

56th Annual Meeting
of the
Texas Chapter
of **The Wildlife Society**



*Outdoor Education to Develop Engaged
Wildlife Professionals*

13–15 February 2020

Corpus Christi, Texas

2019–2020 Executive Board

Executive Director	Don Steinbach
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Program

Cristy Burch, Blake Grisham, Andrea Montalvo, and Landon Schofield

Local Arrangements

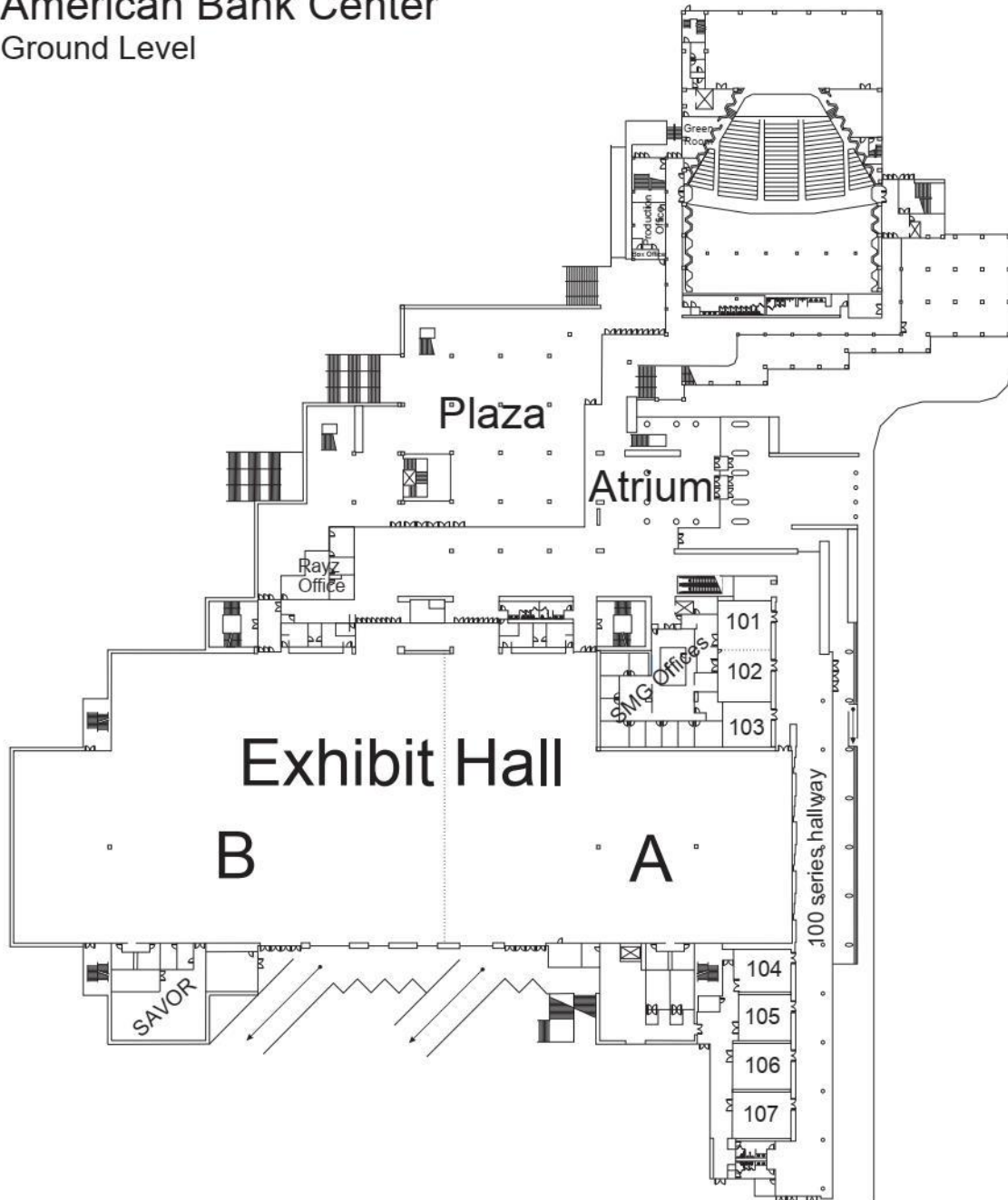
Mary Pearl Meuth and Todd Snelgrove

Posters

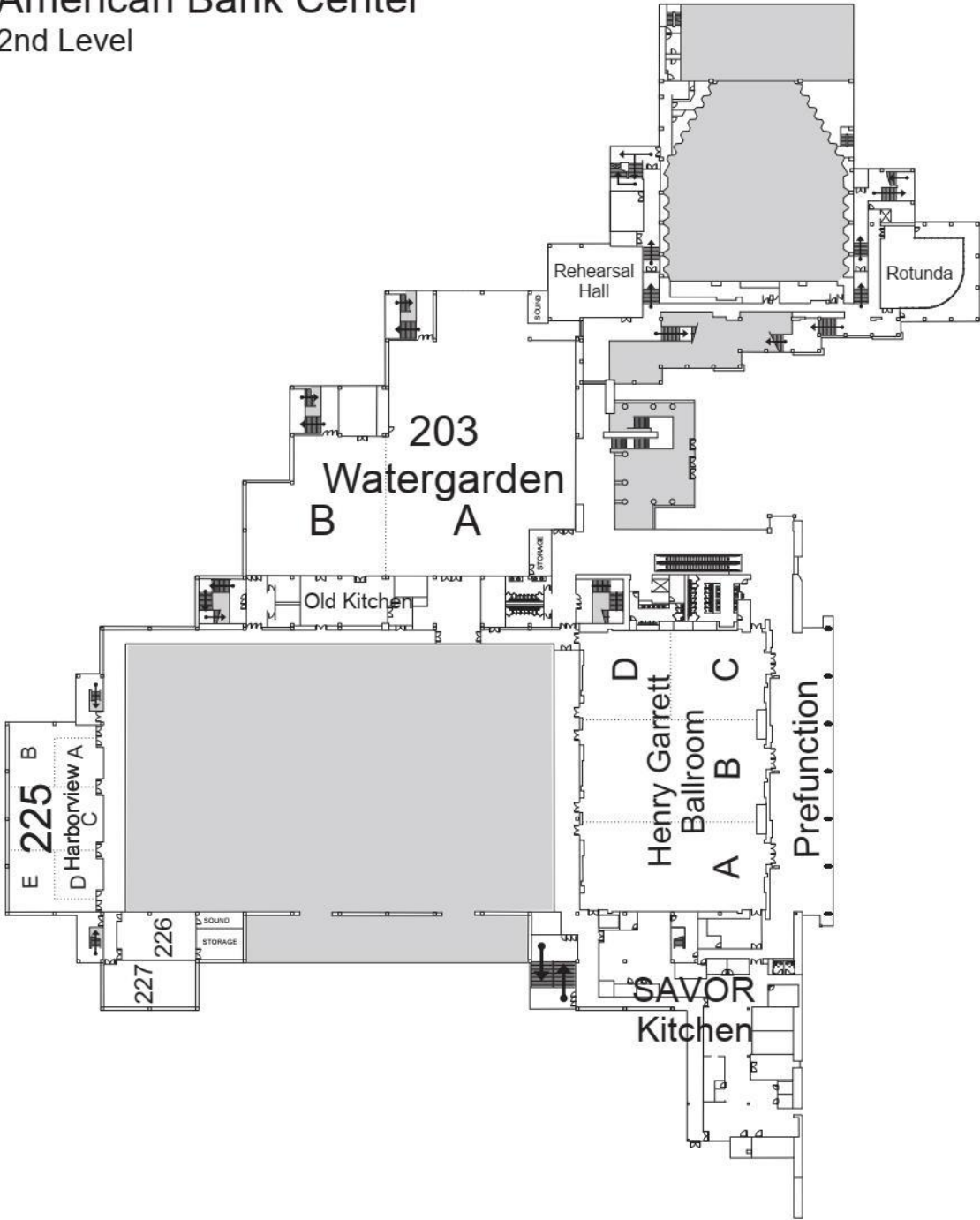
Heather Mathewson

Venue Layout

American Bank Center
Ground Level



American Bank Center 2nd Level



Meeting Schedule

Thursday, 13 February 2020

7:30 AM – 1:00 PM	Workshop – Working Effectively with Landowners	Room 103
8:00 AM – 12:00 PM	Workshop – Media Training	Room 106
8:00 AM – 12:00 PM	Workshop – R and R Studio for Beginners	Room 105
8:00 AM – 3:00 PM	Poster Session I Setup	Watergarden
8:00 AM – 5:00 PM	Registration	Watergarden
8:00 AM – 5:00 PM	Workshop – TBGA Official Scorer Certification	Room 104
8:30 AM – 12:00 PM	Workshop – Nature Photography 101	Oso Bay Wetland Preserve
9:00 AM – 12:00 PM	Workshop – Wildlife Acoustics: Bird and Land Animals	Room 107
10:00 AM – 12:00 PM	Executive Board Meeting	Room 101 & 102
1:00 PM – 4:00 PM	Workshop – Wildlife Acoustics: Bats	Room 107
1:00 PM – 5:00 PM	Workshop – TCTWS Hunting Mentor Training	Room 105
1:00 PM – 5:00 PM	James G. Teer Leadership Institute	Room 106
1:00 PM – 5:00 PM	Student Plant ID Contest	Room 225 A&B
1:30 PM – 3:30 PM	TCTWS Business Meeting	Room 101 & 102
3:30 PM – 5:30 PM	Quiz Bowl	Room 227
5:30 PM – 6:30 PM	Poster Session I Judging	Watergarden
5:30 PM – 7:30 PM	James Teer Reception	Room 103
6:00 PM – 10:00 PM	Presidents Reception and Student Mentor Mixer	Watergarden A
7:30 PM – 8:30 PM	East Foundation Reception	Rotunda
7:30 PM – 10:00 PM	Texas Tech Alumni Reception	Room 101

Friday, 14 February 2020

7:30 AM – 8:30 AM	Student Breakfast	Rotunda
8:00 AM – 9:30 AM	Women of Wildlife Reception	Room 101
8:00 AM – 1:00 PM	Professional Plant ID Contest	Room 225 A&B
8:00 AM – 5:00 PM	Registration	Watergarden
8:00 AM – 5:00 PM	Presentation Submission	Session Rooms
8:00 AM – 5:00 PM	Raffle and Silent Auction	Watergarden
8:00 AM – 5:00 PM	Workshop – Common Plants of the Rio Grande Plains	Room 102
8:00 AM – 5:00 PM	James G. Teer Leadership Institute	Room 103
8:00 AM – 10:00 AM	Art and Photo Contest Submission	Watergarden
8:15 AM – 9:15 AM	Break	Watergarden
9:10 AM – 11:40 AM	Cottam Award Presentations	Henry Garrett Ballroom
10:30 AM – 4:00 PM	Voting for Photo and Art Contest	Watergarden
12:00 PM – 1:30 PM	Lunch (On Your Own)	
12:00 PM – 1:30 PM	Student Chapter Leadership (Invitation Only)	Rotunda
12:00 PM – 1:30 PM	Past-Presidents Luncheon (Invitation Only)	Room 101
1:30 PM – 5:00 PM	Conservation Affairs Committee	Room 104

1:40 PM – 3:00 PM	Plenary Session	Henry Garrett Ballroom
3:00 PM – 3:30 PM	Break	Watergarden
3:00 PM – 4:00 PM	Poster Session I Removal	Watergarden
3:30 PM – 5:00 PM	Ecology and Management of Quail	Room 225C
3:30 PM – 5:00 PM	Avian Ecology and Management 1	Room 225B
3:30 PM – 5:00 PM	Conservation and Ecology of Mammals 1	Room 227
3:30 PM – 5:00 PM	Vegetation and Habitat Management	Room 226
3:30 PM – 5:00 PM	New Technologies and Applications	Room 225A
3:30 PM – 5:00 PM	Amphibians and Reptiles	Room 225E
3:30 PM – 5:00 PM	Exotic and Invasive Species	Room 225D
4:00 PM – 5:00 PM	Poster Session II Setup	Watergarden
4:00 PM – 5:30 PM	Art and Photo Contest Pick-up	Watergarden
5:30 PM – 7:00 PM	Awards Ceremony	Henry Garrett Ballroom
7:30 PM – 10:00 PM	Awards Reception and Networking Event	Watergarden

Saturday, 15 February 2020

7:00 AM – 7:30 AM	Fellowship of Christian Conservationists	Rotunda
8:00 AM – 10:00 AM	Registration	Watergarden
8:00 AM – 9:30 AM	Avian Ecology and Management 2	Room 227
8:00 AM – 9:30 AM	Big Game Ecology	Room 225C
8:00 AM – 9:30 AM	Vertebrate Response to Habitat Management	Room 226
8:00 AM – 9:30 AM	Education	Room 225E
8:00 AM – 11:30 AM	Poster Session II	Watergarden
8:00 AM – 5:00 PM	James G. Teer Leadership Institute	Room 103
9:00 AM – 11:30 AM	Executive Board Meeting	Room 101&102
9:30 AM – 10:00 AM	Break	Watergarden
10:00 AM – 11:30 AM	Avian Ecology and Management 3	Room 227
10:00 AM – 11:30 AM	Conservation and Ecology of Mammals 2	Room 225C
10:00 AM – 11:30 AM	Occupational Planning and Policy	Room 225E
11:30 AM	Poster Session II Removal	Watergarden
11:30 AM	Adjourn	

Friday, 14 February 2020
Clarence Cottam Award Competition
Henry Garrett Ballroom
Moderators: Forrest Cobb and Cord Eversole

- 9:10 **Meeting Welcome and Introduction**, Tyler Campbell
- 9:15 **Cottam Competition Introduction**, Forrest Cobb
- 9:20 **Identifying Landscape Predictors of Ocelot Road Mortality to Support Mitigation**, Greta Schmidt; Rebecca Lewison; Hilary Swarts
- 9:40 **Season of Burn Effects on Composition of Forage Standing Crop in Gulf Cordgrass Communities**, J. Silverio Avila Sanchez; Victoria L. Haynes; Sandra Rideout-Hanzak; David B. Wester; J. Alfonso Ortega-S; Tyler A. Campbell
- 10:00 **Co-Occurrence of Bobcats, Coyotes, and Ocelots in Texas**, Jason V. Lombardi; Darryl I. MacKenzie; Michael E. Tewes; Humberto L. Perotto-Baldivieso; Jose M. Mata; Tyler A. Campbell
- 10:20 **Landscape Connectivity for Lesser Prairie-Chickens on the Southern High Plains of Texas and New Mexico**, Lucas J. Schilder; Lucas J. Heintzman; Nancy E. McIntyre; Samuel Harryman; Christian A. Hagen; Russell Martin; Clint W. Boal; Blake A. Grisham
- 10:40 **Forage Standing Crop Estimation From Unmanned Aerial Vehicles in Semi-Arid Rangelands**, Alexandria M. DiMaggio; Humberto L. Perotto-Baldivieso; J. Alfonso Ortega-S; Chase Walther; Karelys N. Labrador-Rodriguez; Michael T. Page; Jose De La Luz Martinez; Sandra Rideout-Hanzak; Brent C. Hedquist; David B. Wester
- 11:00 **Montezuma Quail Populations Are Losing Future Adaptive Potential Due to Ongoing Genomic Erosion**, Samarth Mathur; James Andrew DeWoody
- 11:20 **Behavior and Dispersal Characteristics of a Large, Unharassed Coyote Population**, Justin T. French; Hsiao-Hsuan "Rose" Wang; William E. Grant; Nova J. Silvy; Tyler A. Campbell; John M. Tomeček

Plenary Session
Outdoor Education to Develop Engaged Wildlife Professionals
Henry Garrett Ballroom
Moderator: Blake Grisham

- 1:40 **Welcome to Corpus Christi**, The Honorable Lois Kolkhorst, District 18, Texas
- 1:50 **Project WILD and You**, Lari Jo W. Edwards
- 2:05 **On A Wing and a Cadence: The Texas Brigades' Odyssey**, Dale Rollins
- 2:20 **Recruiting and Engaging the Next Generation of Land Stewardship Ambassadors: East Foundation and The Witte Museum**, Masi Mejia
- 2:35 **Advantages of Field-Based Learning and Associated Challenges in the Modern Academic Setting**, Warren Conway

**Session A1: Ecology and Management of Quail
Room 225C**

Moderator: Andrea Montalvo

- 3:30 **Translocation of Northern Bobwhite in Central Texas**, John Palarski; Heather Mathewson; Bradley W. Kubečka; T. Wayne Schwertner; Dale Rollins
- 3:45 **Effects of Source Population and Release Strategy on Translocated Scaled Quail Reproduction**, Rebekah Ruzicka; Paul F. Doherty Jr.; Dale Rollins
- 4:00 **Population Dynamic Modeling and Effects of Harvest on Mearn's Quail**, Trey E. Johnson; Carlos E. Gonzalez; Ryan S. Luna
- 4:15 **Implementing and Evaluating a Sustainable Bobwhite Harvest Prescription**, D. Abraham Woodard; Leonard A. Brennan; Fidel Hernández; Humberto L. Perotto-Baldivieso; Neal Wilkins
- 4:30 **Comparative Habitat Use of Montezuma Quail in Texas**, Kristyn G. Stewart; Fidel Hernández; Eric D. Grahmann; Leonard A. Brennan; Humberto L. Perotto-Baldivieso; Robert Perez
- 4:45 **Effects of Predator Reduction on Northern Bobwhite Nest Success and Chick Survival in the Rolling Plains of Texas**, Kelton Mote; Brad Dabbert; Warren Conway; Blake A. Grisham

Session A2: Avian Ecology and Management 1
Room 225B
Moderator: Faith Hardin

- 3:30 **A Model of Shorebird Foraging Habitat in the Laguna Madre**, Mikayla M. House; Bart M. Ballard; Selma N. Glasscock; Mitchell D. Weegman; Humberto L. Perotto-Baldivieso
- 3:45 **Converting Bermudagrass Pastures Into Native Grasslands To Benefit Bobwhite Quail In The Coastal Plains Ecoregion**, Anthony Falk; James Muir; William Kuvlesky
- 4:00 **Movement, Behavior, And Energy Expenditure Induce Cross-seasonal Effects In Greater White-fronted Geese**, Jay A. VonBank; Stephanie A. Cunningham; Mitch D. Weegman; Paul T. Link; Kevin J. Kraai; Daniel P. Collins; Bart M. Ballard
- 4:15 **Wetland Conservation and Use By Midcontinent Greater White-fronted Geese in Mexico**, Joshua P. Vasquez; Jay A. VonBank; Jason P. Loghry; Kevin J. Kraai; Bart M. Ballard
- 4:30 **A 20-Year Look at Areas of Importance Used By Overwintering Mid-Continent Population of Sandhill Cranes**, Kathryn J. Brautigam; William P. Johnson; Daniel P. Collins; Jude R. Smith; Warren C. Conway; Owen N. Fitzsimmons; Gary L. Krapu; David A. Brandt; Aaron T. Pearse; Blake A. Grisham
- 4:45 **Preliminary Occupancy and Nesting Success Rates of Western Burrowing Owls Utilizing Artificial Burrows in the Tularosa Basin**, Sarah J. Turner; Brian L. Pierce; Francisco A. Cartaya; David L. Rizzuto; Allison S. Harvey; Krysta D. Demere; Audrey L. Holstead

Session B1: Conservation and Ecology of Mammals 1

Room 227

Moderator: Seth Rankins

- 3:30 **Species Distribution Modeling in Threatened Species Using the Townsend's Big-Eared Bat, *Corynorhinus townsendii townsendii* as an Example Organism**, Natalie Hamilton; Alexis Pence; Michael Morrison
- 3:45 **Preliminary Analysis of Kit Fox Occupancy in the Trans-Pecos, Texas**, Matt Hewitt; Patricia Moody Harveson; Dana Karelus; Louis Harveson; Russell Martin
- 4:00 **Small Mammal Recovery Following Periods of Low Rainfall**, Alexis R. Pence
- 4:15 **Modelling the Spread of *Pseudogymnoascus destructans* (The Causal Agent of White-Nose Syndrome) in Texas and Mexican Karst Regions**, Lilianna K. Wolf
- 4:30 **The Effects of Variation in the Major Histocompatibility Complex on Antler Development of White-Tailed Deer Under Selective Harvest Pressure**, David Navarro; Randy W. DeYoung; Charles A. DeYoung; Masahiro Ohnishi; Don A. Draeger
- 4:45 **Evaluation of a Black-Tailed Prairie Dog Restoration via Translocation in the Trans-Pecos Ecoregion of Texas**, Barbara Jane Sugarman; Bonnie J. Warnock; Patricia M. Harveson; Sean P. Graham; Russell L. Martin

**Session C1: Vegetation and Habitat Management
Room 226**

Moderator: J. Silverio Avila Sanchez

- 3:30 **Hydrologic Controls on Mottled Duck Habitat Sustainability**, Tiffany Lane; Camille Stagg; Michael Osland; Jena Moon; Courtney Hall; Laura Feher; William Jones; Brady Couvillion; Stephen Hartley; William Vervaeke
- 3:45 **Examining the Efficacy of Stock-Piling Topsoils and Seeding for the Restoration of Frac Ponds**, Dustin Golembiewski; Sandra Rideout-Hanzak; Veronica Acosta-Martinéz; David B. Wester
- 4:00 **U.S. Army Corps of Engineers Ecosystem Restoration Projects in Texas**, Danny Allen
- 4:15 **Predictive Mapping of Potentially Listed Rare Plant Species**, Marissa Pensirikul; Hemanta Kafley; Darrel Murray; Heather Mathewson; Kim Taylor
- 4:30 **Nutritional Differences of Pronghorn-Preferred Forage and a Carrying Capacity Estimation between the Marathon and Marfa Grasslands in Trans-Pecos, Texas**, Katherine E. Haile; Jacob C. Locke; Carlos E. Gonzalez; Louis A. Harveson; Shawn S. Gray
- 4:45 **Effective Management Practices for Increasing Native Plant Diversity on Mesquite Savanna-Texas Wintergrass Dominated Rangelands**, Darrel B. Murray; James P. Muir; Michael S. Miller; Devin R. Erxleben

Session D1: New Technologies and Applications

Room 225A

Moderator: Jacob White

- 3:30 **Evaluating Mesquite Canopy Height Using UAVs and Other Geospatial Methodologies**, Michael Page; Victoria Cavazos; Hunter Carroll; Kiri Baca; Dwain Daniels; Humberto Perotto; Alfonso Ortega-S
- 3:45 **Estimating White-Tailed Deer Population Sizes Using Unmanned Aerial Vehicles (UAVs)**, Jesse Exum; Aaron M. Foley; Randy W. DeYoung; David Hewitt; Jeremy Baumgardt; Mickey W. Hellickson
- 4:00 **Evaluating the Practicality of Unmanned Aerial Vehicles for Rabbit Pellet Surveys**, Andrea E. Montalvo; Israel D. Parker; Brian L. Pierce; Ian T. Gates
- 4:15 **Defining Covey Locations and Flight Path Deviation During Aerial Quail Surveys**, Zachary J. Pearson; Leonard A. Brennan; Fidel Hernandez; Humberto L. Perotto-Baldivieso; Andrea Montalvo; David A. DeLaney
- 4:30 **Using NEXRAD to Understand the Biometeorology of Monarch Butterfly Migration**, James D. Ray; Phillip Stepanian; Jeffrey Kelly
- 4:45 **Open**

**Session E1: Amphibian and Reptiles
Room 225E
Moderator: Amanda Beckman**

- 3:30 **Habitat Forecasting for the Western Massasauga: Implications for Current and Future Populations**, Danielle Walkup; A. Michelle Lawing; Wade A. Ryberg; Toby J. Hibbitts
- 3:45 **Microhabitat Selection By Texas Horned Lizards in a Managed Mesquite Savannah**, Jessica M. Heckman; Richard T. Kuzmaier
- 4:00 **Investigating the Connection Between Human, Crocodylian, and Wetland Systems: A Comprehensive Review**, Rebecca Cavalier; Elizabeth Pratt; Christopher Serenari
- 4:15 **An Evaluation of Western Chicken Turtle Survey and Capture Methods**, Brandon Bowers; Danielle Walkup; Toby Hibbitts; Paul Crump; Wade Ryberg
- 4:30 **Open**
- 4:45 **Open**

Session F1: Exotic and Invasive Species

Room 225D

Moderator: Amanda Veals

- 3:30 **Avian and Vegetation Dynamics Following Native-Grassland Restoration**, Geron G. Gowdy; Javier O. Huerta; Ellart J. Vreugdenhil; Brandon J. Palmer; Fidel Hernandez; Eric D. Grahmann; Timothy E. Fubright; Michael W. Hehman; David Wester
- 3:45 **Assessment of Spilled Hoggone® Accessible to Non-Target Species Following Toxic Bait Deployment**, John C. Kinsey; Justin A. Foster; Nathan P. Snow; Jason D. Wishart; Linton D. Staples; Janis K. Bush; Kurt C. VerCauteren
- 4:00 **The Human Dimensions of Wild Pig Management**, Rachael Connally; John M. Tomeček; Maureen G. Frank
- 4:15 **Distance Surveys for Axis Deer and White-tailed Deer on the Edwards Plateau of Central Texas**, Matthew J. Buchholz; Warren C. Conway; Thomas L. Arsuffi; Blake A. Grisham
- 4:30 **Movements and Home Range Sizes of Nilgai Antelope: Implications for Management of Cattle Fever Ticks in South Texas**, Kathryn M. Sliwa; Jeremy A. Baumgardt; Randy W. DeYoung; J. Alfonso Ortega-S.; David G. Hewitt; John A. Goolsby; Adalberto A. Perez de Leon
- 4:45 **Analysis of Space Use By Nilgai Antelope in South Texas Using a Step-Selection Function**, Jeremy A. Baumgardt; Randy W. DeYoung; Kathryn Sliwa; J. Alfonso Ortega-S.; David G. Hewitt; John A. Goolsby; Adalberto Perez de Leon

Saturday, 15 February 2020

Session A3: Avian Ecology and Management 2

Room 227

Moderator: Abraham Woodard

- 8:00 **A Perfect Home: Designing an Effective Artificial Burrow for the Western Burrowing Owl in the Absence of Fossorial Mammals**, Audrey L. Holstead; Sarah J. Turner; Francisco A. Cartaya; David L. Rizzuto; Brian L. Pierce
- 8:15 **Comparative Productivity of American Kestrels in a Nest Box Program and Natural Nests in Lubbock County, Texas**, Jenny R. Harris; Clint W. Boal
- 8:30 **Roosting and Behavioral Patterns of Rio Grande Wild Turkeys in South Texas**, Amanda K. Beckman
- 8:45 **Secondhand Homes: Varying Success of Secondary Cavity Nesting Birds in Relation to a Local Woodpecker**, Faith Hardin
- 9:00 **Home-Range and Habitat Selection of the Greater Roadrunner on the Welder Wildlife Refuge**, Derek R. Malone; Clint W. Boal; Terry L. Blankenship
- 9:15 **Comparative Nesting Habitat of Riparian Raptors in the Trans Pecos Region of Texas**, Caroline Skidmore; Clint Boal; Benjamin Skipper; Russell Martin

Session B2: Big Game Ecology

Room 225C

Moderator: Kory Gann

- 8:00 **Density-Dependent Changes in Adult Sex Ratio in a Roosevelt Elk Population**, Zaavian S. Espinoza; Floyd W. Weckerly
- 8:15 **Mule Deer and Anthropogenic Change: Effects of Agricultural Encroachment on Population Performance**, Levi Heffelfinger; David Hewitt; Shawn Gray; Warren Conway; Timothy Fulbright; Randy DeYoung; Louis Harveson
- 8:30 **Quantity or Quality? Foraging Ecology and Morphology of White-Tailed Deer Across Environmental Gradients**, Seth T. Rankins; Randy W. DeYoung; Aaron M. Foley; Timothy E. Fulbright; J. Alfonso Ortega-S.; David G. Hewitt; Landon R. Schofield; Tyler A. Campbell
- 8:45 **Influence of Agriculture Production and Anthropogenic Structures on Pronghorn Survival in the Texas Panhandle**, Gary L. Mizer; Warren C. Conway; Anthony P. Opatz; Timothy E. Fulbright; Randy W. DeYoung; Humberto L. Perotto-Baldivieso; Shawn S. Gray
- 9:00 **Behavioral Responses of White-Tailed Deer to Heat Stress and the Potential for Interspecific Competition**, Jacob L. Dykes; Randy W. DeYoung; Timothy E. Fulbright; David G. Hewitt; Charles A. DeYoung; J. Alfonso Ortega-S.; Aaron M. Foley; Tyler A. Campbell
- 9:15 **Comparing Release Methods of Desert Bighorn: Survival and Cause-Specific Mortality**, Taylor S. Daily; Carlos E. Gonzalez; Louis A. Harveson; Warren C. Conway; Froylan Hernandez

Session C2: Vertebrate Response to Habitat Management

Room 226

Moderator: Sharon Smythe

- 8:00 **Open**
- 8:15 **Long-Term Effects of Fire Seasonality on a Rolling Plains Small Vertebrate and Herbaceous Plant Community**, Joselyn M. Gutierrez; Richard T. Kazmaier; Matthew W. Poole
- 8:30 **Ungulate Responses to Time Since Burning in a Managed Rolling Plains Landscape**, Erin E. Stiede; Richard T. Kazmaier
- 8:45 **Space Use of Wild Pigs in Relation to Crop Growth Stages in an Agricultural Landscape**, Bethany Friesenhahn; Randy W. DeYoung; Humberto L. Perotto-Baldivieso; Kurt C. VerCauteren; Nathan P. Snow; Justin W. Fischer
- 9:00 **Evaluation of Soil Erosion and Changes in Plant Communities Resulting From Rooting Behavior of Invasive Wild Pigs on the Kerr Wildlife Management Area**, Joshua R. Coward; John C. Kinsey; Ryan S. Luna; Bonnie Warnock; Ryan O'Shaughnessy
- 9:15 **Cattle Grazing Regimes Effects on Pronghorn Forage Production in Trans-Pecos, Texas**, Jacob Locke; Katherine Haile; Carlos Gonzalez; Louis Harveson; Shawn Gray

Session D2: Education
Room 225E
Moderator: Jared Schlottman

- 8:00 **Lessons Learned From a Novel Approach to Enhancing Undergraduate Education: Wildlife Research and Management Mentorship Program**, Thomas S. Janke; Louis A. Harveson; Christopher M. Estepp
- 8:15 **Undergraduate Wildlife Majors' Confidence in Technical, Research and Career Skills**, Steven "Boot" Chumbley; Matti Bradshaw
- 8:30 **Spatial Analysis and Reporting Biases of Texas Roadkills Using Citizen Science**, Reid A. Viegut; David Kulhavy; Christopher M. Schalk; Daniel Unger; I-Kauai Hung; Yanli Zhang
- 8:45 **Closing the Diversity Gap in Wildlife Careers**, Amanda Masino; Kelly Simon; Wenxian Tan
- 9:00 **Open**
- 9:15 **Open**

Session A4: Avian Ecology and Management 3

Room 227

Moderator: John Palarski

- 10:00 **Drivers and Indicators of Riparian Corridor Avifaunal Diversity in the Trans Pecos Region of Texas**, Caroline Skidmore; Clint Boal; Benjamin Skipper; Russell Martin
- 10:15 **Open**
- 10:30 **Integrating Lidar-Derived Canopy Heights Into Models of Golden-Cheeked Warbler Abundance**, James M. Mueller; Steven E. Sesnie; Sarah E. Lehnen
- 10:45 **Effects of Grazing on Grassland Bird Richness and Abundance on a South Texas Working Ranch**, Allison M. Kohler
- 11:00 **Introducing the Borderlands Avian Data Center: A New Tool for Large-Scale Collaborative Bird Conservation**, James Giocomo; Anna Matthews
- 11:15 **Use of Constructed Roosts by Rio Grande Wild Turkeys**, Alison R. Menefee; Humberto L. Perotto-Baldivieso; William P. Kuvlesky, Jr.; Leonard A. Brennan; J. Alfonso Ortega-S.; Joshua P. Vasquez

