allowed to naturally compact, and 3) each soil texture was compacted boxes, allowed 24 hours to acclimate to their environment, after which the quantity of time spent on each soil was recorded on video. With powdery soils, STEL's spent more time (P < 0.04) within silt loam soils; however, when soils were compacted naturally or mechanically, then STEL's preferred sandy soil texture. Compacted soils only were used if cracks formed within the soil for STEL's to hide.

Modeling the Relative Effects of Water Availability on Blue Wildebeest: A Kalahari Case Study

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Abstract: Numerous species of ungulates in semi-arid regions are facing the effects of rising temperatures and anthropogenic influences. Land managers have introduced artificial water sources and widespread fencing to the landscape and the complex implications of these changes are still being explored. This study focused on the Kalahari region of Botswana because it contains some of the largest remaining contiguous patches of savanna landscape and a unique transition has occurred in which previously migratory ungulates are now experiencing sedentary lives. Advancements in movement ecology theory were used to address the effects of anthropogenic and natural environmental factors on movement of an extremely water-dependent ungulate, blue wildebeest (Connochaetes taurinus), which experienced rapid population decline due to seasonal water supplies and the spread of fencing across the landscape. Movement data from 11 female wildebeest of different herds were collected between 2011 to 2014 and were used to better understand how access to water influenced movement, relative to other driving factors. Preliminary results from integrated step-selection functions suggest that wildebeest favoured shorter steps near waterholes (P=2e-16) and traversed longer distances when a water source failed. Contrary to our initial hypothesis, the distance to fences factor did not significantly influence movement (P=0.376), indicating that wildebeest did not actively avoid areas near fences. Since wildebeest and other water dependent ungulates are crucial to the diets of various predators, large financial assets for landowners, and can potentially shape vegetation communities through grazing patterns, this research provides unique insight on how sedentary ungulates utilize the landscape.

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