Session B3: Conservation and Ecology of Mammals 2

Room 225C

Moderator: Christopher Carter

- 10:00 **Herbivore Abundance and Weather Affect Food Supply Early in Plant Growing Season**, Lee Harris Williamson; Floyd W. Weckerly
- 10:15 **Landscape Patterns of Ocelot Vehicle Collision Sites**, AnnMarie Blackburn; C. Jane Anderson; Amanda M. Veals; Michael E. Tewes; David B. Wester; John H. Young, Jr.; Randy W. DeYoung; Humberto L. Perotto-Baldivieso
- 10:30 **Predictive Performance of GPS Telemetry Fix Rates to Inform Ocelot Species Distribution Models**, Jason V. Lombardi; Humberto L. Perotto-Baldivieso; Michael E. Tewes; John P. Leonard; David G. Hewitt; Daniel G. Scognamillo; Tyler A. Campbell
- 10:45 **Functional Responses in Resource Selection By Ocelots in South Texas**, Amanda M. Veals; AnnMarie Blackburn; Michael E. Tewes; Joseph D. Holbrook; Humberto L. Perotto-Baldivieso; C. Jane Anderson; Randy W. DeYoung; Tyler Campbell; John H. Young Jr.
- 11:00 **Influence of Lunar Phase on Movement and Habitat Use of Ocelots and Bobcats**, Maksim Sergejev; Jason Lombardi; Michael Tewes; Tyler Campbell
- 11:15 **Accelerated Growth of Tamaulipan Thornshrub Habitat for Ocelots**, Jose Gerardo Cortez Jr.; Sandra Rideout-Hanzak; David Wester; Michael Tewes; Jonah Evans

Session C3: Occupational Planning and Policy

Room 225E

Moderator: Alexis Salazar

- 10:00 **Determinants of Private Landowner Participation in Endangered Species Conservation: A Comprehensive Review and Analytical Framework**, Jared Messick
- 10:15 **Determinants of Private Landowner Participation in Houston Toad Safe Harbor Agreement**, Jared Messick
- 10:30 **Open**
- 10:45 **A Fin-Fowl Partnership: Coastal Habitat Mapping and the Potential for Collaboration between Fish and Wildlife Biologists**, Zachary Olsen; Emma Clarkson
- 11:00 **Linking Habitat Delivery and Science: A Case Study with the Grassland Restoration Incentive Program**, Derek Shane Wiley; Anna Matthews; James Giocomo; Steven Riley; William Newman; Leah Lowe; Kenneth Gee; Amanda Haverland
- 11:15 **Raccoon Roundworm as an Occupational Hazard to Captive Wildlife and Their Caregivers**, Tiffany Pope; Austin K. Killam; Victoria M. Cavazos; Scott E. Henke; David B. Wester; Humberto L. Perotto-Baldivieso; Clayton D. Hilton

Poster Session I
3:00 PM – 6:30 PM Thursday, 13 February
(Judging: 5:30 – 6:30 PM Thursday, 13 February)
Watergarden
Organizer: Heather Mathewson

1. **Small Mammal Community Dynamics and Ectoparasite Loads in Tamaulipan Thornscrub Habitat**, Alexa S. Aguilar; Cord B. Eversole
2. **Protein Feeder Utilization By Raccoons in the Cienega Mountains, Texas**, Erin E. Bittner; Thomas Janke; Louis Harveson; Joshua Cross
3. **Evaluating Precipitation Effects on Eyeworm and Cecal Worm Prevalence in Quails Throughout the Trans-Pecos Region of Texas**, Rachel E. Bittner; Ryan S. Luna; Ryan O'Shaughnessy; Dale Rollins; Zoe R. Carroll; Trey E. Johnson
4. **Comparative Landscape Analysis of Wildlife Crossing Structures and Vehicle Collision Sites of the Endangered Ocelot**, AnnMarie Blackburn; Amanda M. Veals; Michael E. Tewes; John H. Young, Jr.; Randy W. DeYoung; Humberto L. Perotto-Baldivieso
5. **Comprehensive Study of Parasites of the Texas State Bison Herd**, Sara B. Boggan; Heather Mathewson; Kristin Herrmann; Donald Beard
6. **Comparison of Nutritional Values of Individual Juniper Species in the Trans-Pecos Region of Texas**, Daniel E. Botello; Thomas S. Janke; Louis A. Harveson
7. **Short-Term Movements of Translocated Northern Bobwhite in Central Texas**, Elizabeth Brogan; John Palarski; Heather Mathewson; Bradley Kubečka; Dale Rollins
8. **Monitoring Wildlife Communities within Riparian Areas**, Kathryn L. Burton; Heather A. Mathewson; Darrel Murray
9. **Reintroduction of Northern Bobwhite to the Gus Engeling Wildlife Management Area**, Ricardo Cagigal Perez; Diego Navarro; Kyle T. Hand; Kyle R. Brunson; Jeffrey W. Gunnels; Therese A. Catanach; Michael C. Frisbie; Jason B. Hardin; Robert M. Perez; Brian L. Pierce; Nova J. Silvy
10. **Influence of Ashe Juniper Cover on Essential Habitat Features of Montezuma Quail**, Annalysa Marie Camacho; Kristyn G. Stewart; Fidel Hernández
11. **Recreationist Effect on Bison Movement at a State Park**, Cody B. Carter; Heather A. Mathewson; Daniel Wilcox; Donald Beard
12. **Assessing Pronghorn Movement at Multiple Spatial and Temporal Scales in Agricultural Landscapes in the Texas Panhandle**, Victoria M. Cavazos; Dakota Moberg; Timothy Fullbright; Randy DeYoung; David Hewitt; Warren Conway; Humberto L. Perotto-Baldivieso; Shawn S. Gray

13. **Javelina Visitation and Interspecies Interactions at Protein Feeders in the Santiago Mountains, Texas**, Weston Ray Conine, Thomas S. Janke; Louis A. Harveson
14. **Mesopredator Abundance in Relation to Northern Bobwhite Mortality Density and Nest Sites**, Brandon Consalus; Heather Mathewson; John Palarski
15. **Estimating Abundance of Black Bear and Mountain Lion Using Remote Cameras in the Davis Mountains, Texas**, Jamie L. Cooper; Patricia Moody Harveson; Dana L. Karelus; Louis A. Harveson
16. **Predictive Mapping of Two Potentially Listed Rare Plant Species in Texas**, Jordan P. Craven, BA; Hemanta Kafley; Heather Mathewson; Darrel Murray; Kim Taylor
17. **Changes in Agricultural Land Cover in Texas Panhandle**, Shae Nicole Diehl; Justin P. Wied; Timothy E. Fulbright; Randy W. DeYoung; David Hewitt; Warren Conway; Humberto L. Perotto-Baldivieso; Shawn S. Gray
18. **Comparing Spring Migration Strategies of Northern Pintails Originating From Different Wintering Regions Across North America**, Georgina R. Eccle; Kevin J. Kraai; Daniel P. Collins; J.Dale James; Mitch D. Weegman; Clayton D. Hilton; Bart M. Ballard
19. **Geographic Variation in Golden-Checked Warbler Song Characteristics**, Drew S. Finn; Ashley M. Long
20. **Small Mammal Community Ecology and Ectoparasite Loads in an Arid Region-Riparian Zone**, Brandi Giles; Cord B. Eversole
21. **Analyzing Seedbanks to Determine the Effectiveness of Stock-Piling Topsoil and Native Grass Seeding in Disturbed Areas**, Dustin A. Golembiewski; Sandra Rideout-Hanzak; Anthony D. Falk; Veronica Acosta-Martínez; David B. Wester
22. **Demographics of Nilgai in South Texas**, Megan M. Granger; Clayton D. Hilton; Scott Henke; Warren Conway; Tyler Campbell
23. **Nest Success and Productivity of State Threatened Raptor Species in the Trans Pecos Region of Texas**, Oliva Gray; Caroline Skidmore; Clint W. Boal; Benjamin Skipper; Russel Martin
24. **Insect Availability to Foraging Northern Bobwhites in South Texas**, Tessa Green; Horacio Rodriguez; Nicole J. Traub; Alan M. Fedynich
25. **Fine Scale Assessment of Woody Cover Near Wildlife Crossings for Bobcats on FM 1847**; John Herschberger; Jason V. Lombardi; Michael E. Tewes; John H. Young; Gilberto Hurtado
26. **Hotspotter: A Machine Learning Approach to Identify Ocelots and Bobcats in South Texas**, Autumn M. Hooker; Jason Lombardi; Michael Tewes; Landon Schofield

27. **Influence of Agriculture on the Spatial Genetic Structure of Mule Deer in the Texas Panhandle**, Lindsey Howard; Levi Heffelfinger; Randy DeYoung; David G. Hewitt; Shawn S. Gray; Warren C. Conway; Timothy E. Fulbright; Louis A. Harveson
28. **Effects of Habitat Restoration on Texas Horned Lizards and Their Prey**, Javier O. Huerta; Scott E. Henke; Victoria M. Cavazos; Fidel Hernandez; Geron G. Gowdy; Ellart J. Vreugdenhil; Brandon J. Palmer; Eric D. Grahmann; Tim E. Fulbright; Michael W. Hehman; Randy L. Powell
29. **First Documentation of the Nematode, *Dispharynx nasuta*, in Scaled Quail**, Trey E. Johnson; Joshua G. Cross; Ryan S. Luna
30. **Who Remains After Reservoir Construction? Spatial Use of Mitigation Land By Freshwater Turtles of Northeast Texas**, Cindy K. Jones; Jazmynn Kennebeck; Johanna Delgado-Acevedo
31. **Locating and Assessing Populations of Alligator Snapping Turtles, *Macrochelys temminckii*, with Habitat Analysis in Northeast Texas**, Jazmynn M. Kennebeck
32. **Effects of Water Salinity on Dry Matter Intake By White-Tailed Deer (*Odocoileus virginianus*)**, Austin K. Killam; Clayton D. Hilton; David G. Hewitt; Aaron M. Foley; Natasha L. Bell
33. **Grazing Effects of Bison on Native Plant and Insect Diversity**, Molly M. Koeck; Adam Mitchell; Donald Beard; Heather A. Mathewson
34. **A Multi-Step Approach to Understanding the Effects of Backyard Bird Feeding on the Abundance and Diversity of Birds in San Antonio, Texas**, Amanda M. Lamberson; Jennifer A. Smith
35. **Microtopography Selection for Reseeding Techniques Using UAV in the Chihuahuan Desert, Brewster County, Texas**, Carolina Medina-Nava; Bonnie J. Warnock; Mieke Titulaer; Kevin Urbanczyk
36. **Population Density of Northern Cottonmouth Snakes within Artificial Wetland Complexes**, Sarah J. Morris
37. **Variability in Lesser Prairie-Chicken Egg Morphometrics and Appearance Across a Climate Gradient**, Sophie A. Morris; Clint W. Boal; David A. Haukos; Blake A. Grisham
38. **Determining the Effect of Invasive Vegetation on Small Mammal and Herpetofaunal Communities**, Andrew J. Mullaney; Cord B. Eversole
39. **Analysis of Allelic Variation in the Prion Protein Gene of White-Tailed Deer**, David Navarro; Randy W. DeYoung; Charles A. DeYoung; Don A. Draeger; Julie A. Blanchong; Jim Reecy; Tyler A. Campbell
40. **Intra- and Interspecific Variability in Mercury Concentrations in Texas Bats**, Matthew Parker; Sarah R. Fritts; Sara Weaver; Melissa B. Meierhofer; Jessica Dutton

41. **The Effect of Brush Canopy Coverage on Trap Site Success for Northern Bobwhites**, Micayla Emily Pearson; D. Abraham Woodard; Leonard A. Brennan; David B. Wester; Andrea Montalvo
42. **Are Mississippi Kite Attacks on Urban Pedestrians Associated with Nesting Phenology?**, Mikayla Pryor; Clint Boal; Ben Skipper
43. **Determining the Mineral Status of Free Ranging White-Tailed Deer**, Seth T. Rankins; Randy W. DeYoung; Aaron M. Foley; Timothy E. Fulbright; J. Alfonso Ortega-S.; David G. Hewitt; Landon R. Schofield; Tyler A. Campbell
44. **Assessing the Performance of Terrestrial Lidar and Drone-Based Structure-From-Motion for Modeling Soil Microtopography in a Chihuahuan Desert Grassland Restoration Project**, Noel R. Rodriguez; Carolina Medina-Nava; Bonnie J. Warnock; Kevin M. Urbanczyk
45. **Acceptance of Motion-Activated Sprayer Systems By White-Tailed Deer at Supplemental Feeders**, Erika L. Rodriguez; Kathryn M. Sliwa; Randy W. DeYoung; Jeremy A. Baumgardt; J. Alfonso Ortega-S.; David G. Hewitt; John A. Goolsby; Adalberto A. Perez de Leon
46. **RGWT and the Effect of Parasite Load on Behavior**, Alexis Salazar; Michael L. Morrison; Amanda Beckman; Andrea Montalvo
47. **Changes in Avian Community Composition Following Prescribed Thinning of Pinyon-Juniper Woodlands in New Mexico**, Lucas J. Schilder; Corrie C. Borgman; Robert D. Cox; Clint W. Boal
48. **How Many Locations Are Needed to Determine the Home Range of Ocelots and Bobcats?**, Maksim Sergeev; Michael Tewes; Jason Lombardi; Tyler Campbell
49. **Effectiveness of Wildlife Exits in Reducing Road Mortalities Along a South Texas Highway**, Zarina Sheikh; Kevin Ryer; John Young; Richard Kline
50. **Community Ecology and Habitat Relationships of Medium and Large-Sized Mammals along the U.S.-Mexico Border**, Elwynn G. Sherman II; Cord B. Eversole;
51. **Assessing Winter Survival of Scaled Quail in the Rolling Plains of Texas**, Manuel Silva; Charlotte Wilson; Sarah R. Fritts; Brad C. Dabbert; John W. McLaughlin; Blake A. Grisham
52. **Cataloging and Population Trends of Birds on East Foundation Ranches: An Analysis of Ten Years of Data**, Delanie Slifka; Leonard Brennan; April A. Conkey; Tyler Campbell; Nathan Young; Jason Loughry
53. **Can Nilgai Be Trained to Consume Medicated Feed to Treat Cattle Fever Tick Infestations?**, Kathryn M. Sliwa; Jeremy A. Baumgardt; Randy W. DeYoung; J. Alfonso Ortega-S.; David G. Hewitt; John A. Goolsby; Adalberto A. Perez de Leon
54. **Bat Population Abundance, Inhabitation and Identification of White-Nose Syndrome in East Texas**, Belem Soto

55. **The Use of Organic Herbicide and Prescribed Fire to Re-Introduce and Restore Native Plants in Blackland Prairie Wetlands**, Brandi A. Stalder
56. **Avian Communities Respond to Restoration Treatments in East Texas Pine Forests**, Eamonn A. Thurmond; Daniel Saenz; Jeffery Reid; Kathryn R. Kidd; Cory Adams; James Childress; Connor S. Adams
57. **A Comparison of Benthic Invertebrate Composition Between Ephemeral Pools and Permanent Pools Along Upper Leon Creek**, Alexander T. Toder; Jeffrey T. Hutchinson
58. **Deep Convolutional Neural Networks Land Cover Classification for Wildlife Habitat in South Texas**, Taylor Trafford, Michael Page; Humberto L. Perotto-Baldivieso
59. **Helminths Within Two Sympatric Game-Bird Hosts in South Texas**, Nicole J. Traub; Taylor R. Shirley; Alan M. Fedynich
60. **Roosting Habitat for Rio Grande Wild Turkeys During Breeding Season**, Joshua P. Vasquez; Michael T. Page; Darrion M. Crowley; William P. Kuvlesky; J. Alfonso Ortega-S; Leonard A. Brennan; Humberto L. Perotto-Baldivieso
61. **Habitat Selection and Nest Success Response of Lesser Prairie-Chicken to Various Prescribed Burning and Grazing Treatments**, Michael D. Whitson; Blake A. Grisham; Christian A. Hagen; Warren C. Conway; David A. Haukos; Carlos Villalobos
62. **Microbiomes Across Body Sites in Desert Bighorn Sheep and Aoudad in Texas**, Rachael C. Wiedmeier; Emily A. Wright; Bob Dittmar; Robert D. Bradley; Warren C. Conway; Caleb D. Phillips
63. **Spatio-Temporal Dynamics, Habitat Use, and Survival of Desert Bighorn Sheep, Mule Deer, and Aoudad**, Daniel C. Wilcox; Carlos E. Gonzalez-Gonzalez; Louis A. Harveson; Dana Karelus; Froylan Hernandez; Shawn Gray
64. **Nest Site Selection By Scaled Quail Hens in Potter County, Texas**, Charlotte D. Wilson; Manuel Silva; Blake A. Grisham; Brad C. Dabbert; John W. McLaughlin; Sarah R. Fritts
65. **Use of DNA From Museum Specimens and Trophy Mounts to Reconstruct the Genetic Profile of Texas Bighorn Sheep**, Emily A. Wright; Rachael C. Wiedmeier; Froylan Hernandez; Caleb D. Phillips; Robert D. Bradley; Warren C. Conway

Poster Session II
5:00 PM – 10:00 PM Friday, 14 February
8:00 AM – 11:30 AM Saturday, 15 February)
Watergarden

Organizers: Blake Grisham, Andrea Montalvo, Landon Schofield

1. **Estimates of Latency to Initial Detection for Mammalian Species in Upland Mixed Pine-Hardwood Forests in Eastern Texas**, John G. Barnett; Daniel G. Scognamillo; Christopher M. Schalk
2. **A Policy Analysis of the Endangered Species Act**, Kendall Beggs; Daniel Scognamillo; Yuhui Weng; Gary Kronrad
3. **Detecting Helminth Eggs in a Gallinaceous Bird: Fecal Versus Cecal Droppings**, Kristin Bondo; Mike Whitson; Clint Boal; Markus Peterson; Brad Simpson; Christian Hagen; Blake A. Grisham
4. **Conspecific Brood Parasitism in Black-Bellied Whistling-Ducks (*Dendrocygna autumnalis*)**, Matti Bradshaw; Bart Ballard; Vijayan Sundararaj; Steven Chumbley; Phillip Lavretsky; J. Dale James
5. **The Effects of Feeder Density on White-Tailed Deer Dominance Hierarchies**, Colton Campbell
6. **Native and Exotic Ungulate Species at Feed Sites**, Taylor N. Cramer; Kathryn M. Sliwa; Jeremy A. Baumgardt; Randy W. DeYoung; J. Alfonso Ortega; David G. Hewitt; John A. Goolsby; Adalberto A. Pérez De León
7. **Impacts of Changes in Land Cover on Population Trends of High Conservation Priority Bird Species Within the Gulf Coast Joint Venture Region**, Stephen J. DeMaso; Joseph P. Sands; Leonard A. Brennan; William G. Vermillion
8. **Economic Model of Nature-Focused Photography in Texas**, Linden S. Eli; David Hewitt; Benjamin Turner; April Conkey; Bart Ballard
9. **The Delineation of Two Subspecies, the Desert Massasauga and the Prairie Massasauga: A Problem That Must Be Addressed**, Corey Fielder; Danielle Walkup; Toby Hibbitts; Michelle Lawing; John Jacisin; Andrew DeWoody; Rian Bylsma; Leland Pierce; Paul Crump; Brandon Bowers; Wade Ryberg
10. **Ways to Age Nilgai Antelope**, Carly A. Folsom; Jeremy Baumgardt; Randy W. DeYoung; John A. Goolsby; Adalberto Perez de Leon
11. **Effectiveness of Landscape Enhancements in Attracting Beneficial Birds to Agroecosystems**, Melissa Hannay; Sarah Groendyk; Olivia Utley; Catherine Lindell
12. **International Assessment of State-Level Grassland Conservation Programs to Support Full Annual Cycle Grassland Bird Conservation**, Amanda A. Haverland; James Giocomo

13. **Determining Texas Horned Lizard Snout-to-Vent Length From Their Scat**, Javier O. Huerta; Scott E. Henke; David B. Wester; Randy L. Powell
14. **The Effects of Social Behavior on Supplemental Feed Use By Free-Ranging White-Tailed Deer in Central Texas**, Susanna L. Husbands; Jeff Breeden
15. **Determining Presence of a Secretive Lizard and Factors Affecting Detection of Desert Grassland Lacterrillians**, Charles Blake Jacobi; Gad Perry; Robert D. Cox; Samantha S. Kahl
16. **Antler Growth and Anomalies Observed in Captive White-Tailed Deer (*Odocoileus virginianus*)**, Austin K. Killam; Clayton D. Hilton; David G. Hewitt
17. **An Overview and Use of Species Status Assessments in Endangered Species Management and Population Viability**, Stephanie G. Martinez, M.Sc.; Michael E. Marshall, M.Sc.
18. **Austin Urban Coyote Study: Preliminary Investigations**, Devaun Anderson; Natalia Cox; Amanda Masino; Wenxian Tan
19. **Questions About Birds From the General Public: A Case Study About Participation in a Live Radio Show**, Taylor E. Massey; Clifford E. Shackelford; William A. Beckett
20. **Quantifying Wild Pig Damage at Different Crop Growth Stages with Remote Sensing Techniques**, Lori D. Massey; Bethany Friesenhahn; Randy W. DeYoung; Humberto L. Perotto-Baldivieso; Justin Fischer; Nathan P. Snow; Kurt C. VerCauteren
21. **The Efficacy of Karst Invertebrate Monitoring Using Camera Trap Technology**, James E. Peterson; Tomás Dwarica; Mathew Kramm; Rustin Tabor; Brian L. Pierce; Roel R. Lopez
22. **Effect of Prescribed Fire on the Viability of *Baylisascaris procyonis* Eggs**, Tiffany Pope; Scott E. Henke; David B. Wester; Sandra Rideout-Hanzak; Clayton D. Hilton
23. **Land Use and Land Cover Classification with Change Detection Analysis of Chitwan National Park, Nepal Using Remote Sensing and GIS**, Ritika Prasai; Hemanta Kafley; Heather Mathewson
24. **Searching for a Needle in a Haystack: Using Computer Algorithms to Detect Reintroduced Louisiana Pinesnakes Captured With Camera Traps**, Wade A. Ryberg; Danielle K. Walkup; Emlyn B. Smith; Josh B. Pierce; James Childress; Forrest East; Corey Fielder; Price Brown; Brian L. Pierce; Toby J. Hibbitts
25. **Documentation of Alternate Reproductive Strategies and Rare Behaviors of the Black-Crested Titmouse in Hays County, Texas**, Rebekah J. Rylander; Sarah R. Fritts
26. **Conquering a Prolific Invader- Optimal Herbicide Rates for Controlling Chinese Tallow**, Colt Sanspree; Andrew Stetter

27. **Effects of Non-Native King Ranch Bluestem on Small Mammal Occurrence at Small Blackland Prairies in Southeastern Texas**, Richard R. Schaefer; J. Howard Williamson; Josh B. Pierce
28. **Native Seed Viability and Cover Crop Considerations for Rangeland Restoration**, Brianna M. Slothower; Anthony D. Falk; Sandra Rideout-Hanzak; Veronica Acosta-Martinez; David B. Wester
29. **Analysis of Breeding Mottled Duck Population Survey in Texas and Louisiana**, Vijayan Sundararaj; Kathy Fleming; Dan Collins; Bart Ballard
30. **The Effects of Precipitation on Red-Cockaded Woodpecker Fledgling Success on the Kistachie National Forest in Louisiana**, Christoph W. Tomford; Daniel Scognamillo; Daniel Saenz; Robert Allen; Yuhui Weng
31. **Circuit Theory to Estimate Road Crossings for the Endangered Ocelot**, Amanda M. Veals; AnnMarie Blackburn; Michael E. Tewes; Joseph D. Holbrook; Humberto L. Perotto-Baldivieso; Randy W. DeYoung; Tyler Campbell; John H. Young Jr.
32. **Out in the Open: Habitat Use, Movements, and Home Ranges in the Spot-Tailed Earless Lizards**, Danielle K. Walkup; Wade A. Ryberg; Jarret Kachel; Connor Adams; Shelby Frizzell; Timothy Johnson; Dalton Neuharth; Toby J. Hibbitts
33. **Genetic Approaches Improve Our Understanding of Bat-Wind Turbine Impacts**, Austin Chipps; Amanda Hale; Sara Weaver; Dean Williams
34. **Can Wildlife Water Developments Increase Viewing Opportunities of Wildlife?**, James D. Whittle; Randy T. Larsen; Jericho C. Whiting; Steven B. Bates
35. **Spatial Analysis of Bobwhite Hunting Dynamics**, D. Abraham Woodard; Leonard A. Brennan; Fidel Hernández; Humberto L. Perotto-Baldivieso; Neal Wilkins
36. **Effects of Prescribed Fire on Butterfly Populations in Coastal South Texas**, Rebecca Zerlin; Silverio Avila-Sanchez; Sandra Rideout-Hanzak; David B. Wester; Tyler Campbell

**Cottam Awards Competition
Henry Garrett Ballroom**

9:20: Identifying Landscape Predictors of Ocelot Road Mortality to Support Mitigation

GRETA SCHMIDT, San Diego State University, San Diego, CA, USA

REBECCA LEWISON, San Diego State University, San Diego, CA, USA

HILARY SWARTS, U.S. Fish & Wildlife Service, Los Fresnos, TX, USA

ABSTRACT For depleted wildlife populations, understanding and effectively mitigating the direct and indirect impacts of roads can be a key component of recovery efforts. The ocelot (*Leopardus pardalis*) is a federally endangered wild felid at risk of local extinction in south Texas, where vehicle collisions are the largest known source of mortality. To support road mortality mitigation, we used presence-only species distribution models to quantify road mortality risk using a 35-year wild felid road mortality dataset. We also asked whether a sympatric carnivore, the bobcat (*Lynx rufus*), could serve as a surrogate to inform ocelot road mortality risk. Areas where core ocelot habitat intersected roadways represented the greatest mortality risk, reflecting ocelot reliance on intact habitat and avoidance of degraded and fragmented landscapes. Bobcat road mortality risk had similar relationships to landscape features. Nearly all areas classified as high-risk for ocelots were also identified as high-risk for bobcats, although more of the road network was predicted high-risk for bobcats. Our analyses suggest that bobcats, with appropriate data filters in place, are an acceptable surrogate for informing ocelot road mortality, particularly for time-sensitive conservation decision-making. Our findings suggest that because ocelot road mortality in south Texas is spatially concentrated, this source of mortality could be reduced with wildlife crossing structures, signage, and speed limit reduction in focused areas where roads and intact ocelot habitat intersect.

9:40: Season of Burn Effects on Composition of Forage Standing Crop in Gulf Cordgrass Communities

J. SILVERIO AVILA SANCHEZ, Texas A&M University-Kingsville, Kingsville, TX, USA

VICTORIA L. HAYNES, Texas Parks and Wildlife, Port O'Connor, TX, USA

SANDRA RIDEOUT-HANZAK, Texas A&M University-Kingsville, Kingsville, TX, USA

DAVID B. WESTER, Texas A&M University-Kingsville, Kingsville, TX, USA

J. ALFONSO ORTEGA-S, Texas A&M University-Kingsville, Kingsville, TX, USA

TYLER A. CAMPBELL, East Foundation, San Antonio, TX, USA

ABSTRACT Gulf cordgrass (*Spartina spartinae* [Trin.] Merr. ex Hitchc.) is a native and productive perennial bunchgrass that has potential to provide valuable forage for livestock and wildlife when managed well. When left unmanaged, Gulf cordgrass grows coarse and unpalatable, becoming highly competitive and creating almost pure monocultures. Fire removes old growth releasing competitive pressure and allowing other plant species to flourish; it also rejuvenates aged Gulf cordgrass and promotes production of tender, palatable shoots. We applied prescribed burning during winter (January-February) and summer (July-August) 2016 and 2017, with the objective of determining the optimal season of burning to enhance forage and habitat for both cattle and wildlife in Gulf cordgrass communities. We collected forage standing crop (FSC) by species at pre-burn, and 45 and 90 days after burning (DAB). We then combined species into functional groups to compare relative abundance of FSC by functional group. A permutational multivariate analysis of variance showed no difference between winter and summer burning in FSC composition by functional group for the first 90 days after burning. Regardless of season, as relative abundance of the native warm season grass group (Gulf cordgrass dominated) decreased after burning, native warm season forbs and subshrubs increased. By 405 DAB during winter functional group composition was similar to non-burned patches, while summer patches remained different up to 470 DAB. Both seasons of burn changed functional group composition and provided lush, nutritious Gulf cordgrass and important browse plants for both cattle and wildlife.

10:00: Co-Occurrence of Bobcats, Coyotes, and Ocelots in Texas

JASON V. LOMBARDI, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

DARRYL I. MACKENZIE, Proteus, Outram, NZ

MICHAEL E. TEWES, 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, TX, USA

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

TYLER A. CAMPBELL, East Foundation, San Antonio, TX, USA

ABSTRACT Interspecific competition among carnivores has been linked to differences in behavior, morphology and resource use. Insights into these interactions can enhance understanding of local ecological processes that can have impacts on the recovery of endangered species. Ocelots (*Leopardus pardalis*), bobcats (*Lynx rufus*), and coyotes (*Canis latrans*) share a small range overlap from South Texas to south-central Mexico but relationships among the three are not known. From May 2011 to March 2018, we conducted a camera-trap study to examine co-occurrence patterns among ocelots, bobcats, and coyotes on the East Foundation's El Sauz Ranch in South Texas. We applied a novel multi-season extension to multi-species occupancy models with three interacting species to identify interspecific interactions and examine potential resource partitioning within this carnivore community. We found strong evidence of seasonal mutual coexistence among these species and observed species-specific seasonal trends in detection. Seasonal coexistence patterns were also explained by increasing distance from a high-speed roadway. We were unable to find evidence of resource partitioning, which may indicate the niches of these species may be too discrete for interspecific competition. This study suggests a coexistence among ocelots, bobcats, and coyotes on South Texas rangelands. These results have important ecological implications for planning strategies to benefit ocelot recovery in the region. Further research would provide a better understanding of the ecological mechanisms that facilitate coexistence within this community. As road networks in the region expand overtime, large private working ranches will be needed to provide important habitat for ocelots and other carnivore species.

10:20: Landscape Connectivity for Lesser Prairie-Chickens on the Southern High Plains of Texas and New Mexico

LUCAS J. SCHILDER, Texas Tech University, Lubbock, TX, USA

LUCAS J. HEINTZMAN, Texas Tech University, Lubbock, TX, USA

NANCY E. MCINTYRE, Texas Tech University, Lubbock, TX, USA

SAMUEL HARRYMAN, Texas Parks and Wildlife Department, Lubbock, TX, USA

CHRISTIAN A. HAGEN, Oregon State University, Corvallis, OR, USA

RUSSELL MARTIN, Texas Parks and Wildlife Department, Midland, TX, USA

CLINT W. BOAL, U.S. Geological Survey Texas Cooperative Fish and Wildlife Research Unit,
Lubbock, TX, USA

BLAKE A. GRISHAM, Texas Tech University, Lubbock, TX, USA

ABSTRACT Lesser prairie-chicken (*Tympanuchus pallidicinctus*; LEPC) habitat is currently a juxtaposition of grassland patches interspersed within large sections of row-crop agriculture and energy development on the Southern High Plains (SHP). Fragmentation has isolated contiguous habitat, suggesting that dispersal through this heterogeneous landscape may be constrained within a patch network. The objective of this study was to understand how structural and functional connectivity for LEPCs on the SHP was potentially altered by landscape conversion that created a patch network. We used graph theory to quantify structural landscape connectivity of leks (breeding display grounds) for LEPCs on the SHP. Our results suggest that there was a 41.9 km coalescence distance of this network; a suite of other connectivity metrics indicated a high degree of clustering among leks ($n = 1,087$). Three leks were identified as cutpoints within the network, meaning if they were fragmented or abandoned, birds near the remaining leks may become isolated. Other results identified several leks that were important for maintaining overall population connectivity for LEPCs on the SHP. We used circuit theory to quantify functional landscape connectivity and model potential movement through the landscape. Our modeled scenario without Conservation Reserve Program lands showed a mean increase in effective resistance (417%) along least-cost paths when compared to our base model. Wind energy development constrained pathways to the north and south of the main lek core; mean effective resistance along least-cost paths increased 349% as a consequence of the presence of turbines built or in the permitting process.

10:40: Forage Standing Crop Estimation from Unmanned Aerial Vehicles in Semi-Arid Rangelands

ALEXANDRIA M. DIMAGGIO, 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
CHASE WALTHER, Texas A&M University-Kingsville, Kingsville, TX, USA
KARELYS N. LABRADOR-RODRIGUEZ, Texas A&M University-Kingsville, Kingsville, TX, USA

MICHAEL T. PAGE, Texas A&M University-Kingsville, Kingsville, TX, USA
JOSE DE LA LUZ MARTINEZ, Natural Resources Conservation Service, Kingsville, TX, USA
SANDRA RIDEOUT-HANZAK, Texas A&M University-Kingsville, Kingsville, TX, USA
BRENT C. HEDQUIST, Texas A&M University-Kingsville, Kingsville, TX, USA
DAVID B. WESTER, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT The application of Unmanned Aerial Vehicles (UAVs) in the monitoring and management of rangelands has exponentially increased in recent years due to the miniaturization of sensors, ability to capture imagery with high spatial resolution, lower altitude platforms, and the ease of flying UAVs in remote environments. The aim of this research was to develop a method to estimate forage standing crop in rangelands using high-resolution imagery derived from the UAV. The specific objectives of this research were to (1) evaluate the feasibility of quantifying forage standing crop in semi-arid rangelands using a double sampling technique with high-resolution imagery and (2) determine altitude for optimal pixel resolution for estimation precision. Orthoimagery and digital surface models (DSM) with a resolution <1.5 cm were acquired with an UAV at altitudes of 30, 40, and 50 meters above ground level (AGL) in Duval County, Texas. Field forage standing crop data were regressed on volumes obtained from DSM. Our results show that volumes estimated with UAV data and forage standing crop as measured in the field have a significant relationship at all flight altitudes with best results at 30-m and 50-m, AGL linear models for these 2 flights were not different. Our study showed that UAV platforms can be potentially used to estimate forage standing crop with similar accuracy to traditional sampling methods. Furthermore, the use of UAVs would allow one to collect a large number of samples using a non-destructive and inexpensive method to estimate available forage for both cattle and wildlife.

11:00: Montezuma Quail Populations Are Losing Future Adaptive Potential Due to Ongoing Genomic Erosion

SAMARTH MATHUR, Purdue University, West Lafayette, IN, USA

JAMES ANDREW DEWOODY, Purdue University, West Lafayette, IN, USA

ABSTRACT Population extirpations are often precursors to species extinctions and thus successful conservation strategies require a thorough understanding of the biological factors that affect population dynamics and sustainability of a species. Montezuma quail (*Cyrtonyx montezumae*) populations in Texas are geographically isolated and considered Vulnerable to extirpation due to recent population declines associated with habitat degradation and fragmentation. Our initial genetic assessment of different Montezuma quail populations within the U.S. (Arizona, Texas, New Mexico) indicated that isolated Davis Mountains birds exhibit signs of genetic erosion, including small effective population size and reduced heterozygosity at fitness-related genes. We have subsequently leveraged whole genome sequences from multiple individuals from each population to further assess the pervasive effects of ongoing genomic erosion. Our results indicate that combined effects of genetic drift, local adaptation, and inbreeding in Texas birds have significantly reduced their nucleotide diversity across their entire genome. These results are worrying as genetic diversity is generally required for long-term population persistence. Our future work will implement forward simulations to determine whether efforts like periodic translocations (genetic rescue) would improve the overall adaptive potential of these small isolated peripheral populations. Ultimately, our population genomics studies of Montezuma quail should yield insights to help wildlife managers conserve this species in Texas and elsewhere.

11:20: Behavior and Dispersal Characteristics of a Large, Unharassed Coyote Population

JUSTIN T. FRENCH, Texas A&M University, College Station, TX, USA

HSIAO-HSUAN "ROSE" WANG, Texas A&M University, College Station, TX, USA

WILLIAM E. GRANT, Texas A&M University, College Station, TX, USA

NOVA J. SILVY, Texas A&M University, College Station, TX, USA

TYLER A. CAMPBELL, East Foundation, San Antonio, TX, USA

JOHN M. TOMEČEK, Texas A&M University, College Station, TX, USA

ABSTRACT Human-carnivore conflict is one of the oldest applied ecological problems in the history of human civilization, yet effective management of carnivore issues remains elusive to this day. This disparity is the result of a vague understanding of the complex social behaviors of carnivores and how these behaviors influence their population dynamics. Recent technological, analytical, and theoretical advances provide an opportunity to quantify and explain carnivore behavior objectively, without *ad hoc* assumptions. We studied an unharassed, high-density coyote population to evaluate competing binary and trinary characterizations of territoriality and examine the dynamic nature of territorial status using hidden Markov models. We evaluated whether coyotes exhibited 2 (resident-transient) or 3 (resident-transient-biding) behavior modes, the effects of sex, body mass, and time of year on the probability of transitioning between behaviors, and the temporal variation in non-resident range sizes. We found definitive support for a resident-transient-biding paradigm of coyote behavior. The dispersal process was not influenced by sex, body mass, or time of year. However, ranges of both transient and biding coyotes were largest in winter and smallest in summer. Transient ranges were approximately 10 times the size of bidders, regardless of time of year. Our results provide a sound basis for modeling social carnivore population dynamics, leading to testable hypotheses about the influence of management efforts. For example, our results suggest that commonly used, non-selective, lethal management techniques are unlikely to achieve population reduction goals due to compensatory immigration.

GENERAL SESSIONS

Friday, February 14, 2020

A1
Ecology and Management of Quail
Room 225C

3:30: Translocation of Northern Bobwhite in Central Texas

JOHN PALARSKI, Tarleton State University, Stephenville, TX, USA

HEATHER MATHEWSON, Tarleton State University, Stephenville, TX, USA

BRADLEY W. KUBEČKA, Tall Timbers Research Station and Land Conservancy, Tallahassee, FL, USA

T. WAYNE SCHWERTNER, Tarleton State University, Stephenville, TX, USA

DALE ROLLINS, Rolling Plains Quail Research Foundation, Roby, TX, USA

ABSTRACT Translocation is the intentional movement of a living organism from one area to another. It is frequently used to either *introduce* individuals to areas outside its native range, *reintroduce* individuals to parts of its native range from which they became extirpated, or *re-stock* individuals to rescue an existing population. Translocation has been used successfully to accomplish introduction, reintroduction, and re-stock many different species of game birds. Despite numerous success stories, the effects of source population in game bird translocation is not well understood. We translocated 167 bobwhites from west ($n = 64$) and south ($n = 103$) Texas to a 1,100 ha site in central Texas during March 2019 to better understand the impacts of source population. We radiomarked 111 individuals ($n = 55$ south Texas, $n = 56$ west Texas) to monitor survival, dispersal, and reproduction. Cumulative survival for spring/summer was similar for south Texas ($\hat{S} = 0.046$) and west Texas ($\hat{S} = 0.049$) individuals. Most of the mortality (58%) occurred in the first 30 days post-release. We observed 17 individuals disperse off site (minimum known dispersal = 1.6 km) and we located 9 nests ($n = 5$ west Texas, $n = 4$ south Texas). We will translocate individuals from west and south Texas again during 2020. Findings from this study will inform managers who wish to translocate bobwhite on the effects of source population.

3:45: Effects of Source Population and Release Strategy on Translocated Scaled Quail Reproduction

REBEKAH RUZICKA, Rolling Plains Quail Research Foundation, Roby, TX, USA

PAUL F. DOHERTY, Colorado State University, Fort Collins, CO, USA

DALE ROLLINS, Rolling Plains Quail Research Foundation, Roby, TX, USA

ABSTRACT Recent research has focused on translocation as a means to reestablish populations of scaled quail (*Callipepla squamata*). Initial reproductive success post-translocation is critical for establishment in short-lived species such as quail. Yet factors influencing reproductive success are poorly understood. We evaluated the effect of source population and variation in delayed release strategy (1-9 weeks) on nest initiation and nest survival of wild-caught, translocated scaled quail. We trapped and translocated scaled quail over two years (2016-2017) from source populations in the Edwards Plateau and Rolling Plains ecoregions to a large contiguous (>40,000 HA) release site in Knox County, Texas. We used a multi-state mark-recapture model with state uncertainty to test for effects of release treatment, source population, age, release location, and year on nest initiation and

survival. We found no effect of release strategy or source population on nest initiation or survival. Juveniles were more likely than adults to initiate nests and the probability of re-nesting was lower during the year with drought conditions. Future reintroduction efforts may benefit from prioritizing translocation of juveniles and conducting translocations when drought conditions are not forecasted.

4:00: Population Dynamic Modeling and Effects of Harvest on Mearn's Quail

TREY E. JOHNSON, Borderlands Research Institute, Alpine, TX, USA

CARLOS E. GONZALEZ, Borderlands Research Institute, Alpine, TX, USA

RYAN S. LUNA, Borderlands Research Institute, Alpine, TX, USA

ABSTRACT Mearn's quail (*Cyrtonyx montezumae*) are one of six species of quail found in the United States. Like other quail species, their populations exhibit boom and bust cycles. Aside from the cyclic pattern of quail populations, species like northern bobwhites and scaled quail have experienced a decline in numbers and distribution. Some suggest factors such as disease, weather patterns, and increase of predators are possible reasons for the decline in populations. Currently, there is little information on the population trends of this species but it is assumed that they have experienced declines similar to those of other quail species in the southwestern United States. The goals of this project were to help identify areas of importance in regards to Mearn's quail population dynamics ecology and the effects of harvest through the use of system dynamics compartmental modeling and sensitivity analysis in order to help fill gaps in knowledge of the species. To do this, program STELLA Architect was used to model Mearn's quail population dynamics and the potential effects of harvest on hypothetical populations of 100, 1,000, and 10,000 individuals. Based on the information provided by this model, small populations may not be self-sustainable. Preliminary results outline the importance estimating reliable Mearn's quail population sizes as well as the need for a better understanding of their basic population ecology.

4:15: Implementing and Evaluating a Sustainable Bobwhite Harvest Prescription

D. ABRAHAM WOODARD, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA

LEONARD A. 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 L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, USA

NEAL WILKINS, East Foundation, San Antonio, TX, USA

ABSTRACT The current harvest rate recommendations for northern bobwhites (*Colinus virginianus*) in South Texas is a 20% harvest (including crippled individuals) of the autumn population. This harvest rate is based on simulations of demographic data, but still requires thorough empirical testing. The goal of this project is to implement a 20% harvest and compare temporal trends between hunted and non-hunted populations. This study is taking place on East Foundation properties in Jim Hogg County. We have designated a hunted (6,118 hectares) and a non-hunted (4,376 hectares) area. These sites are 12 miles apart and comprised of similar soils, vegetation, grazing pressure, and pre-harvest bobwhite densities in 2017 and 2018. Bobwhite density estimates

are obtained on both areas in November, mid-December, late-January, and March using line-transect distance sampling from a helicopter platform. The 20% harvest quota for 2018-2019 hunting season was 422 bobwhites. Hunting cooperators reached this quota after 59 half-day hunts. Surveys on both sites indicated an initial population increases in December, followed by declining trends through March. Resulting spring densities were 0.156 ± 0.02 quail per acre on hunted area and 0.158 ± 0.02 quail per acre on non-hunted area.

4:30: Comparative Habitat Use of Montezuma Quail in Texas

KRISTYN G. STEWART, Caesar Kleberg Wildlife Research Institute, Department of Range and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

FIDEL HERNÁNDEZ, Caesar Kleberg Wildlife Research Institute, Department of Range and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

ERIC D. GRAHMANN, Caesar Kleberg Wildlife Research Institute, Department of Range and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

LEONARD A. BRENNAN, Caesar Kleberg Wildlife Research Institute, Department of Range and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute, Department of Range and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

ROBERT PEREZ, Caesar Kleberg Wildlife Research Institute, Department of Range and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Montezuma quail (*Cyrtonyx montezumae*) are a secretive and understudied bird inhabiting the southwestern United States (Texas, Arizona, and New Mexico), and populations declined during the past century. The two populations of Montezuma quail found in Texas occupy the Edwards Plateau and the Trans-Pecos Mountains and Basins ecoregions. Both ecoregions have unique characteristics defining Montezuma quail habitat; however, both the Edwards Plateau and Trans-Pecos possess a species of juniper, Ashe juniper (*Juniperus ashei*) and alligator juniper (*Juniperus dappena*) among others, respectively. In the Edwards Plateau, Ashe juniper has encroached over the past century and has created large expanses of closed-canopy woodlands that replaced historic oak-savanna grasslands essential to Montezuma quail. In contrast, alligator juniper occurs in portions of the geographic distribution of Montezuma quail where the species appears to thrive. Our objectives are to determine the bounds of habitat suitability for both juniper species (density, percent cover, and height) and other vegetation characteristics at the micro- (16-m radius) and macro- (350-m radius) scale in their respective ecoregions. Preliminary analysis at the micro-scale indicate that Montezuma quail select for areas with $\leq 20\%$ cover of Ashe juniper but $\geq 12\%$ cover of alligator juniper. We documented similar trends for juniper density and height, where Montezuma quail selected for lower values of Ashe juniper but increasing values of alligator juniper. These findings will allow land managers and biologists to define Montezuma habitat and prescribe practices that will aid the habitat management of the species.

4:45: Effects of Predator Reduction on Northern Bobwhite Nest Success and Chick Survival in the Rolling Plains of Texas

KELTON MOTE, Texas Tech University, Lubbock, TX, USA

BRAD DABBERT, Texas Tech University, Lubbock, TX, USA

WARREN CONWAY, Texas Tech University, Lubbock, TX, USA

BLAKE A. GRISHAM, Texas Tech University, Lubbock, TX, USA

ABSTRACT Predation as the leading cause of nest failure of northern bobwhites (*Colinus virginianus*) has a long line of documentation. However as of late, it has evolved into a greater concern due to declines in quail populations. Our study aims to test the hypothesis that predator management can increase quail populations in the Rolling Plains of Texas. In order to measure the effects of mammalian predator reduction on northern bobwhites, our study aims to observe nest success and chick survival. Our study is being conducted at the 6666 Ranch in Guthrie, Texas from January to August during the years of 2018 and 2019. Our study site consists of two treatment units totaling 1,214 hectares and two control units also totaling 1,214 hectares. We define nest success as having hatched at least one chick, while chick survival is monitored by suturing radio-transmitters onto the backs of 9 to 12 day old chicks. In 2018 we observed 43 nesting attempts and attached 21 chicks with radio transmitters while in 2019 we observed 24 nests and sutured 19 chicks. Our predator reduction unit experienced a 10% and 6% increase in nest success in 2018 and 2019, respectively, as compared to our control units. In 2019 chick survival to six weeks of age saw a 21% increase in our treatment unit as compared to the control until. We believe our study provides evidence that predator reduction can help augment northern bobwhite populations in the rolling plains of Texas.

A2
Avian Ecology and Management 1
Room 225B

3:30: A Model of Shorebird Foraging Habitat in the Laguna Madre

MIKAYLA M. HOUSE, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
BART M. BALLARD, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
SELMA N. GLASSCOCK, Welder Wildlife Foundation, Sinton, TX, USA
MITCHELL D. WEEGMAN, University of Missouri, Columbia, MO, USA
HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute,
Kingsville, TX, USA

ABSTRACT The Laguna Madre is likely one of the most important stopover sites for migrating shorebirds in the western hemisphere. Thus, understanding potential impacts to habitats by recent and proposed development is critical for making informed conservation decisions. We are developing a model to estimate the temporal and spatial availability of shorebird foraging habitat in the Laguna Madre during spring migration. Important variables in the model include benthic habitat type, benthic elevation, tide gauge readings, wind speed, wind direction, wind duration, and barometric pressure. We are halfway through an accuracy assessment of the Texas benthic habitat dataset and a digitized seagrass dataset that will delineate benthic habitat types throughout the Laguna Madre. So far, we have found an overall 72% agreement between benthic habitat type identified by the spatial dataset and verified points. Benthic elevation will be compiled from existing bathymetry, LIDAR imagery, and collected elevation data. We will estimate water depth by modeling the movement of the waterline over the lagoon bottom as it relates to tide and weather data. Surface water extractions from satellite imagery and verified by ground-truthing will be used to identify the location of the waterline during different weather conditions. The completed model will delineate potential foraging habitat throughout the Laguna Madre, and will examine the fine-scale spatio-temporal availability of shorebird foraging habitat at specific study sites. This model will allow managers to prioritize areas for conservation and inform them of the potential environmental impacts to shorebirds from future development in and around the Laguna Madre.

3:45: Converting Bermudagrass Pastures Into Native Grasslands to Benefit Bobwhite Quail in the Coastal Plains Ecoregion

ANTHONY FALK, Texas A&M University-Kingsville, Kingsville, TX, USA
JAMES MUIR, Texas A&M AgriLife Research, Stephenville, TX, USA
WILLIAM KUVLESKY, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Non-native herbaceous species have been an important factor contributing to northern bobwhite (*Colinus virginianus*) population decline. Bermudagrass (*Cynodon dactylon*) is a non-native species that creates monotypic stands detrimental to northern bobwhites. Our goal was to develop methods for eliminating Bermudagrass while at the same time establishing a native grassland community that would create more usable habitat for northern bobwhites. We tested 4 Bermudagrass removal treatments, 3 planting techniques, 3 seed mixes, and 2 post planting management techniques in a block design with a split plot arrangement. We found that the percent

cover of Bermudagrass was affected by two, two-way interactions. Bermudagrass removal treatment by seed mix ($p < 0.01$) was the first and Bermudagrass removal treatment by planting technique ($p = 0.01$) the second. Within these interactions Bermudagrass removal treatments that utilized repeat applications of herbicides coupled with commercially produced seed mixes reduced the percent cover of Bermudagrass while disking and drill seeding also reduced the percent cover of Bermudagrass. Secondly, we evaluated the species richness within each treatment combination and found Bermudagrass removal and seed mix (< 0.01) as well as the seed mix and planting technique ($p < 0.01$) interactions for species richness. Plots that were seeded with commercially produced seed mixes following repeat Bermudagrass removal treatments with herbicide had greater species richness while plots that were seeded with the high diversity seed mix by disking and drill seeding had greater species richness.

4:00: Movement, Behavior, and Energy Expenditure Induce Cross-Seasonal Effects in Greater White-Fronted Geese

JAY A. VONBANK, Texas A&M University-Kingsville, Kingsville, TX, USA

STEPHANIE A. CUNNINGHAM, University of Missouri, Columbia, MO, USA

MITCH D. WEEGMAN, University of Missouri, Columbia, MO, USA

PAUL T. LINK, Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA, USA

KEVIN J. KRAAI, Texas Parks and Wildlife Department, Canyon, TX, USA

DANIEL P. COLLINS, U.S. Fish and Wildlife Service, Albuquerque, NM, USA

BART M. BALLARD, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Animals exhibiting seasonal migration from breeding to wintering areas require individuals to make decisions in all periods of the annual cycle regarding when to move, when to perform certain behaviors, and when they can expend limited energy reserves, with consequences of those decisions influencing subsequent reproductive success. The North American midcontinent population of greater white-fronted geese (*Anser albifrons frontalis*) has shifted its winter distribution, with unknown consequences to winter movements, energy expenditure, and subsequent spring migration strategies. In order to understand how movement and behavioral strategies during winter and spring migration may influence subsequent breeding attempts, we investigated movements, behavior, and energy expenditure in 97 GPS-GSM-ACC tagged white-fronts from 2016-2018. White-fronts made large-scale and frequent movements among ecologically-distinct wintering regions, and geese expended significantly more energy in specific regions than others, indicating trade-offs in wintering strategies. We identified that 56% of midcontinent white-fronts attempted to breed, and variation in the amount of time spent foraging increased the probability of successful breeding. Increasing precipitation decreased the amount of time spent foraging, while increasing temperature increased time spent foraging, indicating local weather can affect the probability of breeding. Understanding seasonal movement and energy expenditure, as well as migration strategies and their influence on breeding success, will aid in determining factors that influence population dynamics as well as future conservation and management actions.

4:15: Wetland Conservation and Use By Midcontinent Greater White-fronted Geese in Mexico

JOSHUA P. VASQUEZ, Texas A&M University-Kingsville, Kingsville, TX, USA

JAY A. VONBANK, Texas A&M University-Kingsville, Kingsville, TX, USA

JASON P. LOGHRY, Texas A&M University-Kingsville, Kingsville, TX, USA
KEVIN J. KRAAI, Texas Parks and Wildlife Department, Canyon, TX, USA
BART M. BALLARD, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Greater white-fronted geese (*Anser albifrons frontalis*) use both agricultural and wetland habitats throughout winter with changes in use exhibited temporally and in relation to environmental and landscape factors. Currently, an unknown proportion of white-fronts winter in Mexico, largely along the Laguna Madre and in the Central Highlands, where information regarding wintering ecology is largely unknown. Because conservation efforts for waterfowl typically focus on wetland habitats, understanding what factors influence wetland use by species of interest is imperative to develop informed conservation strategies. We used remote-sensing to measure characteristics of 91 wetlands used by white-fronted geese as determined by GPS/GSM transmitters. White-fronts wintered in the Central Highlands, Interior Plains, and Gulf Coast ecoregions of Mexico in the states of Tamaulipas, Nuevo Leon, Durango, Zacatecas, and Jalisco. We used current satellite imagery to determine wetland characteristics and used generalized linear mixed-effects models and AIC model comparison to explore how wetland and landscape variables influenced wetland use. We then compared wetlands identified in our study to wetlands identified in previous literature as important for white-fronts in Mexico. We investigated the degree of use by our marked sample of white-fronts on 23 wetlands identified as high conservation priority for waterfowl to determine if current wetland conservation planning can benefit from wetland characteristics of importance identified in our study. Wetlands in Mexico are being degraded at a rapid rate, and information such as this is important for future management and conservation planning efforts throughout Mexico for wetland-dependent species such as the greater white-fronted goose.

4:30: A 20-Year Look at Areas of Importance Used By Overwintering Mid-Continent Population of Sandhill Cranes

KATHRYN J. BRAUTIGAM, Texas Tech University, Lubbock, TX, USA
WILLIAM P. JOHNSON, USFWS, Canyon, TX, USA
DANIEL P. COLLINS, USFWS, Albuquerque, NM, USA
JUDE R. SMITH, USFWS, Muleshoe, TX, USA
WARREN C. CONWAY, Texas Tech University, Lubbock, TX, USA
OWEN N. FITZSIMMONS, TPWD, San Marcos, TX, USA
GARY L. KRAPU, USGS, Jamestown, ND, USA
DAVID A. BRANDT, USGS, Jamestown, ND, USA
AARON T. PEARSE, USGS, Jamestown, ND, USA
BLAKE A. GRISHAM, Texas Tech University, Lubbock, TX, USA

ABSTRACT As much as 80% of the Mid-Continent Population of Sandhill crane (*Antigone canadensis*) is estimated to overwinter on the Southern High Plains (SHP) of Texas and New Mexico. Using 20 years of satellite telemetry data, we estimated home ranges and assessed return rates (fidelity) of cranes to wintering sites in the SHP, and identified consistent and/or contemporary wintering areas of importance (AOI). We assessed satellite data from 74 cranes captured in Nebraska during 1998–2003, 18 during 2009–2011, and 35 in Texas during 2014–2017. We used winter locations from ~220 crane-winters to estimate home ranges (95% contour) and core areas (50% contour). We identified 15 areas of importance on the SHP, 21 outside the SHP, each which were visited by at least 1 crane for >7 days in a single winter. All High Plains AOIs had visits by the same

crane(s) in multiple years. We used home range overlap and point locations within home ranges to estimate return rates. Rates among cranes varied widely, (0–98.5%) with an overall average of 35.6% (s = 28.3%). Saline lakes and/or playa wetlands used as roost sites were found in all core areas; however, wetlands cover only ~1% of the landscape and >90% of those have lost natural/historic functionality, leaving cranes using the region vulnerable. Our long-term dataset and geographic assessment add clarity to the Mid-Continent Population's relationship with AOIs on the SHP, highlighting these areas as important points of conservation foci.

4:45: Preliminary Occupancy and Nesting Success Rates of Western Burrowing Owls Utilizing Artificial Burrows in the Tularosa Basin

SARAH J. TURNER, Texas A&M Natural Resources Institute, College Station, TX, USA

BRIAN L. PIERCE, Texas A&M Natural Resources Institute, College Station, TX, USA

FRANCISCO A. CARTAYA, Texas A&M Natural Resources Institute, College Station, TX, USA

DAVID L. RIZZUTO, Texas A&M Natural Resources Institute, College Station, TX, USA

ALLISON S. HARVEY, Texas A&M Natural Resources Institute, College Station, TX, USA

KRYSTA D. DEMERE, Texas A&M Natural Resources Institute, College Station, TX, USA

AUDREY L. HOLSTEAD, Texas A&M Natural Resources Institute, College Station, TX, USA

ABSTRACT The western burrowing owl (*Athene cunicularia hypugaea*) is a small, prairie-specialist bird residing throughout the western United States. Western burrowing are considered a species of concern due to population declines resulting from habitat alteration and decreased populations of burrowing mammals, who excavate cavities for the owls to inhabit. On Holloman Air Force Base in Alamogordo, New Mexico, these owls reside in any natural or anthropogenic cavity they can find, leading to potential safety hazards for military operations. Likewise, due to the fine textured, gypsum soil of the region, the risk of burrow collapse is unnaturally high. Our goal was to locate suitable locations away from the airfield to install artificial burrows that would have a high probability of being occupied by owls. Burrow components consisted of an irrigation valve box as a nest chamber, 10.16 cm (4 in) PVC pipe as an access portal, and 15.24 cm (6 in) PVC pipe for tunneling from the chamber to ground surface. In February 2019, 5 artificial burrows were installed on Holloman Air Force Base at sites of previous owl occupancy and were monitored via human observers and camera traps from installation through the owl mating and nesting season. Owls successfully occupied two of the 5 burrows, and 1 burrow successfully fledged 3 owls. The other 3 burrows were not occupied and had no adjacent owl activity. The success of 2 burrows indicates that the burrow design is suitable for owl occupancy in this region, though lack of discovery may limit its use.

B1
Conservation and Ecology of Mammals 1
Room 227

3:30: Species Distribution Modeling in Threatened Species Using the Townsend's Big-Eared Bat, *Corynorhinus townsendii townsendii* as an Example Organism

NATALIE HAMILTON, Texas A&M University, College Station, TX, USA
ALEXIS PENCE, Texas A&M University, College Station, TX, USA
MICHAEL MORRISON, Texas A&M University, College Station, TX, USA

ABSTRACT Effective management decisions and appropriate conservation efforts depend on knowledge of species distribution and habitat preferences. Distribution maps are especially important in predicting occurrences of endangered or threatened species. The goal of our study was to identify appropriate habitat variables for species distribution modeling on species of special concern, with the Townsend's big-eared bat, *Corynorhinus townsendii townsendii*, as an example species. We applied three machine-learning modeling techniques (maximum entropy, random forest, and generalized linear model) to predict potential habitats for *C. t. townsendii* in California. We analyzed presence-only data at four levels to explore how habitat needs vary. The four levels we included as ecologically relevant: 1) All colonies, 2) Hibernacula colonies, 3) Maternity colonies, and 4) Level 3 ecoregions in California. Models to test species distribution and the potential differences between groups were based on 7 independent variables (elevation, euclidean distance to water, annual precipitation, mean temperature of wettest quarter, precipitation seasonality, mean diurnal range, and euclidean distance to urban centers). The generated models predicted suitable habitat varied between maternity and hibernacula colonies. For hibernating colonies, elevation and distance to water were the strongest predictors of habitat suitability, while annual precipitation and mean temperature of wettest quarter were the strongest predictors for maternity colonies. Our study highlights how species' habitat needs can vary depending on the seasonal habits of the species. Additionally, our results emphasize that management practices will need to consider separate habitat models for migrating species.

3:45: Preliminary Analysis of Kit Fox Occupancy in the Trans-Pecos, Texas

MATT HEWITT, Borderlands Research Institute, Alpine, TX, USA
PATRICIA MOODY HARVESON, Borderlands Research Institute, Alpine, TX, USA
DANA KARELUS, Borderlands Research Institute, Alpine, TX, USA
LOUIS HARVESON, Borderlands Research Institute, Alpine, TX, USA
RUSSELL MARTIN, Texas Parks and Wildlife, Alpine, TX, USA

ABSTRACT The kit fox (*Vulpes macrotis*) is a small fox species endemic to the desert grasslands of the western United States and northern Mexico. Very little is known about the population dynamics and distribution of the Texas kit fox population; therefore, in conjunction with Texas Parks and Wildlife, we initiated a study to investigate kit fox occurrence and to model their distribution in west Texas. We used remote cameras to survey across ranches within suitable habitat in the Trans-Pecos to gather presence and absence data. Each trap location included a Bushnell 16MP Trophy Cam HD Essential E3 remotely activated camera (Oakland Park, Kansas), a wooden stake with an artificial sent tablet, and a can of wet cat food with a metal spike to keep it in place. We began surveys in

March 2018 and to date 780 camera traps have been constructed and monitored, of which 110 cameras had kit fox detections. Photos were analyzed using program Timelapse and image recognition data from Microsoft's AI for Earth program. Occupancy analysis was conducted using the Program R package RPresence. Results from this study may be used as a benchmark for future research and as a scientific basis for decision making for landowners and biologists.

4:00: Small Mammal Recovery Following Periods of Low Rainfall

ALEXIS R. PENCE, Texas A&M University, College Station, TX, USA

ABSTRACT Frequent and reoccurring drought can have sizable impacts on the local wildlife, significantly hindering or halting natural population recovery rates. In addition to this, the use of livestock grazing can alter population recovery rates of wildlife in the area. Therefore, the goal of our project was to determine the effects of both these factors by observing the response that various cattle grazing treatments in southern Texas rangelands had on wildlife population recovery following reoccurring drought periods. Small mammals were studied for this experiment due to their rapid response to environmental changes, rapid reproductive cycles, and short life spans. Mark-recapture studies were conducted from 2014-2019 every February-March using Sherman traps arranged into grids across East Foundation's San Antonio Viejo Ranch in Jim Hogg County, TX. For grazing practices, there was a period of deferment for the first 20 months followed by a cycle of various grazing treatments to include: rotational-moderate, rotational-high, continuous-moderate, and continuous-high, to observe their varying effects. Results following periods of below average rainfall indicated a substantial decline of overall small mammal abundance (approximately 70-80% decrease) across all treatment and reference areas with populations remaining low for the following two consecutive years (2017-2018). Small mammal abundances recovered in 2019. Rotational sites recovered to an average point above the initial 2015 estimate, while continuous sites did not. Findings indicate that some species are more susceptible to the impacts of reoccurring droughts; however, species that are impacted most can surpass original estimates if an appropriate grazing treatment is in place.

4:15: Modelling the Spread of *Pseudogymnoascus destructans* (The Causal Agent of White-Nose Syndrome) in Texas and Mexican Karst Regions

LILIANNA K. WOLF, Texas A&M University, College Station, TX, USA

ABSTRACT White-nose Syndrome (WNS) is a virulent introduced fungal disease that was first documented in the Americas in upstate New York in the winter of 2006. Since this first documentation, the deadly disease has spread rapidly in all directions and has caused a precipitous decline in North American cavernicolous bat populations. The fungus that causes the disease, *Pseudogymnoascus destructans* (*Pd*) has been detected in caves in 10 counties in Texas, as has been determined to be present on the fur of multiple Mexican free-tailed bats. This bat species' broad migratory range suggests it is possible that Mexican Free-tailed bats will spread the fungus from cave to cave in Mexico and possibly Central and South America. The work presented here aims to generate a predictive model of the potential spread of *Pd* through karst systems in Texas and Mexico based on external features that correlate with suitable internal microclimates for fungal growth. An analysis of 54 cave microclimates across the state of Texas reveals a pattern of thermal suitability for *Pd* which correlates significantly with landscape (elevation, lithology) and external climate (mean

surface temperature). Continuing work will involve data from currently deployed equipment along the Sierra Madre Oriental karst region of Mexico. The resulting work will inform Texas and Mexican researchers of areas of significant concern while monitoring the spread of WNS.

4:30: The Effects of Variation in the Major Histocompatibility Complex on Antler Development of White-Tailed Deer Under Selective Harvest Pressure

DAVID NAVARRO, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
CHARLES A. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
MASAHIRO OHNISHI, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
DON A. DRAEGER, Comanche Ranch, Carrizo Springs, TX, USA

ABSTRACT Development of secondary sex characters is costly to an animal and can be an honest signal of male quality. In cervids, antler development is influenced by age, nutrition, and genetics. However, any environmental factors that affect health or body condition may affect antler growth. The immunocompetence handicap hypothesis suggests that the immune system competes for resources with sexually selected ornaments, where an immune system challenge results in decreased growth of antlers. The major histocompatibility complex (MHC) is part of the immune system that recognizes and removes foreign pathogens. Individuals with MHC alleles from different evolutionary lineages can respond to a wider range of pathogens and parasites, thereby diverting more resources to antler growth. If the MHC influences antler development, antler phenotypes may not reflect genetic potential for antler growth. Thus, selective harvest may affect the distribution of immune function variation in a population. As part of a long-term study of culling on antler development at the Comanche Ranch in South Texas, we characterized MHC diversity for 294 white-tailed deer (*Odocoileus virginianus*) in 3 experimental treatments. We will compare antler and morphometric data to evolutionary relationships and diversity among MHC alleles using repeated antler records for individual bucks and established parent-offspring relationships. Preliminary results show 116 unique genotype combinations of 20 different alleles found in the 3 populations, 10 of which have not been previously reported. Results of this study will improve our understanding of factors that affect antler development in wild deer and will have important implications for harvest programs.

4:45: Evaluation of a Black-Tailed Prairie Dog Restoration via Translocation in the Trans-Pecos Ecoregion of Texas

BARBARA JANE SUGARMAN, Sul Ross State University, Alpine, TX, USA
BONNIE J. WARNOCK, Sul Ross State University, Alpine, TX, USA
PATRICIA M. HARVESON, Sul Ross State University, Alpine, TX, USA
SEAN P. GRAHAM, Sul Ross State University, Alpine, TX, USA
RUSSELL L. MARTIN, Texas Parks and Wildlife, Midland, TX, USA

ABSTRACT Prairie dog (*Cynomys spp.*) populations throughout North America have declined because of sylvatic plague (*Yersinia pestis*), shooting, poisoning, and habitat conversion. To aid this keystone species, wildlife managers have used translocation to restore prairie dogs to areas of extirpation. We translocated black-tailed prairie dogs (*C. ludovicianus*) to a private ranch near Alpine, TX. We prepared the translocation site by installing nesting boxes, tubes, and retention baskets.

Prairie dogs were captured and released in 2018 from Marathon, TX (n = 156) and Lubbock, TX (n = 59); additional prairie dogs were captured and released in 2019 from Lubbock (n=48). The 263 prairie dogs were translocated to the same location after they were kept in quarantine. The prairie dog population at the translocation site was regularly monitored post-translocation. Vegetation was measured pre-translocation and post-translocation to assess ecological impacts. Fecal samples (n = 48) from prairie dogs were taken to measure corticosterone levels during different times throughout the translocation process. A population of prairie dogs has persisted at the translocation site since the initial release in October 2018, but juveniles were not detected in spring 2019. As of November 2019, there are approximately 25 to 35 prairie dogs present at the site. Herbivory of honey mesquite (*Prosopis glandulosa*) by prairie dogs was observed in the area surrounding the colony after the translocation. The corticosterone level distributions were not the same for the 4 different time periods assessed. This study will help inform wildlife managers how to best manage future translocations of prairie dogs.

C1
Vegetation and Habitat Management
Room 226

3:30: Hydrologic Controls on Mottled Duck Habitat Sustainability

TIFFANY LANE, US Fish and Wildlife Service, Winnie, TX, USA
CAMILLE STAGG, US Geological Survey, Lafayette, LA, USA
MICHAEL OSLAND, US Geological Survey, Lafayette, LA, USA
JENA MOON, US Fish and Wildlife Service, Winnie, TX, USA
COURTNEY HALL, US Geological Survey, Lafayette, LA, USA
LAURA FEHER, US Geological Survey, Lafayette, TX, USA
WILLIAM JONES, US Geological Survey, Lafayette, LA, USA
BRADY COUVILLION, US Geological Survey, Lafayette, LA, USA
STEPHEN HARTLEY, US Geological Survey, Lafayette, LA, USA
WILLIAM VERVAEKE, US Geological Survey, Lafayette, LA, USA

ABSTRACT Coastal wetlands experience hydrologic feedbacks between vegetation production and flooding. Disruption of these feedbacks can lead to ecosystem collapse. To prevent habitat loss, we must improve understanding of the abiotic-biotic linkages among flooding and wetland stability. Our goal was to determine characteristic landscape patterns and thresholds of wetland degradation to identify areas of vulnerability, reduce flooding threats, and improve habitat quality. We measured local- and landscape-scale responses of vegetation to flooding stress in healthy and degrading coastal wetlands. We hypothesized that conversion of *Spartina patens* wetlands to open water could be defined by a distinct change in landscape configuration pattern at a discrete elevation threshold. We observed differences in the landscape configuration of vegetated and open water pixels in healthy and degrading wetlands. Healthy wetlands were more aggregated and associated with higher wetland elevation and better drainage. Degrading wetlands were more fragmented and had lower elevation and poor drainage. The relationship between vegetation cover and elevation was non-linear, and the conversion from vegetated wetland to open water occurred beyond an elevation threshold of hydrologic stress. The elevation threshold defined a transition zone where healthy wetland converted to a degrading wetland beyond an elevation threshold of 0.09 m North American Vertical Datum 1988 (NAVD88), 0.27 m Mean Sea Level (MSL), and to open water beyond 0.03 m NAVD88 (0.21 m MSL). This illustrates that changes in landscape configuration can be used as an indicator of wetland loss and, in conjunction with specific elevation thresholds, can inform restoration and conservation planning.

3:45: Examining the Efficacy of Stock-Piling Topsoils and Seeding for the Restoration of Frac Ponds

DUSTIN GOLEMBIEWSKI, , Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA, Kingsville, TX, USA
SANDRA RIDEOUT-HANZAK, , Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, USA, Kingsville, TX, USA
VERONICA ACOSTA-MARTINÉZ, USDA-ARS, Lubbock, TX, USA

DAVID B. WESTER, , Caesar Kleberg Wildlife Research Institute, Texas A&M University
Kingsville, Kingsville, TX, USA

ABSTRACT Prior to beginning oil and gas extraction practices, it is commonly recommended that topsoil stock-piles be set aside for future restoration of plant communities. Topsoil is collected using heavy machinery, piled in a nearby location, and re-applied when the energy extraction process is completed, often years later. Our goal with this study is to quantitatively assess the use of stock-piled topsoil following disturbance in semiarid regions. Our study area, a retired fracking pond, was restored in 2017 with 5-yr old stock-piled topsoil collected prior to construction. We segregated the existing stock-pile into 3 layers that were 1-1.5 m in thickness and distributed these layers (along with a non-amended surface) in separate strips over the pond. Each surface layer was split into 15 plots, each receiving one of 3 seeding treatments: (1) 13 native grasses, (2) 13 native grasses plus an annual cover crop, or (3) non-seeded. We are documenting restoration success by monitoring plant density, species composition, and seedbank dynamics. Two years post-restoration, results indicate that satisfactory plant densities (> 5 desirable plants m^{-2}) have been achieved on all surfaces, regardless of surface type. Seeding increased grass density only on the top layer; there was no significant difference between seeding and not seeding on any of the other layers. A seedbank greenhouse study is currently being conducted to determine the viability of the seedbanks of the surfaces. All results will help determine the efficacy of the common recommendation of stock-piling topsoil at our site in South Texas.

4:00: U.S. Army Corps of Engineers Ecosystem Restoration Projects in Texas

DANNY ALLEN, U.S. Army Corps of Engineers, Fort Worth, TX, USA

ABSTRACT The Water Resources Development Act of 1986, 1992, and 1996 authorized the U.S. Army Corps of Engineers (USACE) Civil Works Branch to carry out aquatic ecosystem restoration and protection projects throughout the U.S. and its territories. In addition to the restoration of the Everglades, national priority USACE aquatic ecosystem restoration projects include projects in the Great Lakes, Chesapeake Bay, the Mississippi River, the Missouri River, and the Columbia River. However, numerous aquatic ecosystem restoration projects are planned and have been constructed in Texas. These projects include the restoration of stream, wetland, riparian, coastal marsh, and estuarine habitats throughout the state. This presentation provides an overview of the USACE Southwest Division's ecosystem restoration portfolio in Texas and presents information on ongoing and future aquatic ecosystem restoration feasibility studies for future implementation.

4:15: Predictive Mapping of Potentially Listed Rare Plant Species

MARISSA PENSIRIKUL, Tarleton State University, Stephenville, TX, USA
HEMANTA KAFLEY, Tarleton State University, Stephenville, TX, USA
DARREL MURRAY, Tarleton State University, Stephenville, TX, USA
HEATHER MATHEWSON, Tarleton State University, Stephenville, TX, USA
KIM TAYLOR, Botanical Research Institute of Texas, Fort Worth, TX, USA

ABSTRACT The status of many native plant species that are potentially rare is a growing concern for conservation agencies. Effective conservation planning warrants understanding of accurate species distribution of the native rare plant species. The selected 17 plants are a Species of Greatest

Conservation Need within the state. Collection of species data is from multiple sources: databases, herbariums, and citizen science data. The Maximum Entropy (MaxEnt) model is implemented to the predictive mapping of the rare plant species distribution. Environmental variables were compiled from numerous sources while using the most recent data possible to help predict accurate results. Emphasis on 30-meter spatial resolution for predictor variables in order to sustain fine-scale will help in the prediction of rare plants occurrences. Rare species distribution modeling prompts challenges in obtaining the number of presence data available, lack of true absence, and identifying accurate data. This study will contribute to plant conservation efforts in predicting habitat maps for application in restoring native landscapes. Anticipated results will present strong interactions between environmental variables and rare species persistence that can influence future management practices towards rare plant species.

4:30: Nutritional Differences of Pronghorn-Preferred Forage and a Carrying Capacity Estimation between the Marathon and Marfa Grasslands in Trans-Pecos, Texas

KATHERINE E. HAILE, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA

JACOB C. LOCKE, 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

SHAWN S. GRAY, Texas Parks and Wildlife Department, Alpine, TX, USA

ABSTRACT Forbs play an essential role in the diet of pronghorn (*Antilocapra americana*) due to their higher nutritional value compared to other forages (i.e., grasses and browse). In the Trans-Pecos region of Texas, forbs comprise approximately 80% of pronghorns' forage intake. The objective of this project was to evaluate if a nutritional difference exists between forbs of the same species from two different pronghorn restoration areas, the Marathon Basin and Marfa Northwest grasslands. Another objective of the study was to develop a carrying capacity estimate for these two sites. Vegetation plots (1 m²) were sampled in Marathon (~21,000 ha; $n = 50$) and Marfa (~84,000 ha; $n = 125$) during January 2019. For the nutritional comparison, only forb species detected in both areas ($n = 19$) were used. Acid detergent fiber (ADF) and neutral detergent fiber (NDF) were analyzed using a 2 independent samples t-test, while crude protein (CP) utilized a Mann-Whitney U-test. Results from this study indicate that there is no significant difference in NDF ($P = 0.6472$), ADF ($P = 0.4675$), and CP ($P = 0.5593$) composition between the two areas. The study estimated carrying capacities at 1,467 and 2,462 pronghorn for Marathon Basin and Marfa Northwest, respectively. Knowing there is no difference in forb nutritional composition in the study sites is helpful in calculating a carrying capacity for each site. These results are useful for landowners and Texas Parks and Wildlife Department to better aid in Trans-Pecos pronghorn restoration efforts.

4:45: Effective Management Practices for Increasing Native Plant Diversity on Mesquite Savanna-Texas Wintergrass Dominated Rangelands

DARREL B. MURRAY, Tarleton State University, Stephenville, TX, USA

JAMES P. MUIR, Texas A&M Agrilife, Stephenville, TX, USA

MICHAEL S. MILLER, Texas Parks and Wildlife Department, Kerrville, TX, USA

DEVIN R. ERXLEBEN, Texas Parks and Wildlife Department, Stephenville, TX, USA

ABSTRACT

Throughout the Rolling Plains and Cross Timbers ecoregions of Texas, native grassland plant communities have been converted into low-diversity plant communities by intensive over-grazing by cattle, climatic variations, and fire suppression. Much of the historical plant community has become dominated by annual grasses during the warm season, Texas (*Nassella leucotricha*) during the cool season, and invasive honey mesquite (*Prosopis glandulosa*) brush. This degradation has been so severe that many native bird species, including the Northern bobwhite (*Colinus virginianus*), have disappeared from these areas. We proposed to determine the most effective solution for transforming these mesquite savanna-Texas wintergrass communities with diverse native species supportive of native wildlife species. To determine the best conversion method, we tested multiple management practices following mechanical mesquite brush removal, including timed treatments of herbicide, prescribed burns, and high-intensity short-duration cattle grazing. Results indicate that early-spring herbicide treatments followed by prescribed burning in series over two consecutive years most effectively reduces Texas wintergrass percent cover and promotes native warm-season grass and forb establishment.

D1
New Technologies and Applications
Room 225A

3:30: Evaluating Mesquite Canopy Height Using UAVs and Other Geospatial Methodologies

MICHAEL PAGE, Texas A&M University-Kingsville, Kingsville, TX, USA
VICTORIA CAVAZOS, Texas A&M University-Kingsville, Kingsville, TX, USA
HUNTER CARROLL, Texas A&M University-Kingsville, Kingsville, TX, USA
KIRI BACA, New Mexico State University, Las Cruces, NM, USA
DWAIN DANIELS, Central National Technology Support Center NRCS, Fort Worth, TX, USA
HUMBERTO PEROTTO, Texas A&M University-Kingsville, Kingsville, TX, USA
ALFONSO ORTEGA-S, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Recent advancements in technology such as UAVs have opened new opportunities for Natural Resource personnel to better quantify features within the landscape. Encroachment of invasive plant species on rangelands is of critical concern and Honey Mesquite (*Prosopis glandulosa*) is one of the most invasive species in Texas and the southwest. During the summer of 2019, we collected unmanned aerial vehicle imagery to assess the feasibility of using 3-d models from UAV imagery to quantify tree height. Different methodologies were used to evaluate mesquite heights on a ranch in Hood County, TX. The methods used in this project included: on-site tree height field measurements and Unmanned Aerial Vehicle (UAV) outputs from two different altitude levels of 50m and 100m. A DJI Phantom IV paired with Pix4D® software was used to collect the UAV images. Drone2Map for ArcGIS® was used to process the images to create 2D and 3D outputs using Esri ArcPro® 2.3.3 to evaluate and perform analyses for mesquite distribution and tree heights. Results suggest good agreement between on-site field measurement plant height values and UAV plant height methods such as interactively using the vertical measuring tool from the Esri ArcPro® 2.3.3 software and height analysis using the UAV created LAS Point Cloud Layer. These methods showed efficient ways to monitor mesquite within the landscape. This type of information can be used for wildlife studies to quantify woody cover properties not captured by traditional satellite imagery.

3:45: Estimating White-Tailed Deer Population Sizes Using Unmanned Aerial Vehicles (UAVs)

JESSE EXUM, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
AARON M. FOLEY, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
DAVID G. HEWITT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
JEREMY BAUMGARDT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
MICKEY W. HELICKSON, Orion Wildlife Management Services, Corpus Christi, TX, USA

ABSTRACT In order to successfully manage wildlife populations, it is essential to estimate population sizes, recruitment, and sex ratios. Helicopters are commonly used to conduct surveys of white-tailed deer in south Texas; however, they are expensive, risky, and not always practical for

small ranches. Unmanned aerial vehicles (UAVs) are an emerging technology that has yet to be evaluated for wildlife surveys in Tamaulipan thornscrub. We conducted UAV surveys on 5 ranches with varying numbers of deer and exotic species. Surveys were conducted in November and February to assess variation in counts pre- and post-leaf fall. Further, repeated daytime and nighttime surveys were conducted on each ranch to evaluate whether counts were consistent. The UAV was equipped with a dual thermal and optical video camera. Heat signatures were detected on the thermal imagery, then species identification was confirmed, when possible, via optical imagery. We found that optical footage alone proved difficult in detecting individuals. The addition of thermal imagery improved detection of individuals. Preliminary data shows 60.3% of thermal heat signatures were identified at the species level in optical footage during daytime surveys. Nighttime thermal counts were generally higher (64.8%, range = -64.7% - 149.5%) than daytime thermal counts, suggesting a trade-off between obtaining a higher count of heat signatures during night surveys with no ability to identify animals vs lower daytime thermal counts with the ability to identify ~60% of detections. Year 2 analysis is in progress and additional results will be discussed.

4:00: Evaluating the Practicality of Unmanned Aerial Vehicles for Rabbit Pellet Surveys

ANDREA E. MONTALVO, Texas A&M Natural Resources Institute, College Station, TX, USA
ISRAEL D. PARKER, Texas A&M Natural Resources Institute, College Station, TX, USA
BRIAN L. PIERCE, Texas A&M Natural Resources Institute, College Station, TX, USA
IAN T. GATES, Texas A&M Natural Resources Institute, College Station, TX, USA

ABSTRACT Monitoring for the federally endangered Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*) typically involves fecal pellet counts to be used as an index for abundance and distribution. These surveys can be labor and time intensive because they require researchers to visit each site and count pellets within a given plot. In an effort to maximize the productivity of future surveys, we evaluated the practicality and precision of unmanned aerial vehicles (UAVs) compared to researcher performed pellet counts. We placed a random number of Kix cereal puffs (pellet facsimile) in chalk marked 1 m² circular plots in areas of absent, low, medium, and high herbaceous cover. The UAV flew over each plot to capture photos followed by a researcher performing the counts in person. Later, a second researcher reviewed the UAV plot photos and counted the pellet visible in the images. Only the UAV pilot knew the true number of pellets in each plot. Initial analyses indicate that while UAVs photo pellet counts are similarly accurate to in-person researcher counts in areas with absent or low herbaceous cover, photos often missed pellets in areas of higher herbaceous cover. Additionally, loose matter (i.e., cereal puffs) could be disturbed by the wind from the hovering UAV in absent or low herbaceous cover. Though final analyses are still in progress, we believe UAVs are promising tool for investigating novel or remote potential rabbit habitat; specifically as a complement, though not a replacement, for in-person ground surveys.

4:15: Defining Covey Locations and Flight Path Deviation During Aerial Quail Surveys

ZACHARY J. PEARSON, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
LEONARD A. BRENNAN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
FIDEL HERNANDEZ, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute,
Kingsville, TX, USA
ANDREA MONTALVO, East Foundation, Hebbronville, TX, USA

DAVID A. DELANEY, King Ranch, Kingsville, TX, USA

ABSTRACT Over the last decade, the use of electronic systems to record observations during wildlife surveys has become more popular. The availability of affordable systems and user friendly software allow the integration of spatial information with each observation and flight path. Beginning in 2008 on 46500 ha of south Texas rangeland, distance sampling helicopter surveys have been used to estimate abundance of northern bobwhite quail (*Colinus virginianus*) using electronic systems to record observations. With the abundance of point data for flight paths and covey detections we are able to quantify the efficiency of our surveys. Additionally, spatially explicit covey locations allow us to quantify the distribution of coveys and surrounding habitat. December quail surveys flown from 2009-2018 resulted 6209 covey detections, and 8709 km of flights with a mean flight path deviation of $14.4 \text{ m} \pm 0.14 \text{ m}$. Coveys are located on average $24.9 \text{ m} \pm 0.25 \text{ m}$ away from the designed transect line. Mean covey size is 8.5 ± 0.05 birds and have occupied spaces with a mean woody canopy cover of $18.0\% \pm 0.24\%$ and nearest woody cover is $14.0 \text{ m} \pm 0.25 \text{ m}$. Covey detections occur in areas with similar woody canopy cover regardless of perpendicular distance and covey size. Understanding survey efficiency and distribution of coveys allows us to ensure proficiency in December helicopter surveys.

4:30: Using NEXRAD to Understand the Biometeorology of Monarch Butterfly Migration

JAMES D. RAY, Consolidated Nuclear Security, LLC, U. S. Department of Energy-National Nuclear Security Administration Pantex Plant, Amarillo, TX, USA

PHILLIP STEPANIAN, Department of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame, Notre Dame, IN, USA

JEFFREY KELLY, Plains Institute, University of Oklahoma, Norman, OK, USA

ABSTRACT Long-term declines in insect pollinators create concern about conservation of these species and pollination as an ecosystem function. Among these species, long distance seasonal migrants have been particularly impacted. There has been a decline of $\geq 90\%$ in monarch butterfly populations over the last two decades based on surveys on the wintering ground. Conservation efforts have focused primarily on breeding and wintering biology, however, conditions encountered during en-route migration also have the potential to limit populations and are poorly understood. Our limited understanding of in-flight behaviors and atmospheric conditions restrict the scope of conservation planning for the en-route phase of the annual cycle. A source of en-route information on both monarch behavior and atmospheric conditions is the national network of weather surveillance radars (NEXRAD), which provides near-comprehensive surveillance of the airspace over the contiguous United States, with sub-kilometer spatial resolution and temporal updates every five to ten minutes. An unanticipated benefit of the high sensitivity of weather radars is routine detection of aerial insects engaging in migration or dispersal flights. Using measurements from the NEXRAD network over the south-central USA during fall of 2018, we describe a mass passage of monarch butterflies across the south-central Great Plains. We particularly examine monarch navigation through meteorological features in the airspace and the role of assistance derived from wind patterns that provide tailwind support for long-distance migration.

4:45: Open

E1
Amphibians and Reptiles
Room 225E

3:30: Habitat Forecasting for the Western Massasauga: Implications for Current and Future Populations

DANIELLE WALKUP, Texas A&M University, College Station, TX, USA
A. MICHELLE LAWING, Texas A&M University, College Station, TX, USA
WADE A. RYBERG, Texas A&M University, College Station, TX, USA
TOBY J. HIBBITTS, Texas A&M University, College Station, TX, USA

ABSTRACT Understanding how species distributions shift through time can help us better understand their current status as well as future threats. For the western massasauga (*Sistrurus tergeminus*), historic and future projections of suitable habitat can inform current and future management. Projections allow us to better understand the current distribution and observed relationships among different populations and to interpret how those populations may shift under a changing climate. We used maximum entropy modeling to create multiple species distribution models varying different aspects of the models and evaluated models with multiple statistics. We kept 21 models with an AUC of > 0.8 and projected those models both in the past (mid Holocene 5k - 7kya and last glacial maximum >20 kya (LGM) and in the future (50, 70 years) using multiple general circulation models. At the LGM, the western massasauga had a stronghold in the southern part of its range and further south into Mexico, but by the mid-Holocene, its distribution was similar to its present day distribution. Under the future projections, western massasauga habitat will likely move north based on climate change models, the signal has an even stronger northward trend under a climate scenario with an increase in temperature of 8.5°C . It is likely that southern populations will be extirpated, as they are already under threat from desertification of grasslands, while land use and habitat loss at the northern edge of the species range is likely to make it challenging for this species to actually move northward over time.

3:45: Microhabitat Selection By Texas Horned Lizards in a Managed Mesquite Savannah

JESSICA M. HECKMAN, West Texas A&M University, Canyon, TX, USA
RICHARD T. KAZMAIER, West Texas A&M University, Canyon, TX, USA

ABSTRACT Texas horned lizards (*Phrynosoma cornutum*) are iconographic members of the Texas Panhandle that have experienced diminishing populations and are listed as “threatened” by Texas Parks and Wildlife Department. While the causes of horned lizard decline are likely multifaceted, habitat loss is undoubtedly important. In order to best manage for Texas horned lizards, we must learn their habitat needs and manage to meet those needs. To that end, we evaluated microhabitat selection by Texas horned lizards at Crossbar Management Area, a previously mismanaged property approximately 16 km north of the city of Amarillo that is currently undergoing reconversion to a grassland savannah by active management. We used powder tracking to assess habitat use and availability of Texas horned lizards by collecting vegetation data along pathways and random locations using a 25-cm² quadrat. We found that lizards selected areas with more bare ground relative to live vegetation and litter for movement. Vegetation along pathways was also significantly shorter (mean = 7.5 cm) than random locations (mean = 18.3 cm; $p < 0.001$). A possible

explanation for this is the foraging opportunities and ease of mobility provided by bare ground. However, lizards selected areas with more grass cover and less bare ground for sleeping pallets ($p < 0.061$), possibly enhancing predator avoidance while sleeping. This suggests that Texas horned lizards on this property required a mosaic of bare ground and herbaceous vegetation, and management strategies focused on increasing horned lizard populations should aim to maintain such a mosaic.

4:00: Investigating the Connection Between Human, Crocodilian, and Wetland Systems: A Comprehensive Review

REBECCA CAVALIER, Texas State University, San Marcos, TX, USA

ELIZABETH PRATT, Texas State University, San Marcos, TX, USA

CHRISTOPHER SERENARI, Texas State University, San Marcos, TX, USA

ABSTRACT Remaining relatively unchanged over millions of years, crocodilians (crocodiles, alligators, caiman, and gharials) are an apex predator untouched by evolution. Crocodilians are important to humans for their cultural and economic value in many societies. Problematically, half of these species are predicted to face a “bleak future” due to human activity. The literature on human-crocodilian interactions can be instructive to better understand how humans might share space with terrestrial and aquatic predators, but it is fragmented. We conducted a synthesis of the literature on the human dimensions of crocodilians to understand trends in global human-crocodilian interactions and discuss where we must focus future research efforts. Our preliminary results suggest that studies follow two lines of inquiry. The first focuses on interactions in increasingly urbanizing coastal areas, often reviewing management options and education campaigns. The second path chronicles natural resource dependent peoples living in rural settings where attacks are elevated. In both instances, research most often employs psychological constructs (e.g., attitudes, risk perceptions) to explain the often-chronicled antagonistic views of these species. However, we note that these studies largely omit the implications of larger forces influencing interactions, such as climate change and rural-urban drift, and decouple study findings from their unique, intricate linkages between human-natural-and crocodilian systems (e.g., urban development can influence species distribution and habitat use within wetland ecosystems). Less attention to these species as spectacle, product, and menace may help humans craft new appreciations for crocodilians that facilitate a convivial vision of human-crocodilian relations.

4:15: An Evaluation of Western Chicken Turtle Survey and Capture Methods

BRANDON BOWERS, Texas A&M University Natural Resources Institute, College Station, TX, USA

DANIELLE WALKUP, Texas A&M University Natural Resources Institute, College Station, TX, USA

TOBY HIBBITTS, Texas A&M University Biodiversity Research and Teaching Collections, Texas A&M University Natural Resources Institute, College Station, TX, USA

PAUL CRUMP, Texas Parks and Wildlife Department, Austin, TX, USA

WADE RYBERG, Texas A&M University Natural Resources Institute, 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. There is a lack of formal protection for the subspecies and its habitat, and past research suggests that its remaining habitat within the state 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 review species-wide capture techniques from the literature, recommend an ideal survey season for the WCT in Texas, and evaluate the efficacy and potential biases in capture methods. We compared road surveys, dipnet surveys, seine surveys, night wading surveys, and two types of unbaited fyke net. Fyke nets proved to be the most successful and least biased capture method. A depth of 35 cm is ideal for surveys and trap sessions. In Texas, aquatic surveys and trapping sessions should be performed in May. Dipnet surveys had the highest capture rate among active survey methods, but considerable body size biases between methods were apparent. Utilizing proper survey protocols and understanding the activity season are crucial for performing effective studies on this subspecies.

F1
Exotic and Invasive Species
Room 225D

3:30: Avian and Vegetation Dynamics Following Native-Grassland Restoration

GERON G. GOWDY, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
JAVIER O. HUERTA, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
ELLART J. VREUGDENHIL, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
BRANDON J. PALMER, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
FIDEL HERNANDEZ, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
ERIC D. GRAHMANN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
TIMOTHY E. FUBRIGHT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
MICHAEL W. HEHMAN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
DAVID WESTER, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

ABSTRACT Non-native invasive plants are negatively impacting biodiversity globally. On southwestern rangelands, one such species that has a significant ecological impact on southwestern rangelands is buffelgrass (*Pennisetum ciliare*). Millions of hectares have been planted with or invaded by buffelgrass, creating near monocultures. These monocultures have been shown to reduce diversity of birds and butterflies. We conducted a restoration study on a private ranch in La Salle County, Texas to evaluate if large-scale restoration of buffelgrass-dominated rangeland could be a viable solution to increase biological diversity. The restoration process involved a prescribed burn (Feb. 2014), repeated disking and aerial herbicide application to emerging seedlings of non-native grasses in order to exhaust the seed bank (2014-2016), followed by planting of a mix of grasses and forbs (October 2016). A control site was selected and consisted of non-native grassland receiving no treatment. We hypothesized that the diversity of birds and butterflies would increase as native plants became established over time. Data were collected pre- (2014), during (2015-2016), and post-treatment (2018-2019). We conducted avian point counts during summer (June) and winter (December). Vegetation transect surveys were conducted 3 times a year (March, June, and October). Preliminary results suggest that diversity and richness of the wildlife community temporally tracked the establishment of the native-plant community. Further analysis into the vegetation-wildlife dynamic following native-grassland restoration will continue this spring.

3:45: Assessment of Spilled Hoggone® Accessible to Non-Target Species Following Toxic Bait Deployment

JOHN C. KINSEY, Texas Parks and Wildlife Department, Kerr Wildlife Management Area, Hunt, TX, USA
JUSTIN A. FOSTER, Texas Parks and Wildlife Department, Kerr Wildlife Management Area, Hunt, TX, USA
NATHAN P. SNOW, USDA/APHIS/ Wildlife Services, National Wildlife Research Center, Fort Collins, CO, USA
JASON D. WISHART, Animal Control Technologies Australia, Somerton, Victoria, AU
LINTON D. STAPLES, Animal Control Technologies Australia, Somerton, Victoria, AU

JANIS K. BUSH, Department of Environmental Science and Ecology, The University of Texas at San Antonio, San Antonio, TX, USA

KURT C. VERCAUTEREN, USDA/APHIS/ Wildlife Services, National Wildlife Research Center, Fort Collins, CO, USA

ABSTRACT HOGGONE® has been identified as an effective sodium nitrite-based toxicant against wild pigs (*Sus scrofa*) in Australia, New Zealand, and the United States. Though HOGGONE® is highly lethal to wild pigs, like other toxicants, it is not species specific. Thus, to protect non-target species that may be attracted to HOGGONE®, it will need to be deployed in wild pig-specific bait stations. Bait stations have effectively minimized non-target access to HOGGONE® in both free-range and captive trials, but spillage of bait outside of bait stations caused by feeding wild pigs is a hazard for non-targets. Observations in associated studies at the Kerr Wildlife Management Area have indicated that the method in which HOGGONE® is loaded in bait stations may affect spill rate. In this study, we evaluated post-feeding spillage of three bait station loading methods (crumbled, extruded, and trays) against captive groups of wild pigs and conducted double-observer surveys to estimate spillage. Results indicated that the crumbled method produced significantly higher spillage ($p < 0.01$) than the two alternate presentation methods. Though there was no statistical difference in spillage between trays and extruded presentations, differences in manufacturing and operational logistics led to the selection of trays for field use. Phase 2 of this study will assess risk to potential non-target species through consumption of spilled HOGGONE® delivered to wild pigs in bait stations via trays. This study confirms that bait loading method affects spill rate; and that toxicant spillage mitigation is possible and an essential step for risk management of non-target species.

4:00: The Human Dimensions of Wild Pig Management

RACHAEL CONNALLY, Texas A&M University, College Station, TX, USA

JOHN M. TOMEČEK, Texas A&M University, College Station, TX, USA

MAUREEN G. FRANK, Texas A&M University, College Station, TX, USA

ABSTRACT Exotic, invasive wild pigs (*Sus scrofa*) affect the natural environment in many ways, including degrading water quality, damaging forested and grassland areas, and preying upon native wildlife. Invasive wild pigs pose threats to livestock and human health by harboring and transmitting disease and parasites, and to crop production and storage through foraging and consumption. However, wild pigs impact many different stakeholder groups both positively and negatively. Stakeholders may identify benefits associated with wild pigs such as increased game availability and market sale or lease hunting income. The duality of the issue necessitates a deep understanding of varying stakeholder drivers towards wild pig use and management. Stakeholder diversity and state-wide wild pig presence in Texas provides an ideal opportunity to investigate the complexity of the issue of wild pig management. Although a critical need for effective management, existing research on wild pig management in Texas does not include comprehensive knowledge of wild pig hunter attitudes and motivations. In this study, we identify factors associated with wild pig hunters to generate a greater understanding of the human dimensions of wild pig management in Texas. We collect responses to a mixed-mode survey concerning knowledge, attitudes, demographics, and habit-based factors associated with wild pigs from licensed Texas hunters. We then create a model for participation in wild pig hunting which increases our understanding of this important stakeholder

group. We end with implications for those seeking to manage wild pig abundance in the context of recreational harvest.

4:15: Distance Surveys for Axis Deer and White-Tailed Deer on the Edwards Plateau of Central Texas

MATTHEW J. BUCHHOLZ, Texas Tech University, Lubbock, TX, USA

WARREN C. CONWAY, Texas Tech University, Lubbock, TX, USA

THOMAS L. ARSUFFI, Texas Tech University at Junction, Junction, TX, USA

BLAKE A. GRISHAM, Texas Tech University, Lubbock, TX, USA

ABSTRACT Axis deer (*Axis axis*) have become well established within the Texas Hill Country, and are considered to be the most widespread and abundant exotic Cervid in Texas. However, few population estimates or information relative to local or regional densities exist anywhere within the state. Therefore, our goals were to (1) estimate free-ranging axis deer density on the Edwards Plateau, (2) compare regional axis deer and white-tailed deer (*Odocoileus virginianus*) densities, and (3) assess detection functions and density of axis deer in different habitats. We used distance sampling modified for groups for both axis deer and white-tailed deer during nocturnal spotlight surveys in Kimble County, TX during June, July, and November 2018, and March, June, July, and November 2019. Detection probability was similar between species (0.38 for axis deer vs. 0.33 for white-tailed deer) where detection probabilities declined rapidly beyond 70 m for both species. Average axis deer herd size was 5.7 deer/herd, with herd density between 32 and 57 herds/km². Average herd size of white-tailed deer was 1.8 deer/herd with herd density between 98 and 179 herds/km². Density of axis deer was 215 (157-293) deer/km² vs. 215 (159-291) deer/km² for white-tailed deer. Our results suggest that the density of axis deer is similar to white-tailed deer density in the study area. The density of axis deer were greatest in riparian areas, which are prone to degradation from overgrazing. High density estimates of both axis and white-tailed deer indicate axis deer management is recommended to maintain sensitive habitats for native species.

4:30: Movements and Home Range Sizes of Nilgai Antelope: Implications for Management of Cattle Fever Ticks in South Texas

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

JEREMY A. BAUMGARDT, 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

ADALBERTO A. PEREZ DE LEON, USDA Agricultural Research Service, Knippling-Bushland
U.S. Livestock Insects Research Laboratory and Veterinary Pest Genomic Center, Kerrville,
TX, USA

ABSTRACT In 1906, the Cattle Fever Tick Eradication Program was created by the USDA to combat the tick vectors of bovine babesiosis. *Rhipicephalus (Boophilus) microplus* and *R. (B.) annulatus*, collectively known as cattle fever ticks (CFT), can still be found in the borderlands between South Texas and Mexico. Bovine babesiosis is endemic to Mexico, threatening U.S. cattle herds with disease. Wild ungulates, such as nilgai antelope (*Boselaphus tragocamelus*), can complicate CFT eradication because these alternative host species have the ability to make long-distance movements. Nilgai are an exotic species introduced to South Texas in 1924, and have since spread throughout the region. A previous study suggested nilgai have large home range sizes, however little is currently known on this topic. In this study, our goal was to examine monthly home range sizes of nilgai during summer (gestation) and autumn (birth/lactation) months using hourly locations from 27 GPS-collared nilgai. Overall, nilgai had large and highly variable home ranges: males (n=9), median = 693 ha (range=76-4677 ha), females (n=15) median = 529 ha (range=29-5611 ha). In our study, 2 young females made long-distance movements of over 40 km within a month, resembling dispersal behavior. Dispersal behavior is not common for female ungulates, and may result from the social structure of nilgai, where males are territorial. Large home ranges and long-distance movements are clearly an obstacle for CFT management. With the frequent invasion of CFT, a better understanding of nilgai movements will provide key information needed to eradicate this tick vector.

4:45: Analysis of Space Use By Nilgai Antelope in South Texas Using a Step-Selection Function

JEREMY A. BAUMGARDT, Texas A&M University - Kingsville, Kingsville, TX, USA

RANDY W. DEYOUNG, Texas A&M University - Kingsville, Kingsville, TX, USA

KATHRYN M. SLIWA, Texas A&M University - Kingsville, Kingsville, TX, USA

J. ALFONSO ORTEGA-S, Texas A&M University - Kingsville, Kingsville, TX, USA

DAVID G. HEWITT, Texas A&M University - Kingsville, Kingsville, TX, USA

JOHN A. GOOLSBY, USDA Agricultural Research Service, Cattle Fever Tick Research
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ADALBERTO PEREZ DE LEON, USDA Agricultural Research Service, Knippling-Bushland US
Livestock Insects Research Laboratory and Veterinary Pest Genomics Center, Kerrville, TX,
USA

ABSTRACT Nilgai antelope (*Boselaphus tragocamelus*) are an introduced species that have become common in parts of South Texas. Nilgai are known hosts to cattle fever ticks (*Rhipicephalus microplus* and *R. annulatus*) that can carry bovine babesiosis, a disease that affects cattle and thus, a significant concern to cattle ranchers and the beef industry. The Cattle Fever Tick Eradication Program was established by AHPIS in the early 20th century and a permanent quarantine zone is maintained along the Texas - Mexico border to prevent new establishments of these ticks. Recently, cattle fever ticks have been detected north of the quarantine zone and it is thought that nilgai may be partially responsible. Little is known about nilgai behavior, and more information is needed to better understand the threat nilgai pose to the spread of cattle fever ticks. Our objectives for this study were to quantify nilgai movement behavior and space use. We deployed GPS satellite collars on 30 nilgai (10 male, 20 female) on 2 study areas in Cameron County, TX. We conducted a Step Selection

Function using hourly fixes collected between April and October 2019. We included covariates, such as woody vegetation, fences, and roads to see how these may influence nilgai space use and movement patterns. Our results will have important implications for the management of cattle fever ticks.

Saturday, February 15, 2020

A3
Avian Ecology and Management 2
Room 227

8:00: A Perfect Home: Designing an Effective Artificial Burrow for the Western Burrowing Owl in the Absence of Fossorial Mammals

AUDREY L. HOLSTEAD, Texas A&M Natural Resources Institute, College Station, TX, USA
SARAH J. TURNER, Texas A&M Natural Resources Institute, College Station, TX, USA
FRANCISCO A. CARTAYA, Texas A&M Natural Resources Institute, College Station, TX, USA
DAVID L. RIZZUTO, Texas A&M Natural Resources Institute, College Station, TX, USA
BRIAN L. PIERCE, Texas A&M Natural Resources Institute, College Station, TX, USA

ABSTRACT The western burrowing owl (*Athene cunicularia hypugaea*) is a small, prairie-specialist bird residing throughout the western United States. This species depends on fossorial mammals to create natural burrows for their nesting and brood rearing activities. Western burrowing owls have faced population declines range-wide due to habitat alteration and decreased populations of burrowing mammals, leading to the owl's designation as a species of concern. Conservation efforts have traditionally focused on the construction of artificial burrows replicating natural cavities created by fossorial mammals of the study region. The most common artificial burrow design calls for the use of a rigid chamber of at least 18,000 cm³, and one or more tunnels of at least 3 m in length ascending to the soil surface at no more than a 20-degree angle. This design may not be optimal for the species range-wide, however, depending on the soil composition and topography of the study area. On Holloman Air Force Base in Alamogordo, New Mexico, burrowing owls occupy natural or anthropogenic cavities that are prone to collapse due to the fine-textured soil of the region. To negate the impacts these collapses may cause on infrastructure and mission safety, we designed an artificial burrow capable of withstanding soil compaction while also being an easily maintained model of a natural burrow. We plan to install 15 burrows on Holloman Air Force Base away from mission infrastructure in an active effort to reduce bird/aircraft strike hazards and provide refugia for this at-risk species.

8:15: Comparative Productivity of American Kestrels in a Nest Box Program and Natural Nests in Lubbock County, Texas

JENNY R. HARRIS, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, USA
CLINT W. BOAL, US Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, TX, USA

ABSTRACT The American kestrel (*Falco sparverius*) is the smallest falcon in North America. They are secondary cavity nesters, normally nesting in woodpecker holes and naturally occurring cavities in trees and cliffs. Kestrel populations have been enhanced in many areas by establishment of nest box programs. However, the productivity of American kestrels using nest boxes compared to natural sites has not been evaluated. This has important implications for assessment of kestrel populations and conservation needs. We monitored 29 kestrel nest boxes in Lubbock County,

Texas, during the breeding season of 2019. We also conducted county-wide road surveys to locate breeding pairs not associated with the nest box program, and then monitored their natural nests. Although we refer to these as 'natural' nests, some were in man-made structures, such as barn lofts and abandoned buildings. Seventeen pairs of kestrels used nest boxes, but 3 nesting attempts failed. Nine pairs of kestrels used natural nest structures, and 1 nesting attempt failed. Nest success was 83.2% for the kestrels in the nest box program, and 89.5% for the kestrels using the natural nests. We only compared fledgling counts as many properties and cavities were inaccessible. The average number of fledglings among the nest boxes was 3.9/successful nest, whereas the average among natural nests was 3.1/successful nest. Nest boxes and searches for natural nests will be repeated in 2020, to allow for a larger sample size and higher resolution of interpretation of data.

8:30: Roosting and Behavioral Patterns of Rio Grande Wild Turkeys in South Texas

AMANDA K. BECKMAN, Texas A&M University, College Station, TX, USA

ABSTRACT Strutting Rio Grande wild turkeys (*Meleagris gallopavo intermedia*) are iconic features of the south Texas landscape, but what are they doing for the rest of the day? Ethograms are written and drawn descriptions of distinguishable postures, movements, and sounds that comprise an animal's overall behavior. However, the wealth of knowledge of wild turkeys does not include detailed information about individual behavior in an ethogram. I conducted behavioral observations of Rio Grande wild turkeys at roosts and during the day at the East Foundation's El Sauz Ranch, Willacy County, Texas, from May-July 2019. I counted the number of individuals at roosts and followed flocks throughout the day to record over 70 hours of behavioral observations. I then used individual roosting and behavioral data to compare roosting and behavioral trends between sexes across months. This research is the first step towards making a detailed account of all behaviors shown by male and female Rio Grande wild turkeys. An understanding of behavior patterns are necessary to determine if individual behavior or behavioral patterns can be used by hunters to understand optimal harvest times, or by landowners and managers to better understand the status of wild turkeys on their properties.

8:45: Secondhand Homes: Varying Success of Secondary Cavity Nesting Birds in Relation to a Local Woodpecker

FAITH HARDIN, Texas A&M College Station, Bryan, TX, USA

ABSTRACT Ecosystem engineers mechanically change their environment and have a direct impact on local species. Woodpeckers serve this role as their cavities provide crucial nesting sites for secondary cavity-nesting birds (SCNB). Additionally, as woodpeckers forage for insects they increase insect habitat heterogeneity which has been shown to be positively correlated with insect abundance. This increase in insect abundance may provide additional foraging opportunities for nesting birds leading to increases in abundance and species richness in the avian community. The goals of this project were to (1) look at which nest site characteristics are influencing SCNB clutch sizes and (2) see if the presence of an active woodpecker territory had an impact on the local avian community. Data was collected from 2018 to 2019 on East Foundation lands in south Texas. Overall avian species richness was higher and the abundance of the insect orders Coleoptera, Orthoptera, and Diptera were higher in areas with an active woodpecker territory (n= 89) when compared to areas without (n = 89). Of the species of SCNB, some showed larger clutch sizes and more fledglings in

abandoned woodpecker cavities in trees that had less signs of decay, while some species (e.g. Bewick's wren) did not show any differences. Understanding how woodpeckers influence the avian communities around them will allow us to create better management programs for species that rely on pre-existing cavities and those that may benefit from higher insect loads during the breeding season.

9:00: Home-Range and Habitat Selection of the Greater Roadrunner on the Welder Wildlife Refuge

DEREK R. MALONE, Texas Tech University, Lubbock, TX, USA

CLINT W. BOAL, U. S. Geological Survey Texas Cooperative Fish & Wildlife Research Unit,
Lubbock, TX, USA

TERRY L. BLANKENSHIP, Rob & Bessie Welder Wildlife Foundation, Sinton, TX, USA

ABSTRACT The greater roadrunner (*Geococcyx californianus*) is an understudied but charismatic cursorial avian predator that requires a combination of open areas for foraging and brush for perches and nesting locations. Roadrunners occur throughout much of the Southwestern United States, occupying arid to semi-arid regions from California eastward into some parts of Louisiana. We are assessing how coastal prairie restoration efforts on the Welder Wildlife Refuge, in San Patricio County, Texas, may influence roadrunners by comparing home-range and habitat selection of radio-tagged birds on a 144-ha treatment plot to an untreated 216-ha control plot, as well as the refuge as a whole. Our goal is to understand how prairie restoration efforts can contribute toward grassland bird community recovery, while also accounting for species, such as the roadrunner, that require a mixture of vegetation communities. We captured and outfitted 10 roadrunners in 2018 and 8 in 2019 with VHF backpack style transmitters. We obtained triangulated estimates of roadrunner locations during May - August of each year. We examined home-range size and habitat selection using programs LOAS, the home range tool 2.0 extension and remote sensing data in ArcGIS. Roadrunners had a mean convex polygon home range 20.38 ha and a 50% core range of 9.54 ha. Habitat selection ratios showed that roadrunners selected for bare ground and used dense grass, sparse grass, and shrubland vegetation types proportionally at the 1st and 3rd order. At the 2nd order, roadrunners selected for dense grass, avoided sparse grass and bare ground, and used shrubland proportionally.

9:15: Comparative Nesting Habitat of Riparian Raptors in the Trans Pecos Region of Texas

CAROLINE SKIDMORE, Texas Tech University, Lubbock, TX, USA

CLINT BOAL, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

BENJAMIN SKIPPER, Angelo State University, San Angelo, TX, USA

RUSSELL MARTIN, Texas Parks and Wildlife Department, Alpine, TX, USA

ABSTRACT Riparian woodlands in desert landscapes are important areas for wildlife conservation. The common black hawk (*Buteogallus anthracinus*), gray hawk (*Buteo plagiatus*), and zone-tailed hawk (*Buteo albonotatus*) are riparian obligate or semi-obligate species that are state listed as threatened in Texas. As high trophic level predators with different niches, raptors may serve as indicators of biological community health of riparian zones. However, little information is available regarding 1) their presence and distribution in the Trans Pecos region of Texas or 2) their comparative nesting habitat selection in riparian systems. We surveyed for nesting raptors in ~30 linear kilometers of

accessible riparian systems across 12 sampling areas in Jeff Davis, Brewster, and Presidio Counties, Texas during 2018 and 2019 breeding season. We determined nesting attempts by 10 common black hawk pairs, nine Cooper's hawk pairs, 13 gray hawk pairs, and 25 zone-tailed hawk pairs. We conducted vegetation surveys to quantify nest tree and riparian site characteristics at each nest site. We found substantive differences in height and DBH of nest trees selected between each raptor species, in addition to nest placement heights. Compared to Cooper's hawks and gray hawks, zone-tailed hawks selected for significantly less dense tree groves. Our results indicate the species we studied are selecting sections of riparian woodlands with different characteristic. This suggests even age riparian systems are not adequate for occupancy of this suite of raptor species; rather a mixed-age and structure of riparian woodlands is important for continued presence of these species.

B2
Big Game Ecology
Room 225C

8:00: Density-Dependent Changes in Adult Sex Ratio in a Roosevelt Elk Population

ZAAVIAN S. ESPINOZA, Texas State University, San Marcos, TX, USA

FLOYD W. WECKERLY, Texas State University, San Marcos, TX, USA

ABSTRACT Ecological processes driving female-biased ASR (males:female) have only been addressed hypothetically in the literature. Our study examined whether ASR was density-dependent in a population of Roosevelt elk (*Cervus elaphus roosevelti*) inhabiting Redwood National and State Parks, California. The female substitution hypothesis asserts that female-biased ASR reflects a fitness benefit for females to acquire nutritious forage instead of males. The complementary scramble competition hypothesis claims that females are efficient foragers and displace males from forage habitat. Our objectives were to estimate whether ASR declined with abundance, and assess which of two ecological mechanisms were driving the ASR. The first is there were few males in the study area which precipitated a declining ASR with abundance, and the second was that males dispersed because of declining food supplies associated with increasing female abundance. Systematic population surveys across 23-years were done by driving along a predetermined route within meadow complexes to assess total abundance, and in surrounding areas to assess male abundance. Forage biomass was estimated from vegetation height measurements in sample plots randomly placed within meadows. Bootstrapped linear regressions detected an inverse relationship between abundance and ASR indicating ASR was density-dependent. Males in the area surrounding the study area increased when the ASR was more female-biased. Another bootstrapped linear regression indicated declining food supplies across years when female abundance increased. As abundance increased it appeared that females obtained forage more efficiently and displaced males from the area. Our findings are consistent with the female substitution and scramble competition hypotheses.

8:15: Mule Deer and Anthropogenic Change: Effects of Agricultural Encroachment on Population Performance

LEVI HEFFELFINGER, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

DAVID HEWITT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

SHAWN GRAY, Texas Parks and Wildlife Department, Alpine, TX, USA

WARREN CONWAY, Texas Tech University, Lubbock, TX, USA

TIMOTHY FULBRIGHT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

RANDY DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

LOUIS HARVESON, Borderlands Research Institute, Alpine, TX, USA

ABSTRACT Conversion of native rangeland to row-crop farming is one of the largest forms of habitat fragmentation in the United States. Mule deer (*Odocoileus hemionus*) populations have been stable throughout the western United States, but have increased in the Texas Panhandle, an area of extensive row-crop agricultural production. We assessed habitat selection by mule deer throughout the Panhandle region. Then, we evaluated how individual level habitat use influenced body condition, lactation status, and antler size. We collected multi-year movement (via GPS collars) and

morphometric measurements from 122 males and 185 females. Overall, crop fields only accounted for 3-14% use relative to other land cover types. When using crop fields as a reference, selection coefficients indicated higher selection for all other land cover types ($\beta = 0.41 - 1.61$, $P < 0.001$). We found no effect of individual level crop use on male antler size ($\beta = 45.63$, $P = 0.11$). However, summer agriculture use had a positive effect on rump fat for both mature ($\beta = 48.82$, $P = 0.01$) and young ($\beta = 55.82$, $P = 0.01$) males demonstrating the use of crops to build nutritional reserves before rut. Agriculture use had no effect on rump fat ($\beta = 0.94$, $P = 0.54$) for females. In sites with a higher prevalence of crops, agriculture use increased the probability that an adult female was lactating the following autumn ($\beta = 3.12$, $P = 0.01$), demonstrating the importance of croplands in providing nutrition to support rearing young. Our baseline population measures will aid in establishing an adaptive management plan for mule deer in the Panhandle as the rangeland-cropland juxtaposition continues to change.

8:30: Quantity or Quality? Foraging Ecology and Morphology of White-Tailed Deer Across Environmental Gradients

SETH T. RANKINS, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
AARON M. FOLEY, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
TIMOTHY E. FULBRIGHT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
J. ALFONSO ORTEGA-S., Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
DAVID G. HEWITT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
LANDON R. SCHOFIELD, East Foundation, Kingsville, TX, USA
TYLER A. CAMPBELL, East Foundation, San Antonio, TX, USA

ABSTRACT Long-term capture data from free-ranging populations of white-tailed deer (*Odocoileus virginianus*) in South Texas show that body and antler size are correlated with sand content of the soil. Deer in sandy soils are up to 14 kg and 12 Boone and Crockett inches smaller than deer in loamy soils. Presumably this relationship is nutritionally driven, but it is not clear if the observed differences in deer phenotypes are a result of differences in forage quantity or forage quality. Sandy soils differ in nutrient content, water-holding capacity, and plant species composition. If quantity of high-quality forage is limiting, then deer morphology is more likely to exhibit density-dependent responses. In contrast, if forage quality is limiting, deer growth will be largely controlled by environmental factors. We will assess forage abundance, diversity, and nutrient content, focusing our analysis on high-quality forage plants and plant parts preferred by deer. We will index nutrient content via fiber, minerals, and crude protein. Additionally, we are using a blood serum mineral assay from a subset of captured deer to determine if gradients in forage mineral content might cause chronic deficiencies in ungulates. Preliminary results indicate that variation in serum mineral concentrations were miniscule and not influenced by availability in the surrounding environment. Results from our research will provide valuable insight into mineral transfer through multiple trophic levels of an ecosystem. Furthermore, it will expand our understanding of how foraging ecology influences body and antler size of ungulates in stochastic environments.

8:45: Influence of Agriculture Production and Anthropogenic Structures on Pronghorn Survival in the Texas Panhandle

GARY L. MIZER, Texas Tech University, Lubbock, TX, USA

WARREN C. CONWAY, Texas Tech University, Lubbock, TX, USA
ANTHONY P. OPATZ, Caesar Kleberg Wildlife Research Institute, Texas A&M University–
Kingsville, Kingsville, TX, USA
TIMOTHY E. FULBRIGHT, 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
HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute, Texas
A&M University–Kingsville, Kingsville, TX, USA
SHAWN S. GRAY, Texas Parks and Wildlife Department, Alpine, TX, USA

ABSTRACT Pronghorn (*Antilocapra americana*) movement, survival, and diet can be influenced by natural and anthropogenic landscape features, but little is known about how agriculture plays a role in these factors. We studied movements, home range, and survival response(s) to the rangeland - agricultural landscape using satellite collars deployed on pronghorn in 2 study areas during Feb 2017 to Feb 2019. Pronghorn survival was estimated using two approaches: Known Fate modeling in program MARK and Kaplan-Meier analysis. Survival modeling revealed yearly survival of 74% and 82% in year 1 and year 2 respectively, while seasonal survival ranged from 100% across multiple seasons to 66% during the breeding season. Direct human-caused mortality proved to be a significant cause of death, with 10/34 total mortalities attributed to hunting. We also incorporated a dietary component to the study, to more closely identify how pronghorn used habitats from a nutritional perspective. To date, we analyzed 103 pronghorn fecal samples using DNA metabarcoding. We detected 97 plant genera, including 5 genera of agricultural crop plants. We will compare diet and food habits between male and females, spatiotemporally to more clearly identify how pronghorn utilize food resources in both landscapes. These data will be useful to identify plant species or genera that appear most frequently in pronghorn fecal samples that may help guide land managers in making regional pronghorn management decisions.

9:00: Behavioral Responses of White-Tailed Deer to Heat Stress and the Potential for Interspecific Competition

JACOB L. DYKES, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
TIMOTHY E. FULBRIGHT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
DAVID G. HEWITT, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
CHARLES A. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
J. ALFONSO ORTEGA-S, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
AARON M. FOLEY, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
TYLER A. CAMPBELL, East Foundation, San Antonio, TX, USA

ABSTRACT Heat stress is common in endotherms. Thus, it is important they avoid excess heat during warmer months. Behavioral adaptations, such as seeking shade or wind, or altering activity patterns are often less costly than physiological responses to heat stress. However, behavioral responses may lead to competition if thermal cover is limiting. The goals of this study are to evaluate behavioral adaptations of white-tailed deer (*Odocoileus virginianus*) to heat stress and assess competition for thermal cover with cattle. We deployed 40 GPS collars (30 deer, 10 cattle) at the

East Foundation's El Sauz Ranch in South Texas during spring 2019. Collars recorded a GPS location at 30-minute intervals. Each collar was equipped with a black-globe thermometer to record operative temperature, an integration of convective and radiative heat transfer between an animal and its environment, every 30 minutes. In addition, we deployed 100 black-globes across the landscape to monitor the thermal environment. We will use animal GPS data and operative temperature in a resource-selection framework to evaluate the effects of heat stress on deer movement and resource selection. Also, we will assess spatial and temporal overlap between deer and cattle across the landscape. Knowledge of deer movements, resource selection, and competition for thermal cover will further our understanding of how heat affects deer and cattle and what landscape features are important in mitigating this stress. Management implications include improvements in brush and habitat management regimes, and a better understanding of deer-livestock competition.

9:15: Comparing Release Methods of Desert Bighorn: Survival and Cause-Specific Mortality

TAYLOR S. DAILY, 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

WARREN C. CONWAY, Texas Tech University, Lubbock, TX, USA

FROYLAN HERNANDEZ, Texas Parks and Wildlife Department, Alpine, TX, USA

ABSTRACT Historically, desert bighorn sheep (*Ovis canadensis mexicana*) were prevalent throughout the Trans-Pecos region of Texas. However, they were extirpated by the 1960s due to unregulated hunting, habitat loss, predation, and disease transmission from livestock. Restoration efforts have been successfully conducted by Texas Parks and Wildlife Department to increase population numbers of resident (i.e., animals that currently populate a region of interest) desert bighorn at Black Gap Wildlife Management Area (BGWMA) through the use of translocations. In winter 2017-18, we radio collared and released 30 resident (8 M, 22 F) and 70 within-state translocated desert bighorn (36 M, 34 F) to BGWMA. Of the 70 translocated, 28 (12 M, 16 F) were hard released (i.e., translocated animals immediately released onto landscape) and 42 (24 M, 18 F) soft released (i.e., released into an enclosure before into the landscape). Survival and cause-specific mortality were monitored throughout the duration of the study. Resident desert bighorn had the greatest overall survival ($S = 0.87$), followed by hard released ($S = 0.78$), and then soft released ($S = 0.62$). To date, 26 mortalities (13 M, 13 F) were recorded. Of those mortalities, 4 were residents (15%), 6 were hard released (23%), and 16 were soft released (62%). Soft release is thought to be a better strategy for translocating large mammals, however, for this study it did not improve survival. This is potentially influenced by acclimation time and individual exit strategy from the soft release pen, which should be managed for future restoration efforts.

C2
Vertebrate Response to Habitat Management
Room 226

8:15: Long-Term Effects of Fire Seasonality on a Rolling Plains Small Vertebrate and Herbaceous Plant Community

JOSELYN M. GUTIERREZ, West Texas A&M University, Canyon, TX, USA

RICHARD T. KAZMAIER, West Texas A&M University, Canyon, TX, USA

MATTHEW W. POOLE, Matador Wildlife Management Area, Texas Parks and Wildlife, Paducah, TX, USA

ABSTRACT Controlled burning is an established management tool used to replicate a natural process that is often missing from modern grasslands, but fire research has focused on short-term responses. From 2004-2009 and 2018-2019, we explored responses to seasonality of fire on small vertebrates and vegetation in a sand sage prairie ecosystem. We used pitfall traps to sample small vertebrates and quadrat sampling for herbaceous vegetation in a randomized complete block design with 5 blocks and 3 treatments (summer-burned, winter-burned, and unburned) during early and late seasons. We regressed sample year against community metrics to evaluate longer-term responses to burning. In the early season, summer-burning increased species richness, evenness, and diversity of vertebrates over time ($P < 0.029$), but individual species responses were variable. In contrast, treatment did not generally alter community metrics for vegetation. However, comparison of early season indices of similarity demonstrated that presence of burning shifted the species composition of the herbaceous plant community over time ($P < 0.100$), whereas during the late season, the small vertebrate community shifted in the unburned treatment ($P = 0.032$), but not in either burn treatment ($P > 0.510$). Thus, burning is shifting the plant community regardless of weather patterns, but it may be ameliorating the effects of long-term drought on the small vertebrate community. In general, our results suggested that summer-burning may be slightly more beneficial to vertebrate communities, but both burning treatments improved conditions relative to lack of burning.

8:30: Ungulate Responses to Time Since Burning in a Managed Rolling Plains Landscape

ERIN E. STIEDE, West Texas A&M University, Canyon, TX, USA

RICHARD T. KAZMAIER, West Texas A&M University, Canyon, TX, USA

ABSTRACT Fire is a natural disturbance in the Rolling Plains ecosystem. When applied properly, fire removes unwanted litter, decreases woody plant densities, and increases herbaceous plant production. Burning can affect plant abundance, density, and biomass in different years post-burn. These vegetational changes because of fire, have the potential to affect herbivores. Therefore, our objective was to assess the responses of ungulates to time since burning was applied. We used camera traps in 16 different locations with 0-5+ years post-burn on Matador Wildlife Management Area in Cottle County, Texas, in 2018-2019. We calculated an activity index for each species for each year of data. We then regressed the activity indices against years since burning. We detected 5 ungulates on the property: white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), javelina (*Pecari tajacu*), feral hog (*Sus scrofa*), and domestic cattle (*Bos taurus*). Domestic cattle and feral hog activity were not influenced by time since burned. White-tailed deer activity increased with increasing time post-burn ($P = 0.094$). Mule deer activity approached significance ($P = 0.106$) with a

tendency for increased activity as years post-burned increased. Whereas, javelina approached significance ($P= 0.101$) with a tendency for decreased activity as year since burned increased. We suspect unusual weather patterns influenced our ability to detect clearer patterns. However, our initial results suspect that continued data collection is warranted to further clarify possible relationships.

8:45: Space Use of Wild Pigs in Relation to Crop Growth Stages in an Agricultural Landscape

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
KURT C. VERCAUTEREN, USDA APHIS WS NWRC, Fort Collins, CO, USA
NATHAN P. SNOW, USDA APHIS WS NWRC, Fort Collins, CO, USA
JUSTIN W. FISCHER, USDA APHIS WS NWRC, Fort Collins, CO, USA

ABSTRACT Wild pigs are an invasive species that were first introduced to North America in the 1500s. Due to their high reproductive rate and omnivorous diet, their populations have been growing exponentially throughout many areas of the US, northern Mexico, and Canada. Wild pigs annually cause billions of dollars in damage to agriculture in the US through rooting up seeds or trampling mature plants. Our objective was to quantify space use of wild pigs in an agricultural landscape to determine periods of greatest crop damage and use in relation to crop stage. We monitored wild pig movements hourly using GPS collars ($n = 30$ adult wild pigs, both male and female) during the 2019 crop growing season (Jan-Sep) in Delta County, Texas. We obtained information on agricultural field locations, crop types, and planting and harvest dates for crops within our study area from landowners and farmers. This information allowed us to know what crops were available to the collared pigs and compare their change in movements during growth stages. We then quantified and related space use of wild pigs during 5 separate periods: pre-planting, planting, vegetative stages, milk stage, and mature, to identify stages of greatest use. Preliminary analyses suggest that greatest use by wild pigs occurred during the mature stage. This study will help to better understand wild pig movements and space use and help guide Wildlife Services and landowner control efforts in minimizing wild pig damage.

9:00: Evaluation of Soil Erosion and Changes in Plant Communities Resulting From Rooting Behavior of Invasive Wild Pigs on the Kerr Wildlife Management Area

JOSHUA R. COWARD, Sul Ross State University, Alpine, TX, USA
JOHN C. KINSEY, Kerr Wildlife Management Area, Texas Parks and Wildlife Department, Hunt, TX, USA
RYAN S. LUNA, Natural Resources Management Department, Borderlands Research Institute, Alpine, TX, USA
BONNIE WARNOCK, Natural Resources Management Department, Borderlands Research Institute, Alpine, TX, USA
RYAN O'SHAUGHNESSY, Sul Ross State University, Alpine, TX, USA

ABSTRACT Invasive wild pigs (*Sus scrofa*) are a destructive species that cause an estimated \$1.5 billion in combined costs of control efforts and damage mitigation annually. They exhibit rooting behavior that is destructive to soil structure and morphology and disturb the plant communities they occupy. Little research has been conducted in Texas to evaluate how rooting affects soil composition and plant communities. My objectives were 1) determine if there is a significant change in soil erosion post-rooting, 2) determine if there are significant changes in soil texture, moisture content, pH and electrical conductivity, organic and inorganic carbon, nitrogen and bulk densities, and 3) determine how plant communities change post-rooting. To measure soil erosion, I installed 14 erosion bridges in exclosures and collected samples weekly from January-September of 2018. To measure changes in soil components, I sampled rooted areas to a depth of 15 cm and collected bulk density samples using the compliant cavity method. These soil samples were analyzed in a laboratory to determine whether soil components were significantly impacted by rooting when compared to those of control sites. To measure change in plant communities, I sampled vegetation to determine cover class estimates and species presence in rooted areas and compared these data to data from 2016 and 2017. I used analyzed vegetation cover classes and presence/absence data to determine how plant communities changed after a rooting event.

9:15: Cattle Grazing Regimes Effects on Pronghorn Forage Production in Trans-Pecos, Texas

JACOB LOCKE, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA

KATHERINE HAILE, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA

CARLOS GONZALEZ, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA

LOUIS HARVESON, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA

SHAWN GRAY, Texas Parks and Wildlife Department, Alpine, TX, USA

ABSTRACT Pronghorn (*Antilocapra americana*) evolved in grasslands with a diet composed of highly nutritional forbs. However, grassland habitat for pronghorn has been lost throughout North America due to habitat fragmentation and degradation. Additionally, effects on how cattle grazing affects forb production are not well known in West Texas. To assess the effects of different cattle grazing regimes on forbs, we sampled vegetation during the growing season in the months of September 2018 and 2019. Our hypothesis was that there is a difference in forb nutritional composition, biomass production, and species diversity between a rotational grazing system, a continuous grazing system, and no grazing. We randomly sampled all grazing regimes using 96 (rotational grazing), 100 (continuous grazing), and 64 (no grazing) 1 m² plots. We collected all forbs in each plot and analyzed differences in nutritional composition, biomass production, and species diversity using an analysis of variance, Kruskal-Wallis test, and Shannon-Weiner diversity H index, respectively. Results from this study indicate that there is no significant difference ($P > 0.05$) in forb biomass, protein ($P > 0.05$), NDF ($P > 0.05$), and ADF ($P > 0.05$) composition across the 3 regimes. However, the species diversity index revealed the rotational grazing regime as having a higher diversity of forbs. The knowledge gained from this study may be used by wildlife biologists and landowners alike in order to improve the suitability of pronghorn habitat by utilizing different cattle grazing regimes.

D2
Education
Room 225E

**8:00: Lessons Learned From a Novel Approach to Enhancing Undergraduate Education:
Wildlife Research and Management Mentorship Program**

THOMAS S. JANKE, Borderlands Research Institute, Sul Ross State University, Alpine, TX, USA
LOUIS A. HARVESON, Borderlands Research Institute, Sul Ross State University, Alpine, TX,
USA

CHRISTOPHER M. ESTEPP, Agricultural Education, Communication, and Technology
Department, University of Arkansas, Fayetteville, AR, USA

ABSTRACT The Borderlands Research Institute (BRI) is the research arm of the Department of Natural Resource Management (NRM) at Sul Ross State University. Our mission is ‘*Conserving the natural resources of the Chihuahuan Desert Borderlands through research, education, and outreach*’. Since the Institute’s inception in 2007, it has become a recognized and trusted authority on natural resources and agricultural issues in the region. Although our “educational leg” is inherent to our mission (as we are a part of the Texas State University System), we identified areas we hoped to improve upon. Specifically, our NRM undergraduates with the University were not keeping pace with the quality of graduate students we were producing. Beginning in 2014, the BRI partnered with the Houston Livestock Show and Rodeo to create a novel ‘Mentorship’ Program for our NRM undergraduate students. The focus of the Mentorship Program was to better retain and prepare undergraduate students for serving in the NRM industry. Since its creation, we have mentored 39 different undergraduate students on >50 different research projects. Over the last 5 years, we have had better than anticipated success and experiences with this Program. Though there is always room for improvement, we hope to be able to share our experiences and the Mentorship ‘model’ to other departments within the University, or even other colleges, so we can all ultimately better develop and prepare our future natural resource managers and industry leaders.

8:15: Undergraduate Wildlife Majors' Confidence in Technical, Research and Career Skills

STEVEN "BOOT" CHUMBLEY, Texas A&M University-Kingsville, Kingsville, TX, USA
MATTI BRADSHAW, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT The insufficient level of education and lack of experience among professionals in the field of wildlife ecology has sparked debate at the national level. The lack of quality education among graduates is increasingly noticeable to professionals in the field. The purpose of this study was to identify the confidence levels of wildlife majors in an introductory wildlife course. A total of 68 students participated from a class of 70, resulting in a response rate of 97%. The instrument that guided this study was researcher developed from the minimum required state standards for secondary wildlife courses. The 25-question instrument included the scales: *career skills*, *technical skills* and *research skills*, measured on a 5-point likert-type scale. Overall mean was 3.01 (SD = 1.17). This showed low to moderate confidence levels from participants. The highest score was within the prompt “*Analyzing the importance of wildlife, with an emphasis on use and management*” (M= 3.47, SD = 1.29). The highest scores were found related to technical skills and lowest scores related to career skills. There were low levels of significance when comparing scores by demographic characteristics,

with higher mean confidence scores for males than females. Using One-way ANOVA the researchers found significant differences in individual prompts based on gender and ethnicity. A similar study is will be conducted within the senior wildlife capstone course, to measure differences in student confidence scores. We hope to use these findings to address gaps in student knowledge and prepare all student for academic and career success.

8:30: Spatial Analysis and Reporting Biases of Texas Roadkills Using Citizen Science

REID A. VIEGUT, Stephen F. Austin State University, Nacogdoches, TX, USA
DAVID KULHAVY, Stephen F. Austin State University, Nacogdoches, TX, USA
CHRISTOPHER M. SCHALK, Stephen F. Austin State University, Nacogdoches, TX, USA
DANIEL UNGER, Stephen F. Austin State University, Nacogdoches, TX, USA
I-KAUI HUNG, Stephen F. Austin State University, Nacogdoches, TX, USA
YANLI ZHANG, Stephen F. Austin State University, Nacogdoches, TX, USA

ABSTRACT Every year, many animals are killed by vehicle collisions while attempting to cross roads. Analyses of roadkills are used to determine hotspots and develop mitigation measures to decrease the frequency of animal-vehicle collisions. Searching for roadkill is traditionally a time consuming and costly process, however, citizen scientists can help amass large amounts of data across broad spatial scales. By using data collected through the iNaturalist Roadkills of Texas project, emergent information about multiple species across a broad area can be collected quickly. However, as these data are not collected in a systematic fashion, there may be biases in this dataset. For example, roadkills on more densely traveled roads or roads with a higher speed limit are likely to be under reported while roads within urban environments are likely to be overrepresented. To explore emergent roadkill hotspots as well as explore biases in our dataset, we selected common and widespread taxa that comprised a high number of reported observations (skunks [*Mephitis mephitis* and *Spilogale putorius*], Virginia opossum [*Didelphis virginiana*], and common raccoon [*Procyon lotor*]). We classified the frequency of landcover type in a 400 meter buffer around each meso-mammal roadkill and compared this to the frequency of each landcover type within Texas. Virginia opossum mortality was more common near wetlands, common raccoon mortality was more frequent near woody wetlands, and skunk mortality was more common in pastures and wooded wetlands. Overall, roadkills were more frequently recorded in developed, urbanized areas and pastures relative to the state of Texas.

8:45: Closing the Diversity Gap in Wildlife Careers

AMANDA MASINO, Huston-Tillotson, Austin, TX, USA
KELLY SIMON, Wildlife Division, Texas Parks and Wildlife Department, Austin, TX, USA
WENXIAN TAN, Huston-Tillotson, Austin, TX, USA

ABSTRACT Diversity and inclusion in wildlife and conservation career fields remains low. African Americans comprise 12% of the current U.S. population (14% with biracial individuals included), and Hispanic/Latinx individuals comprise 17%. Yet only 4% of life science-related positions are held by African Americans and 7 % held by Hispanics. The disparity is even more pronounced in conservation science jobs, where only 2% of workers are African American and 4% Hispanic/Latinx (Pew Research Centers, 2018). The problem extends across sectors, with academia, industry, and government facing similar diversity challenges. Even the non-profit sector falls short, with only

11.3% of the leadership positions in conservation organizations held by *any* ethnic minority, including African-Americans, Hispanics, Asians, Native Americans, and other non-White individuals (Taylor, 2014). This lack of diversity limits the intellectual resources, community buy-in, and inclusive planning needed to achieve strong and lasting protection of natural resources. To address this problem, the Texas Parks and Wildlife Department partnered with Huston-Tillotson University, a historically black college or university (HBCU), to create an undergraduate wildlife biology program. The program includes an area of concentration within the Biology major and a faculty-led research program investigating urban coyotes. Students receive research training, mentorship from faculty and TPWD personnel, and, through a program of the TPWD Foundation, internships across a range of units at TPWD. Program pillars include investment in long-term sustainability and engagement with diversity issues. We will discuss program elements, best practices, and challenges applicable to similar endeavors, particularly programs at other minority-serving institutions (MSIs).

A4
Avian Ecology and Management 3
Room 227

10:00: Drivers and Indicators of Riparian Corridor Avifaunal Diversity in the Trans Pecos Region of Texas

CAROLINE SKIDMORE, Texas Tech University, Lubbock, TX, USA

CLINT BOAL, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, USA

BENJAMIN SKIPPER, Angelo State University, San Angelo, TX, USA

RUSSELL MARTIN, Texas Parks and Wildlife Department, Alpine, TX, USA

ABSTRACT Riparian zones of the arid southwest are estimated to contain up to half of the avifaunal regional diversity, making them important areas of conservation concern. These riparian woodlands support multiple federal and state threatened species including the western yellow-billed cuckoo (*Coccyzus americanus*), common black hawk (*Buteogallus anthracinus*), gray hawk (*Buteo plagiatus*), and zone-tailed hawk (*Buteo albonotatus*). During the breeding season of 2018 and 2019, we conducted 53- and 66-radial point count surveys across 8 sampling areas, respectively, with three survey efforts per season within Jeff Davis, Presidio, and Brewster County, TX. For each sampling area, we conducted randomized vegetation surveys which included percent composition, shrub height, cow patty index, mature tree density, and DBH and height measurements of mature trees. We derived density estimates and distance decay functions for each avian species with sufficient (>70) detections across both breeding seasons to calculate abundance. We calculated the Shannon diversity index per point count, followed by an ANOVA to detect significant differential diversity between each sample site ($p = 0.002$). We also conducted a linear mixed effects model investigating overall riparian corridor diversity in relation to vegetation characteristics, as well as species indicators of high diversity. Additionally, we identified specific species such as the summer tanager ($p = 0.001$) that may serve as indicators of high avian diversity. Our results provide evidence of the importance of heterogeneous riparian corridors for the conservation of avian biodiversity in the southwest.

10:30: Integrating Lidar-Derived Canopy Heights Into Models of Golden-Cheeked Warbler Abundance

JAMES M. MUELLER, US Fish and Wildlife Service, Marble Falls, TX, USA

STEVEN E. SESNIE, US Fish and Wildlife Service, Albuquerque, NM, USA

SARAH E. LEHNEN, US Fish and Wildlife Service, Albuquerque, NM, USA

ABSTRACT The U.S. Fish and Wildlife Service is continuing a project to (1) delineate potential golden-cheeked warbler (*Setophaga chrysoparia*, hereafter warbler) breeding habitat using multirate multispectral imagery, (2) develop a fine-grain density model using avian point count surveys, and (3) quantify population size across the 67,000 km² breeding range and areas of conservation interest. Working with American Bird Conservancy, we detected 810 warblers during 1,807 point count surveys across the Edwards Plateau and Cross Timbers in spring 2018. We developed models of detection and density using hierarchical distance sampling. We observed potential overestimates in the models of warbler density in the arid portions of the breeding range. These areas were associated with low canopy height. Lidar was only available for portions of the range, preventing use of canopy height as a metric for modeling. However, new acquisitions of lidar through the USGS 3DEP

program will result in near complete lidar coverage across our project area by April 2020. We are processing these collections to obtain canopy heights. We will combine canopy heights with our cover classification developed at a 1-m pixel resolution using leaf-on and leaf-off 4-band digital aerial photographs to develop refined predictors for modeling warbler density.

10:45: Effects of Grazing on Grassland Bird Richness and Abundance on a South Texas Working Ranch

ALLISON M. KOHLER, Texas A&M University, College Station, TX, USA

ABSTRACT Grassland birds have experienced declines in distribution and abundance over the past several decades, mainly due to habitat loss. Many migratory grassland birds travel through Texas to reach their breeding and wintering grounds each year. This project was established in 2014 by the East Foundation in Jim Hogg and Starr counties, TX, USA. They aimed to determine how grazing affects wildlife across their ~570 km² San Antonio Viejo Ranch. Over the course of six years, point counts were completed across off-treatment reference sites and 4 areas with distinct grazing treatments: continuous grazing with high (14 ha/AU) stocking rate, continuous grazing with moderate stocking rate (20 ha/AU), rotational grazing with high stocking rate, and rotational grazing with moderate stocking rate. Avian richness for all species was not different in any treatment group compared to the control from 2014 to 2019. The relationship between abundance and grazing treatment will also be examined to determine how grassland bird abundance fluctuates with grazing treatment and reference over time. Management implications will provide ranchers with recommendations on how they should apply cattle grazing to support local assemblages of grassland birds that depend on their land for a successful migration.

11:00: Introducing the Borderlands Avian Data Center: A New Tool for Large-Scale Collaborative Bird Conservation

JAMES GIOCOMO, Oaks and Prairies Joint Venture, Round Rock, TX, USA

ANNA MATTHEWS, Oaks and Prairies Joint Venture, San Marcos, TX, USA

ABSTRACT In 2018 the Borderlands Avian Data Center (BADC, www.borderlandsbirds.org) was launched as a regional node of the Avian Knowledge Network covering Texas, Oklahoma, New Mexico, Arizona and parts of Northern Mexico. The goal of BADC is to provide an online collaboration space to support partnerships for coordinated bird monitoring in the region. Through the node partners work collaboratively to share and access data and tools at multiple scales that support bird and habitat conservation. An example of one of BADC's tools is PluMA, which consolidates eight disparate datasets from the southwestern U.S. and northern Mexico to visualize the projected impacts of different climate change scenarios on birds and habitats across the region. Another example is the Phenology tool that provides information about when a species of interest is likely to be present within a given area. There is also an Observations Map tool that will display available bird monitoring data sets, like eBird, Breeding Bird Survey, and other locally based surveys, on one map for a given species. Other tools include online data entry portals for coordinated multi-state bird monitoring programs for Partners in Flight "Red Watch List Species" and citizen-science based programs to promote surveys of remote areas. The BADC is part of a network of nodes across North America developed to encourage standardized bird monitoring methods, facilitate

communication, and archive monitoring data and metadata. A demonstration of new tools and data management infrastructure will be provided.

11:15 Use of Constructed Roosts by Rio Grande Wild Turkeys in South Texas

ALISON MENEFEE, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute,
Kingsville, TX, USA

WILLIAM P. KUVLESKY, JR., Texas A&M University-Kingsville, Kingsville, TX, USA

LEONARD A. BRENNAN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

J. ALFONSO ORTEGA-S., Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

JOSHUA P. VASQUEZ, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

ABSTRACT Rio Grande wild turkeys are an important upland game species in South Texas. Constructed roosting structures may be erected in areas where trees are a factor limiting population increases if no natural roosting structures are available. Very little research attention has been paid to the use of constructed roosts, and even less research has been undertaken to study how site and landscape characteristics may influence their use by wild turkeys. Our goal was to assess factors influencing the use of constructed roost sites by wild turkeys in South Texas rangelands. We used 32 constructed roosts across South Texas to assess how vegetation composition and associated landscape structure correlate with roost site use. Vegetation sampling occurred during the breeding and wintering seasons for 2018 and 2019 (May 2018, November 2018, June 2019). We identified roost use, measured ground canopy cover, height of visual obstruction, and identified plant species. Satellite imagery was downloaded from PLANET database at 3m temporal resolution for each sampling period and classified into woody, herbaceous, and bare ground classes. Buffers in 20m increments, up to 1000m, were then clipped from the classified imagery to determine the relation between roost use and landscape changes as a function of distance from roosts. The metrics used to assess landscape structure within buffers that were most correlated with roost site use were percent woody cover, largest patch index, mean patch area, aggregation index, edge density, patch density, and Euclidean nearest neighbor distance distribution. Knowledge of landscape structure and compositions obtained from the imagery will allow us to identify trends in roost site characteristics used by wild turkeys.

B3
Conservation and Ecology of Mammals 2
Room 225C

10:00: Herbivore Abundance and Weather Affect Food Supply Early in Plant Growing Season

LEE HARRIS WILLIAMSON, Texas State University, San Marcos, TX, USA
FLOYD W. WECKERLY, Texas State University, San Marcos, TX, USA

ABSTRACT Vegetation responses to herbivory are mediated by precipitation. How herbivory and precipitation affect food supplies for an entire herbivore population, however, has not been addressed. Our study examines environmental variables influencing forage biomass for a population of Roosevelt elk (*Cervus canadensis roosevelti*) early in the plant growing season in Redwood National and State Parks. The food supply consists of a meadow complex with a year-round elk population in an area with a growing season from autumn to early spring. Using elk abundance to index herbivory and direct estimates of forage biomass, we collected data across the 7 sub-patches in the meadow complex grazed by the elk population. We obtained data on precipitation during the early growing season from a local weather station. We collected data over 15 years where elk abundance (17-67) and precipitation (7-88") varied and used this data to construct linear-mixed effect models that examined the influences of elk abundance and total precipitation early in the area growing season on forage biomass. We then compared models to see whether elk abundance and precipitation better predicted forage biomass as fixed interacting effects or fixed additive effects. The model that best predicted forage biomass included abundance and precipitation as fixed additive effects with random effects of sub-patch and year. Elk abundance had a negative affect on forage biomass and precipitation a positive effect. These results indicate that elk abundance and precipitation each have a straightforward influence on herbivore food supply with no interaction.

10:15: Landscape Patterns of Ocelot Vehicle Collision Sites

ANNMARIE BLACKBURN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
C. JANE ANDERSON, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
AMANDA M. VEALS, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
MICHAEL E. TEWES, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
DAVID B. WESTER, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
JOHN H. YOUNG, JR., Texas Department of Transportation, Environmental Affairs Division,
Austin, TX, USA
RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute,
Kingsville, TX, USA

ABSTRACT Road networks can have widespread negative impacts on wildlife populations such as habitat fragmentation, decreased landscape connectivity, and wildlife-vehicle collisions, which can influence the spatial ecology and population dynamics of imperiled species. The ocelot (*Leopardus pardalis*) is a federally endangered wild felid found in South Texas, with two remnant populations of <80 individuals. Ocelots in this region are habitat specialists selecting areas with $\geq 75\%$ woody

cover. Vehicle collisions are one of the highest sources of mortality for Texas ocelots. This study examined whether land cover spatial structure is related to ocelot road mortality locations. We examined the amount and distribution of three land cover types at multiple spatial scales surrounding ocelot-vehicle collisions ($n = 26$) from 1986-2017. We found road mortality sites consisted of higher percentages of woody cover ($p < 0.0409$), larger patches of woody cover ($p < 0.0455$) relatively close to roads (450-600-m), and shorter distances between woody patches ($p < 0.0382$) relatively further away from roads (1200-1500-m) compared to random road locations. Percent land cover was the best indicator of ocelot-vehicle collision sites. This indicates that ocelots were struck in areas similar to those they typically select. These findings suggest that the development of roads in these areas can have negative impacts on ocelots by fragmenting critical habitat and increasing ocelot vulnerability to vehicle collisions. This information will provide conservation planners with a better understanding of the landscape features at ocelot road mortality sites and consequently can be used to guide the placement of future road crossing structures.

10:30: Predictive Performance of GPS Telemetry Fix Rates to Inform Ocelot Species Distribution Models

JASON V. LOMBARDI, 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, TX, USA

MICHAEL E. TEWES, Caesar Kleberg Wildlife Research Institute, Texas A&M University
Kingsville, Kingsville, TX, USA

JOHN P. LEONARD, Natural Heritage New Mexico, Department of Biology, University of New
Mexico-Albuquerque, Albuquerque, NM, USA

DAVID G. HEWITT, Caesar Kleberg Wildlife Research Institute, Texas A&M University
Kingsville, Kingsville, TX, USA

DANIEL G. SCOGNAMILLO, Arthur Temple College of Forestry and Agriculture, Stephen F.
Austin State University, Nacogdoches, TX, USA

TYLER A. CAMPBELL, East Foundation, San Antonio, TX, USA

ABSTRACT Private rangelands in Willacy and Kenedy counties, Texas are home to 80% of the known breeding population of ocelots (*Leopardus pardalis*) in Texas. Loss of habitat and fragmentation in surrounding areas has isolated this Ranch Population from the Refuge Population in Cameron County. Species distribution modeling combines observational data with a suite of environmental predictor layers to generate a model of potential habitat. However, knowledge of current ocelot presence or distribution is difficult to determine which can be problematic for the development of future management or recovery goals. Further, serial autocorrelation often prevents the use of GPS telemetry data to be incorporated into such models. We conducted the present study to evaluate the predictive performance of GPS fix rates in program MaxEnt to identify the optimal GPS fix rate to inform ocelot distribution models. From 2014-2017, we captured and collared 8 ocelots on the East Foundation's El Sauz Ranch in Willacy and Kenedy counties, Texas. Two hour fix rates have similar performance to 12 hr fix rates and might represent the optimal fix rates for researchers trying to obtain as much GPS data over longer periods as possible while avoiding serial autocorrelation. Probability of ocelot presence was greatest in mixed woody canopies which is important in determining ocelot presence on the Coastal Sand Plain of South Texas. This study indicates that accounting for serial autocorrelation among step lengths at different fix rates can

enable researchers to use high-frequency GPS data within MaxEnt without potentially biasing occurrence data.

10:45: Functional Responses in Resource Selection By Ocelots in South Texas

AMANDA M. VEALS, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
ANNMARIE BLACKBURN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
MICHAEL E. TEWES, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
JOSEPH D. HOLBROOK, University of Wyoming, Laramie, WY, USA
HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute,
Kingsville, TX, USA
C. JANE ANDERSON, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
TYLER CAMPBELL, East Foundation, San Antonio, TX, USA
JOHN H. YOUNG, Texas Department of Transportation, Austin, TX, USA

ABSTRACT The distribution of animal populations and the factors that influence animal use of the landscape are of key interest to ecologists and managers. Individual animals often experience different environmental conditions and may have different behavioral responses to those environments, termed a functional response in habitat use or selection. Traditional methods to evaluate resource selection by animals do not take functional responses into consideration, which could constrain conservation efforts. We assessed functional responses in habitat use for a federally endangered carnivore, the ocelot (*Leopardus pardalis*). We examined how spatial and temporal variation influenced ocelot-habitat relationships by leveraging a 35-year (1982-2017) telemetry dataset of 83 ocelots (42 males, 41 females) to evaluate how individual behavior changed across a gradient of environmental conditions. We implemented an integrated approach to characterize ocelot-habitat relationships and assess behavioral differences with changing environments across time periods. We paired remotely sensed data with telemetry locations of ocelots and assessed habitat use, resource selection, and functional responses. We tested a second-order selection model that included vegetation cover, road densities, and traffic volumes, then estimated inverse variance-weighted mean coefficients averaged across individuals. Ocelots used areas that were dominated by woody cover but were more heterogenous in landscape structure. Our results show ocelots selected for areas farther from roads across all time periods. Spatial and temporal variation in habitat availability strongly influenced functional responses by ocelots. The insights garnered from our approach can advance habitat conservation efforts and subsequent transportation network planning.

11:00: Influence of Lunar Phase on Movement and Habitat Use of Ocelots and Bobcats

MAKSIM SERGEYEV, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
JASON LOMBARDI, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
MICHAEL TEWES, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA
TYLER CAMPBELL, East Foundation, San Antonio, TX, USA

ABSTRACT For nocturnal animals, visibility is greatly influenced by moon phase and, as such, the phase of the moon may influence activity and habitat selection of these species. However, the effects of varying moon stage may differ across taxa. Prey species often reduce activity during highly visible

periods of night while predators may increase activity or alter their habitat use. Ocelots (*Leopardus pardalis*) and bobcats (*Lynx rufus*), two nocturnal predatory felids that coexist in southern Texas, may also alter their behavior in response to the phase of the moon. We predicted that ocelots would increase use of dense thornshrub to reduce their visibility during a full moon. However, as bobcats are habitat generalists and are more active during crepuscular periods, we predicted less influence of moon phase on activity. To examine the effect of moon phase on movement and selection preferences, we collected high-frequency GPS data on 8 ocelots and 6 bobcats on the East Foundation's El Sauz Ranch in southern Texas from May 2013 to May 2017. We used logistic regression models to examine differences in daily movement rates. To evaluate habitat selection, we performed resource selection functions to compare land use during periods of high luminosity (± 3 days of a full moon) compared to low luminosity (± 3 days of a new moon). Movement was highest during full moons for both species. Additionally, use of canopy cover was greatest during waxing/waning moons for both species. Understanding habitat use patterns is instrumental for the conservation of ocelots and similarly threatened species.

11:15: Accelerated Growth of Tamaulipan Thornshrub Habitat for Ocelots

JOSE GERARDO CORTEZ JR., Texas A&M University-Kingsville, Kingsville, TX, USA
SANDRA RIDEOUT-HANZAK, Texas A&M University-Kingsville, Kingsville, TX, USA
DAVID WESTER, Texas A&M University-Kingsville, Kingsville, TX, USA
MICHAEL TEWES, Texas A&M University-Kingsville, Kingsville, TX, USA
JONAH EVANS, Texas Parks and Wildlife, Boerne, TX, USA

ABSTRACT Loss of habitat is a major issue contributing to the declining number of ocelots (*Leopardus pardalis*) in the Lower Rio Grande Valley (LRGV), Texas. Ocelots within this region are limited to 2 displaced breeding populations, located in Willacy and Cameron counties, widely separated from one another by urban and agricultural development. The objectives of this project are to test various management techniques on (1) newly-planted, and (2) established thornshrub plants to identify which treatments are most successful in rapidly growing high-quality thornshrub cover for ocelots. I hypothesize that (1) to encourage multiply stemmed shrubs, leading trunks can be clipped within 15 cm of the soil surface and (2) survivorship in the harsh environment of the LRGV can be encouraged by placing mulch, to cool the soil surface, and reduce water demand and competition, around emergent stems and under the canopy. Established individual plants of 3 species will be either (1) clipped, (2) mulched, or (3) receive both clipping and mulching. Exclosures will also be placed around some replicates of each species and treatment combination to determine the impact of browsers on growth and development. I will also plant seedlings of 7 species commonly associated with ocelot habitat. Upon planting these seedlings will receive clipping, mulching, or combination treatment. Comparing the results of treatments among established and newly planted populations will not only allow evaluation of the treatments themselves in survivorship and formation of shrub architecture, but may determine when treatments are best applied, at the time of planting or afterwards.

C3
Occupational Planning and Policy
Room 225E

10:00: Determinants of Private Landowner Participation in Endangered Species Conservation: A Comprehensive Review and Analytical Framework

JARED MESSICK, Texas State University, San Marcos, TX, USA

ABSTRACT Endangered species (ES) populations are increasingly threatened by habitat loss and displacement. In the U.S., the future of ES is largely in the hands of private landowners and agency and non-governmental entities' ability to collaborate with them. While there is a growing literature investigating factors driving landowner participation in private lands conservation (PLC), studies suggest that the decision of landowners to engage in PLC may be significantly influenced by the potential presence of ES populations. In this comprehensive review of the PLC literature, we focus on the drivers of landowner engagement in ES conservation. Using vote counting, we conducted a thorough review of the literature to catalogue existing PLC research into an existing, popular environmental stewardship framework. Findings revealed three key themes. First, government incentives and individual moral obligation to conserve wildlife on one's property were the most influential factors driving participation in ES conservation programming. Second, a lack of physical, financial, and human capital available to private landowners can limit a landowner's capacity and efficacy in carrying out PLC. Finally, diverging from common themes within the PLC literature promoting individual attributes as the most significant determinants of landowner behavior, our results suggest that the success of ES conservation on private lands is dependent on the social and ecological context that influences landowner preferences for government interventions. By removing cultural and financial disincentives for private landowners, we posit that the social and human capital available to governing institutions can alter social-ecological systems in favor of PLC.

10:15: Determinants of Private Landowner Participation in Houston Toad Safe Harbor Agreement

JARED MESSICK, Texas State University, San Marcos, TX, USA

ABSTRACT The importance of endangered species conservation on private property continues to grow as endangered species populations are increasingly threatened by habitat loss and displacement. The importance of private lands conservation (PLC) for endangered species protection is an exercise in stewardship. However, much of the literature centers on specific species, government interventions, or geographic areas. A sizable knowledge gap exists regarding the factors that lead to the success or failure of environmental stewardship in the context of endangered species conservation on private lands. In Texas, nearly 98% of all property is privately owned, rendering PLC critical for protecting Texas-endemic endangered species across entire ranges. To understand how a novel agency-led intervention to promote endangered species on private lands can support and enable local efforts to protect Houston toads (*Anaxyrus houstonensis*) at the landscape scale, we situate findings from 32 interviews with key informants within a popular stewardship framework. Our approach revealed that landowners may have a greater willingness to participate in PLC as social capital between agencies and landowners increases. Results also suggest that the prevalence of landowners' obligations to protect natural resources supersede culturally embedded myths and

attitudes of anti-government sentiment associated with rural areas. Finally, our results highlight landowner preferences for educational and technical incentives in motivating and enabling PLC when financial incentives are lacking. In conclusion, agency inclusion of and communication with private landowners in the PLC process can remove disincentives associated with endangered species on private lands and capitalize on landowner obligations to steward endangered species.

10:45: A Fin-Fowl Partnership: Coastal Habitat Mapping and the Potential for Collaboration between Fish and Wildlife Biologists

ZACHARY OLSEN, Texas Parks and Wildlife Department, Corpus Christi, TX, USA

EMMA CLARKSON, Texas Parks and Wildlife Department, Corpus Christi, TX, USA

ABSTRACT The research and management of fish and wildlife is often conducted by different entities, with little communication among professionals in these disparate disciplines. The need for coastal habitat data is one potential commonality among fish and wildlife biologists and presents an opportunity for collaboration between these two fields. Here we present a coastal habitat mapping project that includes Galveston Bay, Matagorda Bay, San Antonio Bay, and Aransas Bay and focuses on mapping saltmarsh, mangrove, tidal flats, shell beach, emergent oyster reef, and seagrass to the intertidal zone. This project uses publicly available aerial imagery collected by the Texas Orthoimagery Program and semi-automated mapping techniques supported by extensive ground-sampling to verify mapped outputs. Deliverables from this project (digital habitat maps) will be beneficial to the management of both fish and waterfowl habitats in the Texas coastal region. Future collaborations between fish and wildlife biologists could make such habitat mapping initiatives more useful to a wider array of applications by aligning needs for specific data features (e.g., what habitats or habitat characteristics are mapped and where) and data standards (e.g., spatial scale of imagery and minimum mapping unit of the final mapped product). Further, given the amount of effort necessary for such large-scale mapping endeavors, future collaborations could leverage both funding and man-power for more efficient and frequent updating of coastwide habitat maps.

11:00: Linking Habitat Delivery and Science: A Case Study with the Grassland Restoration Incentive Program

DEREK SHANE WILEY, Oaks and Prairies Joint Venture, Quail Forever, Throckmorton, TX, USA

ANNA MATTHEWS, Oaks and Prairies Joint Venture, American Bird Conservancy, San Marcos, TX, USA

JAMES GIOCOMO, Oaks and Prairies Joint Venture, American Bird Conservancy, Round Rock, TX, USA

STEVEN RILEY, Oaks and Prairies Joint Venture, Texas Parks and Wildlife Department, Georgetown, TX, USA

WILLIAM NEWMAN, Oaks and Prairies Joint Venture, Quail Forever, Floresville, TX, USA

LEAH LOWE, Oaks and Prairies Joint Venture, National Wild Turkey Federation, Ada, OK, USA

KENNETH GEE, Oaks and Prairies Joint Venture, American Bird Conservancy, Ardmore, OK, USA

AMANDA HAVERLAND, Oaks and Prairies Joint Venture, American Bird Conservancy, San Marcos, TX, USA

ABSTRACT The Oaks and Prairies Joint Venture (OPJV) and its partners work to link landscape-level planning and science-based conservation to on-the-ground management striving for national bird population goals. Using a Strategic Habitat Conservation framework, the OPJV works at multiple scales to perform biological planning, landscape conservation design, habitat evaluation, and population monitoring to support species that depend on grasslands within the Oaks and Prairies and Edwards Plateau Bird Conservation Regions within Texas and Oklahoma. Using northern bobwhite (*Colinus virginianus*) as the flagship species, the OPJV developed Grassland Restoration Incentive Program (GRIP) as the habitat delivery portion of our conservation framework. GRIP has improved grassland wildlife habitat on over 85,000 acres (34,398 ha) of working lands with 300 projects in the OPJV geography since 2014. GRIP utilizes proven grassland management practices including prescribed fire, prescribed grazing, range planting, and brush management to streamline grassland management. OPJV partners conduct county-level, spring grassland bird monitoring which has included 27,971 point counts since 2013. Partners are also designing field-level effectiveness monitoring protocols for GRIP projects along with over-winter bird monitoring methods. This combination offers unique opportunities to assess effectiveness of conservation delivery and habitat practices on multiple scales for birds, landowners, and land. Additionally, there is opportunity to apply existing long-term monitoring data to research questions to improve OPJV-wide habitat and grassland bird population models. This case study highlights the value of creating landscape-level, long-term conservation plans that incorporate science and monitoring in conjunction with landscape-level conservation delivery efforts.

11:15: Raccoon Roundworm as an Occupational Hazard to Captive Wildlife and Their Caregivers

TIFFANY POPE, Texas A&M University-Kingsville, Kingsville, TX, USA

AUSTIN K. KILLAM, Texas A&M University-Kingsville, Kingsville, TX, USA

VICTORIA M. CAVAZOS, Texas A&M University-Kingsville, Kingsville, TX, USA

SCOTT E. HENKE, Texas A&M University-Kingsville, Kingsville, TX, USA

DAVID B. WESTER, Texas A&M University-Kingsville, Kingsville, TX, USA

HUMBERTO L. PEROTTO-BALDIVIESO, Texas A&M University-Kingsville, Kingsville, TX, USA

CLAYTON D. HILTON, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Caregivers of captive wildlife are at risk of zoonotic diseases because they have contact with wildlife, their bodily fluids, and feces. One such zoonosis is *Baylisascaris procyonis*, an intestinal parasite of raccoons (*Procyon lotor*), whose larvae can cause blindness, paralysis, and death in intermediate hosts, including humans. Our objectives were to 1) determine the prevalence of *B. procyonis*-positive scats and raccoons within a wildlife research facility operated by Texas A&M University-Kingsville, 2) determine the potential exposure of *B. procyonis* to captive wildlife and human caregivers, and 3) determine the most effective method to neutralize potential transmission of *B. procyonis* to humans and captive animals. Fifty wild raccoons were captured within the research facility during July 2017 - June 2018. Twenty-three (46%) raccoons were infected with 295 *B. procyonis* roundworms, as well as 18 of 120 raccoon scats (15%) collected throughout the facility during the same period were also infected with *B. procyonis*. We estimated about 20% of the total enclosure areas contain *B. procyonis*-contaminated soil. A greater number of *B. procyonis*-contaminated scat was found in and around food bins within the facility; exposing wildlife caregivers to potential

B. procyonis infection. Flaming contaminated soil with a propane pear burner followed by discing and re-flaming the area for at least 1 minute/m² was successful in rendering the majority of *B. procyonis* eggs unviable within the top 5 cm of the soil column. Presoaking the contaminated area with water prior to flaming reduced the flaming time of the soil by 50%.

Poster Session 1
Watergarden

1. Small Mammal Community Dynamics and Ectoparasite Loads in Tamaulipan Thornscrub Habitat

ALEXA S. AGUILAR, Texas A&M International University, Laredo, TX, USA

CORD B. EVERSOLE, Texas A&M International University, Laredo, TX, USA

ABSTRACT Small mammals play an integral role in ecosystem ecology not only in Texas, but throughout the world. These organisms are known to be great indicators of overall ecosystem function and health. Studies over small mammals are important ecologically as well as medically, because they are known to be highly competent hosts for ticks and tick-borne disease. This can have major implications for wildlife, livestock, and human health. In this study, we gathered data on small mammal community ecology to determine species diversity, abundance, and overall ectoparasite (i.e., ticks) loads at a South Texas site. We assessed differences in the parameters in edge vs interior habitats across a gradient of habitat fragmentation and species assemblage. We trapped small mammals via Sherman traps baited with an oat and grain mixture. Our data demonstrate that our study site is dominated by *Peromyscus leucopus*, a known generalist species. This is likely due to the major disturbance factors present (past land management, invasive grasses) at this site. These data provide insight into the overall small mammal diversity of this area, as well as potential disease risks across South Texas.

2. Protein Feeder Utilization by Raccoons in the Cienega Mountains, Texas

ERIN E. BITTNER, Sul Ross State University, Alpine, TX, USA

THOMAS JANKE, Sul Ross State University, Alpine, TX, USA

LOUIS HARVESON, Sul Ross State University, Alpine, TX, USA

JOSHUA CROSS, Sul Ross State University, Alpine, TX, USA

ABSTRACT Protein feeders are a popular management tool used in the Trans-Pecos region of Texas to provide supplemental feed to various wildlife species throughout the year. Feeders are most commonly used to target big game species (e.g., deer), but other non-game species, such as raccoons (*Procyon lotor*), are seen utilizing the feeders as well. To better understand the extent raccoons visit various feeder sites, and what species they may or may not interact with at the feeder locations, we placed 13 Moultrie (M-880) motion-activated trail cameras at 13 free-choice protein feeders from November 2018 - April 2019 on a private ranch in the Cienega Mountains. Objectives of the study included: 1) documenting the timing and group size of raccoon feeder visitation, 2) quantifying interspecies interactions with raccoons at feeder sites, and 3) evaluating feeder preference by the raccoons. Over the course of the study, 144,815 photos were collected. All photos were re-named based on their date and time stamp, organized into feeder locations, and sorted into species categories. All raccoon photos (n = 12,649) were later sub-sorted by the number of individuals at the feeder as well as any observed interspecies interactions. Results show that raccoons: 1) prefer crepuscular and nocturnal feeder visits, 2) averaged just over 2 raccoons per independent photo capture, 3) had the most (~86%) interspecies interactions with mule deer (*Odocoileus hemionus*), and 4)

utilized ~85% of the feeder locations. Observations from this study will better aid biologists and managers in the usage of protein feeder by raccoons.

3. Evaluating Precipitation Effects on Eyeworm and Cecal Worm Prevalence in Quails Throughout the Trans-Pecos Region of Texas

RACHEL E. BITTNER, Sul Ross State University, Alpine, TX, USA

RYAN S. LUNA, Sul Ross State University, Alpine, TX, USA

RYAN O'SHAUGHNESSY, Sul Ross State University, Alpine, TX, USA

DALE ROLLINS, Rolling Plains Quail Research Ranch, Rotan, TX, USA

ZOE R. CARROLL, Sul Ross State University, Alpine, TX, USA

TREY E. JOHNSON, Sul Ross State University, Alpine, TX, USA

ABSTRACT Quail populations in the southwestern U.S. are influenced by the amount and timing of precipitation. Precipitation (or the lack thereof) is an important driver of the diversity and amount of plants present in the Trans-Pecos. The plants available in an area influence the concentration of insects, such as grasshoppers (*Acridomorpha* spp.), which are an important food source for both quail chicks and adults. Precipitation may also influence parasite population dynamics, specifically, parasites that utilize insects as intermediate hosts. However, there is currently little information regarding the precipitation/parasite relationship of the parasitic eyeworm (*Oxyuris petroni*) and the cecal worm (*Anlonocephalus pennula*) infecting quails of the Trans-Pecos ecoregion: scaled quail (*Callipepla squamata*), Gambel's quail (*Callipepla gambelii*), and Montezuma quail (*Cyrtonyx montezumae*). We collected a total of 386 scaled quail, 7 Gambel's quail, and 1 Montezuma quail, using a combination of hunter donations, funnel trapping, and collection under scientific permit. Eyeworms and cecal worms were extracted, identified, and counted. The objective of this study is to evaluate the effects of a precipitation gradient on eyeworm and cecal worm prevalence, abundance, and intensity in these 3 species of quail. Understanding the precipitation/parasite relationship dynamics in desert ecosystems is an important step in evaluating how these parasites may be impacting Trans-Pecos quails.

4. Comparative Landscape Analysis of Wildlife Crossing Structures and Vehicle Collision Sites of the Endangered Ocelot

ANNMARIE BLACKBURN, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

AMANDA M. VEALS, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

MICHAEL E. TEWES, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

JOHN H. YOUNG, JR., Texas Department of Transportation, Environmental Affairs Division,
Austin, TX, USA

RANDY W. DEYOUNG, Caesar Kleberg Wildlife Research Institute, Kingsville, TX, USA

HUMBERTO L. PEROTTO-BALDIVIESO, Caesar Kleberg Wildlife Research Institute,
Kingsville, TX, USA

ABSTRACT Wildlife-vehicle collisions are a novel source of mortality for wildlife, having significant impacts on imperiled populations. Wildlife crossing structures are designed to mitigate the impact of road mortality by allowing safe passage of wildlife above or below roads. Ideally, crossing structures connect to suitable habitat for a target species. For many carnivores, vehicle

collisions typically occur near habitat and use areas for those species, thus, crossing structures are often placed near road mortality hot spots. Ocelots (*Leopardus pardalis*) are a federally endangered felid with remnant populations of <80 individuals between two isolated populations in the Lower Rio Grande Valley (LRGV) of South Texas. Vehicle collisions are considered one of the highest sources of mortality for Texas ocelots. Crossing structures designed for ocelot use have been implemented throughout the LRGV since the 1990s. However, there has been no documented use of these crossing structures by an ocelot. The goal of this study is to analyze landscape characteristics surrounding these crossing structures compared to those surrounding ocelot-vehicle collision sites. We will quantify land cover types surrounding crossing structures (n = 32) at multiple spatial extents and calculate landscape metrics that explain the amount and distribution of each land cover type. We will then compare these metrics to those from ocelot-vehicle collision sites (n = 26). We aim to understand if ocelots are not using these structures due to improper placement in relation to ocelot habitat.

5. A Comprehensive Study of Parasites of the Texas State Bison Herd

SARA B. BOGGAN, Tarleton State University, Stephenville, TX, USA

HEATHER MATHEWSON, Tarleton State University, Stephenville, TX, USA

KRISTIN HERRMANN, Tarleton State University, Stephenville, TX, USA

DONALD BEARD, Texas Parks and Wildlife Department, Austin, TX, USA

ABSTRACT Parasites can have a significant effect on the typical growth and weight gain of any species, in our case we are evaluating Bison. Texas Parks & Wildlife Department (TPWD) biologists are charged with the management of the Texas State Bison herd at Caprock Canyons State Park, Briscoe County, Texas, and base their management plans on restoring native prairies to preserve the historic herd. To improve their management plan, we have started a comprehensive study of the micro and macro parasites of the herd. The objectives of this study are to 1) determine the presence and prevalence of micro and macro parasites, 2) identify the species of micro and macro parasites present, and 3) determine if treatment of the herd for parasites is necessary in the Texas State Bison herd. We will collect fecal samples from a treatment and control group of cows and juveniles. For this study, TPWD biologists will not provide treatment to 50% of tagged females during the winter and summer treatment months, thus allowing them to serve as controls. We will test all samples using the Modified McMaster test. Thus far, preliminary results have suggested the presence of *Coccidia*, *Trichostrongylus* spp., and *Moniezia* spp. Findings from this study will provide TPWD with data concerning the presence and prevalence of micro and macro parasites found in the herd.

6. Comparison of Nutritional Values of Individual Juniper Species in the Trans-Pecos Region of Texas

DANIEL E. BOTELLO, Sul Ross State University, Alpine, TX, USA

THOMAS S. JANKE, Sul Ross State University, Alpine, TX, USA

LOUIS A. HARVESON, Sul Ross State University, Alpine, TX, USA

ABSTRACT

The Trans-Pecos region of Texas is home to various species of juniper (*Juniperus*). These *Juniperus* species are all very similar in appearance and are said to be similar in nutritional value. As part of a region-wide, multi-season nutrition study, vegetation samples were collected as composite

representations of *Juniperus* from several mountains ranges during the 2018 Hot/Dry (Mar - Jun) and 2018 Warm/Wet (Jul - Oct) seasons. From Jan - Feb 2019 (Cold/Dry season) samples were collected with a focus at the species level, with the intent of identifying any significant differences in nutritional value for wildlife. A composite sample from each collection site was also taken to compare to previous seasonal results. Rose-fruited juniper (*J. coahuilensis*), Redberry juniper (*J. pinchotii*), Alligator juniper (*J. deppeana*), and One-seeded juniper (*J. monosperma*) were collected and individually tested for %Crude Protein, %ADF, and %aNDF. Results show that during the 2019 Cold/Dry season, *J. pinchotii* had highest average levels of %Crude Protein, and *J. deppeana* had the lowest average levels of %ADF and %aNDF. This data, along with previously reported secondary compound composition (i.e., terpenoid type and levels), will hopefully help researchers, managers, and landowners better understand the nutritional value (and possibly palatability and overall digestibility) of these *Juniperus sp.* throughout the Trans-Pecos.

7. Short-Term Movements of Translocated Northern Bobwhite in Central Texas

ELIZABETH BROGAN, Tarleton State University, Stephenville, TX, USA

JOHN PALARSKI, Tarleton State University, Stephenville, TX, USA

HEATHER MATHEWSON, Tarleton State University, Stephenville, TX, USA

BRADLEY KUBEČKA, Tall Timbers Research Station and Land Conservancy, Tallahassee, FL, USA

DALE ROLLINS, Rolling Plains Quail Research Foundation, Rotan, TX, USA

ABSTRACT The decline of the northern bobwhite (*Colinus virginianus*; hereafter bobwhite) has resulted in local, regional, and statewide extirpation across its range. Within the Cross Timbers ecoregion of Texas, this decline is evident and remnant populations exist across a fragmented landscape. To reverse this decline, translocation has emerged as a possible solution to restock remnant populations in restored habitat. Site fidelity post-release is crucial to the success of a translocation effort. Although mostly sedentary, bobwhites possess the ability to make large movements that can lead to decreased survival over time. In April 2019, we released 167 wild-trapped bobwhites on a 1,011-ha area in Erath County, Texas. We fit 5 males with backpack-style GPS transmitters. Our objective was to describe short-term movements of translocated bobwhites. The GPS transmitters obtained daily fixes at 0800, 1530, 1930, and 2200 hrs CST for 3 weeks post-release. These times represent morning foraging, afternoon loafing, evening foraging, and roosting. Moreover, this information allowed us to monitor initial movement patterns of translocated bobwhites upon release. Individual core home ranges varied from 2.70 to 12.28 ha for all 5 birds, and they did not move more than approximately 400 m from their release site. Mean daily movement did not exceed 400 m for any of these individuals. We found that translocated male bobwhites, employed under a soft release, maintained high site fidelity within the first 3 weeks post release.

8. Monitoring Wildlife Communities within Riparian Areas

KATHRYN L. BURTON, Tarleton State University, Stephenville, TX, USA

HEATHER A. MATHEWSON, Tarleton State University, Stephenville, TX, USA

DARREL MURRAY, Tarleton State University, Stephenville, TX, USA

ABSTRACT Wildlife communities can be influenced by changes in riparian zones, such as water levels and vegetative composition. Land restoration practices are used to improve the ecosystem and monitoring of land changes is necessary to evaluate the effectiveness of the practices. In Palo Pinto County, Texas, we are surveying vegetation, avian, invertebrate, and mammal communities within specified riparian buffer zones for occupancy and changes in communities. We used stratified random sampling to establish 20 points across the riparian buffers to monitor multi-year, landscape-scale changes. We conduct surveys within each of four seasons. At each point, we conduct avian point counts for all species seen or heard, and we use pitfall traps, pollinator surveys, aquatic invertebrate surveys, and vacuum sampling for documenting the invertebrate community. We use a point-center-quarter method with Daubenmire frames for vegetation surveys to obtain canopy cover, herbaceous cover, and species composition, as well as some vegetation structure information that we can correlate with the invertebrate community. Additionally, we have a game camera established at each point and we take photo documentation of the point site. To compare local-scale impacts of specific land management activities, including brush management, prescribed burns, and native seed plantings, we will survey each community before and after every management activity. Over the 5+ years of this project, we will be able to determine effectiveness of land restoration activities on the vegetation, invertebrate, and avian communities.

9. Reintroduction of Northern Bobwhite to the Gus Engeling Wildlife Management Area

RICARDO CAGIGAL PEREZ, Texas A&M University, College Station, TX, USA

DIEGO NAVARRO, Texas A&M University, College Station, TX, USA

KYLE T. HAND, Texas Parks and Wildlife Department, Tennessee Colony, TX, USA

KYLE R. BRUNSON, Texas Parks and Wildlife Department, Tennessee Colony, TX, USA

JEFFREY W. GUNNELS, Texas A&M University, College Station, TX, USA

THERESE A. CATANACH, Texas A&M University, College Station, TX, USA

MICHAEL C. FRISBIE, Texas Parks and Wildlife Department, Austin, TX, USA

JASON B. HARDIN, Texas Parks and Wildlife Department, Austin, TX, USA

ROBERT M. PEREZ, Texas A&M University, College Station, TX, USA

BRIAN L. PIERCE, Texas A&M University, College Station, TX, USA

NOVA J. SILVY, Texas A&M University, College Station, TX, USA

ABSTRACT We evaluated the effectiveness of reintroduction of northern bobwhite (*Colinus virginianus*) on the Gus Engeling Wildlife Management Area (GEWMA), where they have been extirpated, but suitable habitat exists. Prior to reintroduction, GEWMA was surveyed to ensure no bobwhites were present on the site. Forty-six (26 males and 20 females) bobwhites were trapped from 7 March-5 April 2019 in South Texas, banded, radio-tagged, transported to GEWMA, and released. Seventeen (9 males and 8 females) bobwhites were trapped from 13-15 April 2019, banded, radio-tagged, and released back into the source population as a control for comparison of movements, reproduction, and survival estimate differences between the source and released. Survival for bobwhites released at GEWMA only was 37.0% compared to 70.6% for birds left on the ranch in South Texas. As of 1 July 2019, 3 nests (all depredated) were found at GEWMA while none were found on the ranch in South Texas. Movement distances between daily locations for males and females did not differ between sites, however there was a significant difference in daily movement between study areas. Female quail at GEWMA moved 5.4 times the distance of female quail in South Texas and male quail at GEWMA moved 5.9 times the distance of male quail in South Texas. Quail at GEWMA were located in woody cover only 24.2% of the time, compared to 76.1%

of the time in South Texas. The greater daily movement and lower use of woody cover by quail at GEWMA contributed to their lower survival.

10. Influence of Ashe Juniper Cover on Essential Habitat Features of Montezuma Quail

ANNALYSA MARIE CAMACHO, Cesar Kleberg Wildlife Research Institute, Department of Rangeland and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

KRISTYN G. STEWART, Cesar Kleberg Wildlife Research Institute, Department of Rangeland and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

FIDEL HERNÁNDEZ, Cesar Kleberg Wildlife Research Institute, Department of Rangeland and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA

ABSTRACT Montezuma quail (*Cyrtonyx montezumae*) are a unique and understudied species inhabiting the Southwestern United States, specifically Arizona, New Mexico, and Texas. In Texas, the Edwards Plateau ecoregion contains an isolated population of Montezuma quail. Over the past century, Ashe juniper (*Juniperus ashei*) has encroached across the Edwards Plateau, converting historic savanna grasslands into large, closed-canopy woodlands. Current research indicates that Montezuma quail avoid areas with >20% juniper cover. To understand how increasing juniper cover specifically affects habitat features essential for Montezuma quail, we conducted research to quantify grass height, bunch-grass density, and forb diversity in relation to Ashe juniper cover. We documented that grass height, bunch-grass density, and forb diversity decreases as juniper cover increases. These findings highlight potential pathways through which juniper encroachment decreases habitat suitability for Montezuma quail.

11. Recreationist Effect on Bison Movement at a State Park

CODY B. CARTER, Tarleton State University, Stephenville, TX, USA

HEATHER A. MATHEWSON, Tarleton State University, Stephenville, TX, USA

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ABSTRACT Recreationist use can affect movement of mammals on the landscape. Texas Parks & Wildlife Department manages a herd of approximately 250 Southern Plains Bison (*Bison bison*) in Caprock Canyons State Park (CCSP), Briscoe County, Texas. This 6,197 ha park receives over 70,000 visitors a year who are able to access walking trails within the areas used by bison. We are investigating the relationship of human use of trails to temporal and spatial activity of bison. We conducted surveys for two weeks in March, April, June 2019 and January 2020. We calculated Relative Activity (RA) of bison and humans for each camera by dividing the number of images of each species by the number of trap nights. The RA index represents spatial displacement of bison based on behavior of humans. We calculated temporal displacement by measuring percent daytime activity (PDA) by dividing all bison pictures per site into several temporal categories based on human use. This project further assists CCSP biologists because the RA calculations and the temporal movements provide knowledge of relative habitat use of the locations. Future analyses we'll examine bison movement relative to movement patterns of carnivores, such as coyote and bobcat. This information will assist TPWD in their management plan for bison at CCSP.

12. Assessing Pronghorn Movement at Multiple Spatial and Temporal Scales in Agricultural Landscapes in the Texas Panhandle

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ABSTRACT Pronghorn (*Antilocapra Americana*) are located in 27 counties of the Texas Panhandle. Their behavior and movement is easily influenced by the quantity and quality of forage as well as other resources. However, data to support these influencing factors are lacking in this region and studies are required to obtain further information. The objective of this project is to determine the spatial and temporal movement distribution of these ungulates in relation to landscape features. For this study we used two locations, one near Pampa, TX and the other near Dalhart, TX. The study collected data from 86 collars and we are currently analyzing data to determine the number of animals and number of months that we can use for further analysis. We are currently partitioning the data by months and we plan to estimate distance travelled per month, number of location per land cover, and home range. This will provide very useful information about the spatial and temporal dynamics of pronghorn movement across the landscape. By examining the habitat preferences at different scales, we can gain more knowledge regarding components of the area as well. It is essential to understand the effects of structures, barriers, habitat fragmentation, and crop production. The results of this project can then assist in the development of future management plans and provide insight on the effectiveness of the applied methods.

13. Javelina Visitation and Interspecies Interactions at Protein Feeders in the Santiago Mountains, Texas

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ABSTRACT Javelina (*Pecari tajacu*) can be seen individually, or in groups, at protein feeders throughout the Trans-Pecos. Some of the other species that also visit protein feeders include mule

deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), bison (*Bison bison*), and bighorn sheep (*Ovis canadensis*). The objectives of this project were to 1) determine the timing of javelina feeder visitation, 2) quantify the number of javelina typically visiting feeders at one time, and 3) identify interspecies interactions at the feeder sites. From Nov 2018 - Mar 2019, motion-activated game cameras (n = 12) were rotated around free-choice protein feeders (n = 20) on a private ranch in the Santiago Mountains. All collected photos (n = 113,219) were re-named by the date and time stamp, organized for feeder location, and sorted by species. All javelina photos were sub-sorted by 1) number of individuals in each photo, and 2) separate folders for respective interspecies interactions. All data was re-named, organized, and analyzed using SpecialRenamer, DataOrganize, and DataAnalyze, respectively, through smallcats.org. An independence threshold of 1-hour was set for all photos. Of the 17,636 photos consisting of >1 javelina, 1,083 were considered independent and used in analyses. Of the 5,810 pictures consisting of various javelina × species interactions, 637 were considered independent and used in analyses. Data from this study will hopefully help researchers, biologists, managers, landowners, and wildlife enthusiasts better understand the utilization and interactions of javelina at protein feeders in the Trans-Pecos.

14. Mesopredator Abundance in Relation to Northern Bobwhite Mortality Density and Nest Sites

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ABSTRACT A large contributor to Northern bobwhite (*Colinus virginianus*; hereafter bobwhite) mortality is predation. In Texas, mesopredators such as raccoon (*Procyon lotor*), virginia opossum (*Didelphis virginiana*), nine banded armadillo (*Dasypus novemcinctus*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*), are most prevalent nest predators of bobwhites, while raccoon, bobcat, gray fox, and coyote are prevalent adult predators. In spring 2019, 167 translocated bobwhite were released towards the center of a 1,011 ha private property in the Cross Timbers ecoregion of Texas. Our objectives are to 1) assess mesopredator abundance relative to nest sites and locations where we found adult mortalities, and 2) evaluate change in mesopredator land use throughout the year. We placed 30 camera traps spaced evenly across the study area. In summer 2019, we recorded GPS coordinates of bobwhite mortalities, and coordinates of both successful and unsuccessful nest sites. From camera trapping sessions in May and July we recorded the presence of target mesopredators. Using ArcMap 10.6.1, we create a kernel density map of bobwhite mortalities and a map illustrating successful and unsuccessful nest attempts. We overlaid these densities with points that illustrated predator abundance at each camera location. We found that shortly after bobwhite release, predators were more abundant away from the area with bobwhite activity. We suggest this might be a result of increased human activity while we were monitoring bobwhite. Findings from this study will illuminate how mesopredator abundance changes in response to an influx of wild bobwhite.

15. Estimating Abundance of Black Bear and Mountain Lion Using Remote Cameras in the Davis Mountains, Texas

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ABSTRACT Apex predators act as keystone species and indicators of ecosystem health as they play an essential role in maintaining the balance of ecosystems. Understanding large carnivore population demographics is therefore useful not only for their management, but also when managing their prey species and habitat. Difficulties arise when studying these carnivores as they are often elusive, few in numbers, and have large ranges, but ever-evolving methods using remote cameras and spatial data may provide more feasible options for estimating population densities. Limited research on the population demographics of apex predators in western Texas has previously been performed, thus, our objective is to evaluate new spatial capture-recapture (SCR) techniques to estimate abundance of black bears (*Ursus americanus*) and mountain lions (*Puma concolor*) in the Davis Mountains. We set up a 342-km² grid in the Davis Mountains, encompassing 36 trail cameras, to survey for these species. We placed cameras at baited sites on likely travel corridors, such as mountain saddles, canyons, and game trails and surveyed for 12-week periods in Summer 2018 and Spring 2019. We obtained approximately 235,000 photos from Summer 2018 and approximately 600,000 photos from Spring 2019. We analyzed photos using program Timelapse and image recognition data from Microsoft's AI for Earth platform. Statistical analyses will be performed using program R. The results will be useful to conservation and management specialists where density estimates of large carnivores are needed.

16. Predictive Mapping of Two Potentially Listed Rare Plant Species in Texas

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ABSTRACT Using historical collections, herbaria databases, and citizen science records we are using presence-only data of occurrence for Texas trillium (*Trillium texanum*) and Rough-stemmed aster (*Symphytotrichum puniceum scabriculaule*) to model potential habitat throughout the state of Texas. Predictive models will be created as a function of a number of bioclimatic variables (WorldClim), solar radiation, soil layers (Web Soil Survey), geological features (USGS) using MaxEnt. We will assess the contribution of each environmental variable using a jackknife test. Our goal is to determine the areas of suitable habitat for each of the species and to determine where present-day populations may be found. Using diagnostic ROC curves and AUC values, the predictive ability of the models will be assessed. We hope to find that these models accurately predict known presence locations and new sites that have thus far gone undocumented by both scientists and citizen scientists. We will then validate these models using data collected from field surveys performed by

the Botanical Research Institute of Texas. These models will be integral in the future management of these plant species, especially if they were to become listed in the state of Texas. These models will be a useful resource for the Texas Department of Transportation in determining roadside maintenance and planning in the future.

17. Changes in Agricultural Land Cover in Texas Panhandle

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ABSTRACT The Texas Panhandle is known for large portions of irrigated agriculture focused on sorghum, cotton and wheat. The area and number of fields used to grow these crops are in areas traditionally considered rangelands. Currently there is evidence that irrigation is depleting the non-rechargeable Ogallala aquifer. However, there is little information on how the amount and spatial distribution of these cropland areas affects rangeland connectivity and potential impacts on wildlife. Our objective is to quantify the spatial distribution of crop fields and the changes that have occurred in the past 15 years in the Texas Panhandle. We used 1-m resolution digital orthoquadrangles provided by Texas Natural Resources Information Systems from the years 2004, 2006, 2010, 2012, 2016 and Sentinel-2 satellite imagery for 2019 over 24 counties within the Texas Panhandle. We digitized all cropland areas within the imagery for each time period using a scale of 1:24,000. We are currently digitizing imagery from 2019. Once we complete digitizing, we will quantify the amount and spatial distribution of land cover data by sub ecoregion (level 4) for each period. The findings of this study will provide a detailed picture of the spatial and temporal dynamics of land cover changes in the panhandle in the last 15 years. It will also provide insights into the effects of rangelands fragmentation and its potential impacts for wildlife species across the region.

18. Comparing Spring Migration Strategies of Northern Pintails Originating From Different Wintering Regions Across North America

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ABSTRACT Contrary to other duck populations, the continental population of northern pintails (*Anas acuta*; hereafter pintails) remain below conservation objectives despite three decades of optimal conditions on breeding habitats. Although factors on breeding areas undoubtedly effect populations, it is likely factors on nonbreeding areas impact pintails, given its unique life-history characteristics. Pintails wintering in different regions utilize different habitats during winter, are subjected to different winter stressors, appear to vary in rates of winter survival, and migrate through markedly different landscapes during spring migration. Thus, our objectives are to (1) compare spring migration strategies of pintails within and among wintering regions in North America, (2) investigate linkages between migration strategies and reproductive success, (3) assess the contribution of endogenous reserves to reproduction for different regions and migration strategies, and (4) identify critical stopover areas for pintails migrating from different wintering regions. Adult females will be captured at major wintering grounds across North America (e.g., Texas coast, Texas Panhandle, Arkansas, Louisiana coast, New Mexico, Arizona and California) during January of each year (2020, 2021, 2022). Females will be outfitted with hybrid GPS-ACC tracking devices ($n = 180$ each year). Several pieces of information will be gained from this research that will help inform an array of management questions. For example, understanding the differences in nutrient reserve dynamics across wintering areas, and their relation to optimal migration strategies, may help guide the use of limited conservation resources on wintering areas to greatly improve our effectiveness for managing pintails in North America.

19. Geographic Variation in Golden-Cheeked Warbler Song Characteristics

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ABSTRACT Many taxa exhibit geographic variation in acoustic signals. Because acoustic signals can influence mate choice, resource defense, and species recognition, this variation can lead to reproductive isolation and divergence among populations. As such, understanding the spatial variation of acoustic signals within a species may reflect its population structure, and can therefore inform management of priority species. The golden-cheeked warbler (*Setophaga chrysoparia*; hereafter warbler) is a federally endangered Neotropical songbird that nests exclusively in central Texas. Using songs recorded in 2012, 2017, and 2018 ($n = 171$ individuals), we examined geographic variation in warbler song characteristics across the species' breeding range. Preliminary analyses for two song types (A-songs and B-songs) suggest that there is greater variation in B-songs compared to A-songs, and that there is segregation in warbler acoustic signals based on location. Our results could help inform recovery efforts for the species and will contribute to our knowledge of songbird communication.

20. Small Mammal Community Ecology and Ectoparasite Loads in an Arid Region-Riparian Zone

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ABSTRACT Little is known about the ecology of riparian areas that occur in arid regions. It is postulated that these areas play an important role in vector ecology by aiding in the maintenance of known vector species, such as small mammals and their ectoparasites. It is important to study the ecology of this unique habitat type due to the associated health implications for wildlife, livestock, and humans. We are gathering data on small mammal community ecology to determine species diversity, abundance, and overall ectoparasite (i.e., ticks) loads at a South Texas riparian zone along the Rio Grande. We are assessing differences in these parameters in edge vs interior habitats across a gradient of habitat fragmentation and species assemblage. We are trapping small mammals via Sherman traps baited with an oat and grain mixture. These data will provide insight into the overall small mammal diversity of this area, as well as potential disease risks for South Texas, and how these parameters of interest change across the natural landscape mosaic. We hypothesize that species diversity will be lower along habitat edges and that the abundance and diversity of ectoparasites will increase in edge habitats. Additionally, we hypothesize that abundance and diversity of small mammals and ectoparasites will persist at increased levels as compared to other habitat types in South Texas.

21. Analyzing Seedbanks to Determine the Effectiveness of Stock-Piling Topsoil and Native Grass Seeding in Disturbed Areas

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ABSTRACT Prior to beginning oil and gas extraction practices, it is commonly recommended that topsoil stock-piles be set aside for future restoration of plant communities. Topsoil is collected using heavy machinery, piled in a nearby location, and re-applied when the energy extraction process is completed, often years later. Our goal with this study is to quantitatively assess the use of stock-piled topsoil following soil disturbance in semiarid regions. Our study area, a retired fracking pond, was restored in 2017 with 5-yr old stock-piled topsoil collected prior to construction. We segregated the existing stock-pile into 3 layers that were 1-1.5 m in thickness and distributed these layers (along with a non-amended surface) in separate strips over the pond. Each surface layer was split into 15 plots, each receiving one of three seeding treatments: (1) 13 native grasses, (2) 13 native grasses plus an annual warm-season grass cover crop, or (3) non-seeded. We are conducting a greenhouse study to examine seedbank dynamics as affected by surface and seeding treatment. Composite soil samples were collected from each plot, spread out evenly over 9 cm of coarse, clean sand in 28 by 37 centimeter trays, and randomly organized in blocks in the greenhouse. Emergence date and identity of all seedlings will be recorded. We will compare species composition, species richness, and seedling density of the different surface layers to assess overall seedbank characteristics of each restored surface. These data will help determine if stock-piling topsoils and supplemental seeding amendments provide sustainable seedbanks over time.

22. Demographics of Nilgai in South Texas

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ABSTRACT Nilgai antelope (*Boselaphus tragocamelus*) are bovids that are endemic to India and portions of Pakistan and Nepal. They were introduced into South Texas in the 1930's and now have a free-roaming population of approximately 33,000 individuals. Nilgai are known vectors of the Cattle Fever Tick (*Rhipicephalus annulatus* and *R. microplus*) who transmit deadly Babesia organisms to cattle. They have an estimated life span of 12-13 years in the wild. Females reach sexual maturity at approximately 2-3 years of age and they commonly have twins. Tooth eruption is used to estimate ages of other herbivores and may be used to determine the ages of nilgai. No studies have been conducted to assess the use of tooth eruption or tooth wear to provide age estimates of nilgai. To determine age class of individuals, we will be analyzing data taken from nilgai cows that will be commercially harvested on two ranches in South Texas. Central incisors will be extracted, and cementum annuli analyses will be performed. These data will be correlated with photographs of eruption and wear of the cheek teeth and incisors of the harvested nilgai in order to provide age estimates. Additionally, we will determine if feti are present, and if so, record fetal gender(s) and crown-rump length(s). All these data will be compared to carcass weights to further refine estimates of age. By establishing a method for aging nilgai and understanding more about nilgai population structure, wildlife managers will be better equipped to manage populations in South Texas.

23. Nest Success and Productivity of State Threatened Raptor Species in the Trans Pecos Region of Texas

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ABSTRACT Acting as hotspots of biodiversity in the arid Trans Pecos Region of Texas, riparian zones are pertinent areas of conservation concern. Specifically, these desert woodlands provide breeding and nesting habitat for three Texas state threatened raptors including the common black hawk (*Buteogallus anthracinus*), gray hawk (*Buteo plagiatus*), and zone-tailed hawk (*Buteo albonotatus*), in addition to the more common Cooper's hawk (*Accipiter cooperii*). The listing status of the three threatened species is primarily due to a lack of information, indicating a need for population metrics that may aid in understanding the current status of each species. We assessed nesting success and productivity for each species during the 2018 and 2019 breeding season in Jeff Davis, Brewster, and Presidio Counties, Texas. We monitored nests every 7-14 days until nests fledged young or failed.

We considered nests fledging ≥ 1 chick as being successful, and calculated productivity on basis of both fledglings produced per successful nest and per all nesting attempts. We found nest success and productivity were greater in 2019 compared to 2018 for all species. This may be due to an average +6 F deviation from the mean Trans Pecos June temperatures during the 2018 breeding season. This increased temperature occurred when nestlings were likely at their most vulnerable stage, and may have simultaneously reduced prey availability for foraging adults. Given predicted increases in temperature and aridity for the region, our results suggests a better understanding of the environmental tolerances for these species' reproductive success is warranted.

24. Insect Availability to Foraging Northern Bobwhites in South Texas

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ABSTRACT The northern bobwhite (*Colinus virginianus*) is extensively studied in south Texas. Although primarily granivorous, insects compose the majority (>80%) of bobwhite hen and newly hatched chick diets. By gaining a better understanding about insects available to bobwhites, landowners and natural resource managers will be able to better manage habitats that promote the abundance of selected insects. Sweep nets were used to collect insects on south Texas ranches during the summer months of 2018 and 2019 to determine which insects were available and their relative abundance. We examined the crops of hunter-donated bobwhites from the 2016-2017 and 2017–2018 hunting seasons to determine which insects bobwhites eat during the winter months. We collected 1,092 insects during summer 2018 and 735 insects during summer 2019. The three most abundant insect orders from summer 2018 were Orthoptera (n=355, 33%), Lepidoptera (n=224, 21%), and Hemiptera (n=216, 20%); however, orders Orthoptera (n=333, 45%), Hemiptera (n=214, 29%), and Coleoptera (n=149, 20%) were most abundant in 2019. We collected 327 insect specimens from the crops of hunter-donated bobwhites from 2016-2018. Insects recovered from crops were numerically dominated by orders Coleoptera (n=115, 35%) and Blattodea (n=112, 34%). Our results suggest that bobwhites shift from Orthoptera consumption during summer months to a greater consumption of Coleoptera and Blattodea during winter months and that Coleoptera are available and consumed year-round. Our study provides important information regarding insect consumption and availability to foraging northern bobwhites during summer and winter months in south Texas.

25. Fine Scale Assessment of Woody Cover Near Wildlife Crossings for Bobcats on FM 1847

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ABSTRACT In Texas, 80% of the human population live in urbanized areas, which are rapidly expanding in many areas each year. Relatedly, the increased traffic volume of vehicles on primary and secondary roadways can have a detrimental effect on wildlife species. Use of wildlife crossing structures in combination of cattle guards and fencing is regarded as an effective strategy for maintaining connectivity and reducing road mortality for large carnivores in other areas but have yet to be proven to be effective within Texas. The bobcat (*Lynx rufus*) is an abundant native felid in South Texas and has become adapted to living near urban areas and can serve as a proxy for endangered ocelots (*Leopardus pardalis*). We monitored cat use of five future wildlife crossings and four cattle guards on FM 1847 from August - December 2019 in Cameron County. We will conduct a fine-scale (2 m) land cover classification for the study area and conduct a landscape-level and class-level spatial analyses around areas used by bobcats. Results from this study will allow researchers and state agencies to assess use effect of spatial distribution and structure of woody cover at each crossing structures, and potential benefits for bobcats and endangered ocelots.

26. Hotspotter: A Machine Learning Approach to Identify Ocelots and Bobcats in South Texas

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ABSTRACT Camera traps have widely been used to detect elusive species across the world and have allowed researchers to gain a stronger understanding of population dynamics of species. Classification and identification of species detected on camera traps is critical for further analyses, but techniques to do so are limited. Machine learning algorithms, such as Hotspotter have recently been developed to automatically individually identify unique pelage patterns used to quantify population metrics. We undertook this study to assess the feasibility of using Hotspotter to uniquely identify ocelots (*Leopardus pardalis*) and bobcats (*Lynx rufus*) in South Texas. We conducted camera surveys on the East Foundation's El Sauz Ranch (113 km²) in Willacy and Kenedy counties, Texas, USA. We conducted camera surveys at 28 paired camera stations in the southwestern (13 camera stations) and northwestern (15 camera stations) areas of El Sauz from January 2018 to December 2019. This study may allow researchers to gain a stronger understanding of the demographics and population sizes of elusive felids across a large geographic area. Hotspotter may reduce the time needed to process hundreds of photographs and may yield more precise and reliable identifications.

27. Influence of Agriculture on the Spatial Genetic Structure of Mule Deer in the Texas Panhandle

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ABSTRACT Habitat loss and fragmentation pose a threat to ecosystems and wildlife conservation worldwide. In the Great Plains region of the United States, including portions of the Texas Panhandle, conversion of land for agricultural use is one of the main drivers of habitat fragmentation. Although habitat fragmentation can be a detriment to native wildlife, game species, such as mule deer (*Odocoileus hemionus*), seem to benefit from agriculture. Mule deer in the Panhandle have steadily increased in the past 30 years, but there is not much information on their spatial use of farmland. Our goal is to study how agricultural habitat fragmentation affects the spatial genetic structure of mule deer populations in the Texas Panhandle. Tissue samples were collected from 314 individuals across 3 study sites with varying degrees of habitat fragmentation. We extracted DNA and are using 11 microsatellite DNA loci to conduct analyses of spatial genetic autocorrelation within each study site. Knowledge of spatial genetic structure can be used to make inferences about animal movement and dispersal patterns. The results of this study will reveal fine-scale response of mule deer to a fragmented landscape, with implications for management decisions as well as conservation of these charismatic large mammals.

28. Effects of Habitat Restoration on Texas Horned Lizards and Their Prey

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ABSTRACT Texas horned lizards are a Texas State threatened species, and as such, restoring their population numbers and distribution is a priority. In an effort to stop the decline of Texas horned lizard numbers and distribution, we restored a 121-ha tract of land from a non-native buffelgrass pasture back to native forbs and grasses. We compared Texas horned lizard age and sex structure between the restored pasture and a non-native buffelgrass site (i.e. control). Eighty-six Texas horned lizards have been caught from the two sites, ($N = 56$ and 30 from the restored and control sites, respectively). Horned lizards emerged from hibernation in late February, their abundance peaked in

June/July, and entered into hibernation by October. Sex ratios of Texas horned lizards were similar between sites; however, more juvenile and hatchling horned lizards were located on the restoration site (N = 29) compared to the control site (N = 10). Texas horned lizard were abundant on both the restoration and control areas with a density of about one lizard per hectare. Harvester ants and red imported fire ants were more abundant on the restoration area than the control area, which is possibly due to greater disturbance and greater moisture on the restoration area. It is possible that female horned lizards selected the restoration area as a nursery habitat to lay their eggs so as to provide their young with an abundant food source and the best possibility for survival.

29. First Documentation of the Nematode, *Dispharynx nasuta*, in Scaled Quail

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ABSTRACT Quail populations in the United States have been declining for several decades due primarily to habitat loss and fragmentation. A myriad of other factors have been subjected to criticism surrounding quail losses as well. Among them are the effects that parasites may have on quail survival. Parasite communities of quails have been studied thoroughly. Among these communities is the nematode, *Dispharynx nasuta*. In some cases, *Dispharynx nasuta* has caused severe damage to the proventriculus and disruption of nutrient uptake. This parasite has been recorded in a number of galliformes species such as northern bobwhites, lesser prairie-chickens, and dusky grouse. Because of the similarities between northern bobwhites and scaled quail, it has been assumed that scaled quail may carry this parasite. This being said, our specimen is the first to be officially documented in scaled quail.

30. Who Remains After Reservoir Construction? Spatial Use of Mitigation Land By Freshwater Turtles of Northeast Texas

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ABSTRACT Humans have excavated channels, filled wetlands, built levees, and impounded rivers all to control the wild flows of rivers or gain access to water. These changes have improved many conditions for human progress but have come at a high price for freshwater ecosystems. The construction of reservoirs in former wetland habitat increases stress on the feeding habits and breaks the upstream/downstream continuity for numerous species (Bodie, 2001). Our research examines the altered riverine habitat around Jim Chapman Lake, a less than 30-year-old construction on the Middle and South Sulphur rivers. The research will elucidate the freshwater turtle species still found in the altered landscape and the habitats they are selecting. Methodology includes live turtle capture with various aquatic traps. In addition to the species data, we are documenting sex, shell dimensions, and weight to establish demographics on the remaining populations. Traps are placed in the following habitats; managed moist-cell units, human-channelized and remnant-meandering river, forested swamp, and marsh wetlands. Specific habitat variables like water flow, aquatic vegetation, and physical structure will be documented. At this early stage in our research, results have

documented only five out of eleven species originally reported to be abundant or common in this area prior to the construction of the reservoir. More changes are in the planning stages for the Sulphur River and other river basins guaranteeing dramatic changes for freshwater ecosystems. Reservoir construction involves human engineering of the ecosystem. Ideally this and other research should help guide best practice outcomes for future mitigation lands.

31. Locating and Assessing Populations of Alligator Snapping Turtles, *Macrochelys temminckii*, with Habitat Analysis in Northeast Texas

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ABSTRACT Alligator snapping turtles (*Macrochelys temminckii*) are the largest freshwater turtle species in North America and because of historical anthropogenic persecution, they are listed as vulnerable or endangered throughout much of their distribution. In Northeast Texas, current populations are not well documented. Along the Sulphur River populations have not been documented in well over 20 years. Our initial goal is to locate any current populations along the Sulphur River Basin. Following that, we intend to gain a better understanding of the demographics of the populations with habitat analysis. To assess the species, we are deploying various sizes of live-capture hoop traps. Upon capture, morphometric measurement and environmental conditions of the habitat are taken. Thus far, we have located a population within McKinney Bayou a small tributary of the Red River in Bowie County. The McKinney Bayou population is using a shallow, heavily vegetated emergent stream suggesting the species is a habitat generalist. In the Middle and South Sulfur Rivers around Jim Chapman Lake, we have not located any populations, nonetheless, we have many more locations to sample. Locating the populations of *M. temminckii* in this area will help us assess the need for further conservation and understanding the habitat preferences will lead to more effective conservation efforts.

32. Effects of Water Salinity on Dry Matter Intake By White-Tailed Deer (*Odocoileus virginianus*)

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ABSTRACT Surface water in the southwestern United States is often limited due to frequent droughts. Large mammals in this environment are forced to rely on pumped ground water or rapidly evaporating pools of poor-quality water that may contain high (> 7,000) levels of salt and dissolved solids. I hypothesized that water quality will affect the nutritional plane of white-tailed deer (*Odocoileus virginianus*) by decreasing the quantity of dry matter consumed. Salinity is the focus of this study because it is the primary cause of poor-quality water in South Texas. Throughout fall, spring, and summer, nutritional requirements are elevated for both sexes due to reproductive endeavors, so consumption of adequate amounts of forage and supplemental feed is critical. To evaluate the

impact of water salinity on dry matter intake of white-tailed deer, I will perform a series of studies at the Albert and Margaret Alkek Ungulate Facility, Kingsville, Texas. We will house deer in 3.0 x 4.0-m pens. Water will be provided *ad libitum* at varying (1,000, 2,500, 4,000, and 6,000ppm) salinity levels to determine 1) the upper threshold of salinity at which white-tailed deer will drink, 2) how water salinity effects water intake across season, and 3) to observe how salinity affects their daily intake of dry matter. Individuals will be randomly assigned to a 4×4 Latin Square. The ultimate objective is to improve water resource management for white-tailed deer and determine its effects on dry matter intake; a relationship that is poorly understood for this species.

33. Grazing Effects of Bison on Native Plant and Insect Diversity

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ABSTRACT Texas Parks & Wildlife (TPWD) manages a herd of Southern Plains Bison (*Bison bison*) at Caprock Canyons State Park (CCSP) in Briscoe County, Texas. Today the bison population in Caprock Canyons State Park is approximately 250 individuals. Caprock Canyons State Park bases their management plans on restoring native Texas prairies for their bison herd. Our goals are 1) to identify the effects of bison grazing at CCSP on native plant and insect diversity and 2) to assist TPWD with determining ecological carrying capacity and provide data for their bison management plan at Caprock Canyons State Park. In summer 2018, CCSP biologists established 20 3x3-m grazing exclosures at random locations but with consideration of accessibility of the bison to the area. We will use a paired design by selecting a 3x3-m grazed area proximate to the exclosure that represents similar soil and topography. At both grazed and ungrazed areas, we will survey vegetation using Daubenmire quadrat frames to determine plant diversity, litter depth, and ground cover, and to collect samples for biomass. For woody vegetation, we will use a point-center-quadrat method to determine density of woody vegetation. We will use a Robel pole to measure grazing restraint, which is represented by plant height and biomass. We will survey for arthropods within grazed and ungrazed areas using pitfall traps and bee bowls to target pollinators and dung beetles. The data collected from this research will be used to produce a TPWD management plan for CCSP.

34. A Multi-Step Approach to Understanding the Effects of Backyard Bird Feeding on the Abundance and Diversity of Birds in San Antonio, Texas

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ABSTRACT The provision of store-bought wild bird food has created a lucrative industry in developed nations; in the United States alone sales of wild bird food generated US \$4 billion in profits in 2016. Pervasive feeding of wild birds raises questions regarding the potential for anthropogenic subsidies to affect wild birds. Previous studies addressing these questions have mainly focused on birds in temperate areas, in non-urban settings, and have occurred during the breeding season. This study utilizes a multi-step approach to evaluate the effects of wild bird food on the abundance and diversity of birds in San Antonio, an urban setting in a subtropical region, during the non-breeding season. We will 1) use sales data from different stores offering wild bird food to investigate what, when, and where wild bird food is provided in San Antonio, 2) survey residents of neighborhoods about wild bird feeding habits to acquire site specific information, and 3) use data from Objective 1 and 2 to inform a field-based study incorporating citizen science to evaluate the

effects of wild bird feeding on the abundance and diversity of birds. Preliminary results from Objective 1 suggest that varieties of mixed seed and nyjer seed are most commonly bought in San Antonio and that bird food is provisioned year-round. Results from this research will expand on existing knowledge and aid in understanding of how urbanization affects birds.

35. Microtopography Selection for Reseeding Techniques Using UAV in the Chihuahuan Desert, Brewster County, Texas

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ABSTRACT Understanding the fate of rainwater is critical in semi-arid and desertic systems, as water is often the limiting factor in plant growth and distribution. Therefore, it is important to assess water availability (wetness index) in soils in a degraded state. Microtopography in the landscape can enhance germination and survival by providing soil moisture for longer periods. The goal of this project is to develop a model to characterize soil surface microtopography using high-resolution imagery from Unmanned Aerial Vehicles (UAVs) to then be used for potential seeding microsite selection, and; implement and compare different reseeded techniques in microsites to establish native grasses in an area treated with Tebuthiuron for brush removal. A high-resolution topographic map of the study area was created using a combination of low-level aerial photography (DJI Matrice 600) equipped with a multispectral camera (MicaSense RedEdge-M Camera). Flights were designed using Drone Deploy at 60.96 m with a 75% overlap. Images were processed using Agisoft Software to then obtain a Digital Elevation Model (DEM) and an Orthoimage. To determine wetness index values and select microtopography locations, the DEM was analyzed using TauDEM (Terrain Analysis Using Digital Elevation Model) toolbox in ArcGIS. Microsite points were then ground-truthed to calibrate the model and determine its success. The results of this study will not only depict a detailed analysis of the surface characteristics, but a better understanding of the flow of water and deposition of sediments, which will help model which microsites are best suited for reseeded, and thus improve seed survival.

36. Population Density of Northern Cottonmouth Snakes within Artificial Wetland Complexes

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ABSTRACT Northern cottonmouth snakes (*Agkistrodon piscivorus*) have been found across the south-central United States (Texas-Florida) up to the Atlantic coastal plain (southern Virginia, Illinois, and Missouri). They can be found in semi-aquatic habitats such as swamps, ponds, lakes, and even in wetland complexes. At Texas A&M University-Commerce there is a constructed artificial wetland complex with many types of species. The goal of this research is to observe the

population density of the cottonmouth snakes in the wetland complexes. I will capture cottonmouth snakes, tag them using Biomark PIT tags, release them, and try to recapture them to create data in the development of a population model. I will use the GIS program to map out the artificial wetlands of Texas A&M University-Commerce and determine where to set up transects. Transects will give us relative abundance in each sample unit. Twenty-five Transects will be established spanning the extent of the east-west width of the wetland. Five transects per night will be surveys starting at dawn. The information we gain from the research can be important to the understanding of functions in the wetlands and how the environment influences the species that live within it.

37. Variability in Lesser Prairie-Chicken Egg Morphometrics and Appearance across a Climate Gradient

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ABSTRACT Lesser prairie-chickens are distributed from southeast New Mexico to south-central 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 or egg sizes as an adaptation to local environmental conditions. To assess this, we compared morphometric characteristics and appearances of lesser prairie-chicken eggs between 4 study areas; one in Texas and three in Kansas. We used analysis of variance tests to compare egg length, width, volume, surface area, deviation from an ellipse, and mass. We also compared egg coloration and extent of speckling. We found Texas eggs were larger, with greater volume than any of the Kansas study areas, and a greater mass than two of the Kansas study areas. Texas prairie-chicken eggs also had greater deviation from an ellipse than two Kansas study areas. Preliminary comparison of clutch size indicate that prairie-chickens in Texas lay significantly fewer eggs per clutch (mean 6.7 ± 1.75 SD) compared to those in Kansas (mean 10.3 ± 2.36 SD). Analysis of egg color and speckling are still in progress, but preliminary assessment suggests Texas eggs tend to be lighter toned in shell color but have a greater frequency of speckling than Kansas eggs. Our results suggest that lesser prairie-chickens in Texas set fewer but larger eggs per clutch. The lower surface to volume ratios of larger eggs reduces evapotranspiration loss of moisture, which may increase hatching success in arid conditions.

38. Determining the Effect of Invasive Vegetation on Small Mammal and Herpetofaunal Communities

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ABSTRACT Invasive vegetation, such as Old World Bluestems (*Dichanthium annulatum* and *Bothriochloa ischaemum*) and Huisache (*Vachellia farnesiana*), has taken over much of the South Texas rangeland that was once native mixed and tallgrass prairie habitat. The proliferation of these plants is a considerable threat to conservation and native wildlife. Therefore, it is important to monitor how these invasions are affecting biodiversity. Our study aims to determine how the diversity and dynamics of herpetofaunal and small mammal communities are affected by invasive vegetation. We

are sampling these communities at six sites on the Welder Wildlife Refuge, two sites per habitat type (i.e., invaded, moderate, native), to identify community and habitat differences along a gradient of ecosystem change (i.e., invasion). We hypothesize that communities in invaded stands will host the least amount of diversity among sites and will be dominated by generalist species. This project will have a significant impact on understanding the implications of invasive vegetation on wildlife communities and will provide better insight into the management of natural resources at both local and landscape scales.

39. Analysis of Allelic Variation in the Prion Protein Gene of White-Tailed Deer

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ABSTRACT Chronic Wasting Disease (CWD) is a fatal neurodegenerative disease, classified as a transmissible spongiform encephalopathy. Spread by infectious prion proteins, CWD has become a major management concern for North American cervids. Currently there is no cure for CWD, but some cervids have rare genetic mutations in the prion protein gene (*Prnp*), such as codon 96 in white-tailed deer (*Odocoileus virginianus*), that confer partial resistance and delay the progression of CWD. However, this period of latency also makes detection of CWD more difficult. Furthermore, infected deer may live longer but continue to spread the misfolded prion proteins. We amplified and sequenced the *Prnp* gene from tissue samples of 120 white-tailed deer across 3 previously unreported US states (Texas, Iowa, North Carolina), and 2 states in Mexico (Coahuila, Sonora) to determine the occurrence of mutations within codons of the *Prnp* gene. We observed 17 mutations in the *PrnP* gene, including 7 not previously reported in white-tailed deer, with unknown significance. Frequency of the resistant codon 96 mutation in Texas white-tailed deer was high, 54 of 74 individuals (73%), and alleles varied within and among regions of Texas. All other states had low frequencies (under 30%) of codon 96. These results suggest that frequency of resistant mutations, that are thought to be rare, may actually depend on geographic location. With growing concerns for the impact of CWD on deer populations, understanding genetic variation and frequency in the *PrnP* gene has implications for future management decisions aimed at controlling the spread of the disease.

40. Intra- and Interspecific Variability in Mercury Concentrations in Texas Bats

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ABSTRACT Mercury (Hg) threatens the health of wildlife, including bats, at low concentrations. Texas produces more Hg pollution than any other state, yet only one study has examined Hg accumulation in Texas bats and those were sampled from only 2 remote wind farms locations in North and South Texas. Thus, there is a need to measure Hg concentrations in bats throughout Texas and determine if certain species are at greater risk of Hg toxicity. We assessed the intra- and interspecies variability in Hg concentration in fur ($n = 196$) collected from 7 bat species across 22 sites throughout the eastern half of Texas using a Direct Mercury Analyzer. Mercury concentrations varied significantly among species ($P < 0.001$); tricolored bats (*Perimyotis subflavus*) had the highest mean Hg concentration ($6.17 \mu\text{g/g}$; $n=63$) and Brazilian free-tailed bats (*Tadarida brasiliensis*) had the lowest mean Hg concentration ($1.07 \mu\text{g/g}$; $n=21$). A t-test was used to assess variation in Hg concentration among juvenile and adult age classes for 3 species. Evening bat (*Nycticeius humeralis*) was the only species that had a significant difference in Hg concentration between age classes ($P = 0.011$) with adults having a higher mean Hg concentration than juveniles (6.02 vs $2.84 \mu\text{g/g}$, respectively). The findings of this study have important implications for bat conservation and management in Texas.

41. The Effect of Brush Canopy Coverage on Trap Site Success for Northern Bobwhites

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ABSTRACT Researchers trap northern bobwhites (*Colinus virginianus*) for a variety of purposes (e.g., mark-recapture, population parameters, and translocations). Typically, the size and accessibility of a study area dictates trap placement and overall trapping effort. However, local landscape characteristics (e.g., brush canopy cover) can influence the distribution and abundance of bobwhites, which may influence individual trap site success. The objective of this study was to determine the effect of brush canopy coverage on trap site success. The study took place on East Foundation's, San Antonio Viejo Ranch. Trap sites were randomly selected along main access roads within the designated study area. We obtained percent brush canopy coverage for the hectare surrounding each trap site using classified 2016 NAIP imagery. In total, we baited and trapped at 100 individual sites from 21 December 2018 through 7 April 2019. The mean brush canopy coverage of all trap sites was 23% and ranged from 3% to 75%. We captured 65 northern bobwhites at 25 of the trap sites. Mean percent brush canopy coverage of successful sites was 19% and mean percent brush canopy coverage of unsuccessful sites was 25%. The probability of trap site success decreased with increasing brush canopy coverage ($P < 0.05$). Therefore, researchers may increase the efficiency of trapping northern bobwhite by selecting trap sites in areas with $< 20\%$ brush canopy coverage.

42. Are Mississippi Kite Attacks on Urban Pedestrians Associated with Nesting Phenology?

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ABSTRACT Birds nesting in urban landscapes may display a decreased wariness and secrecy and an increased inclination to engage in aggressive nest defense. Aggressive defense of nests has been noted among Mississippi Kites (*Ictinia mississippiensis*), a common and abundant raptor in towns and cities across the Southern Great Plains. Defensive behaviors include swoops at, and occasional contact with, humans who venture close to nests. Depending on location, previous research found aggressive responses in 16-20% of experimental trials. However, the influence of nestling ontogeny on nest defense by adults has not been assessed. We examined Mississippi Kite responses to pedestrians in public green spaces in Lubbock, Texas. We assessed responses during each week of nestling development to explore possible increases or attenuation of aggressive behaviors. During our experiments, we first conducted a 'baseline' trial in which the trial pedestrian replicated the most common human traffic pattern in the area (e.g., walking on a nearby sidewalk, walking from a parking lot to a building). Our experimental trial then consisted of a trial pedestrian approaching the nest on a random selected bearing from a 60m start point, walking directly under the nest, and continuing on another 60m to the end point. An observer recorded behavior of the adult(s) during the baseline and experimental trials. Responses were recorded on a scale of 0 (no response) to 5 (physical contact). As this study is currently ongoing, the results of this experiment at 30 Mississippi Kite nest in 2019 are pending.

43. Determining the Mineral Status of Free Ranging White-Tailed Deer

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ABSTRACT Liver samples are the standard benchmark for assessment of trace mineral status in ungulates, an index of health and body condition. Unfortunately, liver samples are only available post-mortem. Blood or serum is generally used to assess mineral status of living animals, but requires capture and restraint or sedation of the animal. Non-invasive alternatives to blood or serum provides an additional tool for the evaluation of animal health. We evaluated the performance of hair and antler samples to determine the mineral status of un-managed, free-ranging white-tailed deer (*Odocoileus virginianus*) on South Texas rangelands. We compared relative mineral levels in 3 substrates (serum, antler, and hair) collected from 28 deer on 2 sites. We included a female and male deer from each site and each age class (0.5 yrs. - 6.5+ yrs.). Mineral composition (Ca, P, K, Mg, Na, S, Fe, Zn, Cu, Mn, Mo) was measured using inductively coupled plasma mass spectrometry by an independent laboratory, and we tested for correlation between mineral levels among the 3 substrates. Mineral concentration in hair, antler, and serum were not correlated ($r^2 < 0.46$). Our results indicated that hair and antler are poor substitutes for serum for monitoring the nutritional health of deer. Antler is the fastest-growing tissue. Therefore, most of the minerals in antler come from endogenous sources, making it a poor indicator of diet intake. This research suggests that the

benefits of using more invasive methods to collect serum and blood samples to assess mineral health of live deer is normally justified.

44. Assessing the Performance of Terrestrial Lidar and Drone-Based Structure-From-Motion for Modeling Soil Microtopography in a Chihuahuan Desert Grassland Restoration Project

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ABSTRACT Chihuahuan Desert watersheds are currently experiencing negative effects of multiple years of mismanagement or desertification. Establishing healthy populations of native grasses to an area marked by overgrazing or desertification could decrease erosion and improve the absorption and retention rate of rainfall. A healthy grassland community would additionally provide benefits such as better water quality, and habitat for native wildlife. It is important to keep as much water in the soil as possible in the Chihuahuan Desert, where evaporation rates are significantly higher than other regions. The success of this rangeland restoration project, however, is dependent on the survival rate of native grass seeds. To expect a higher success rate and favorable results, elements such as water flow and deposition must be accounted for when selecting potential micro-sites. This study will focus on comparing Digital Elevation Models (DEMs) from two different technologies: LiDAR and structure-from-motion (SfM) by overlapping and using a Digital Elevation Difference tool (DOD) in ArcGIS. DEMs will be obtained using a terrestrial LiDAR and a DJI 600 Pro drone, equipped with a multi-spectral camera, to document reseeding plots at the O2 Ranch, Brewster County, Texas. The results of this study will not only depict a detailed analysis of the surface characteristics (at millimeter resolution) but will also add to the understanding of water flow and sediment deposition for the area. All of this will help model micro sites best suited for reseeding, thus aiding in the survival and restoration of native grass seeds.

45. Acceptance of Motion-Activated Sprayer Systems By White-Tailed Deer at Supplemental Feeders

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ABSTRACT Cattle fever ticks (CFT), *Rhipicephalus microplus* and *R. annulatus*, are vectors of the protozoan parasite responsible for bovine babesiosis, an economically important disease in the livestock industry. Along the border of Texas and Mexico, CFT are an issue because bovine babesiosis is prevalent in Mexico. Besides cattle, white-tailed deer (*Odocoileus virginianus*) can act as hosts of CFT. South Texas is home to thousands of free-roaming deer leading to the potential spread of CFT. The USDA-APHIS approved method for treating deer for CFT is using ivermectin treated corn at supplemental feed sites. Ivermectin is an anti-parasitic drug used to control tick vectors including CFT. Due to a 60-day withdrawal period before deer hunting season, medicated corn cannot provide year-round treatment. In this study, we tested the acceptance of motion-activated sprayer systems at 4 supplemental feeder sites frequented by deer. The sprayers were filled with a solution of water and nematodes, which may be used as a non-toxic biological control agent with the potential to kill ticks. The objectives of this research are to (1) quantify the use of feeders by deer when no sprayers are active, (2) compare the use of feeders by deer when sprayers are activated, and (3) determine if nematodes alter the deer's use of feeders. These results will be used as a pilot for a future, larger study.

46. RGWT and the Effect of Parasite Load on Behavior

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ABSTRACT Rio Grande Wild Turkeys (*Meleagris gallopavo intermedia*) are susceptible to various parasites and diseases. As a host, Rio Grande Wild Turkeys (RGWT) can be negatively affected physically by parasite load. Male traits like snood length and plumage can be altered based on parasite presence. However, the effect of parasite load on male behavior is not as well observed in the wild. We reviewed the recent literature regarding RGWT social behaviors and common parasites. In the future, we will collaborate to capture and individually tag male RGWTs at the East Foundation's El Sauz Ranch, Willacy County, Texas this upcoming winter. Individual observations of male behavior will take place throughout the breeding season, and PCR will be used to identify parasites present from blood samples. we will use these data to determine if there was a difference in behavior depending on which parasites were present in the male. By looking at the parasite load and if it can cause a change in behavior, we can determine which parasites could have the most impact on a male's behavior. This could be valuable to the conservation and management of RGWTs if parasite presence could be visually assessed by managers and researchers using behavior.

47. Changes in Avian Community Composition Following Prescribed Thinning of Pinyon-Juniper Woodlands in New Mexico

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ABSTRACT Pinyon-juniper woodlands are an extensive vegetation community found throughout the western United States, where climate and land use practices have significantly altered woodland range and density. This expansion has created federal and state agency interest in tree removal and thinning with the goals of reducing fuel loads and restoring historic stand structure. Alternatively, the high proportion of avian pinyon-juniper specialists included on national and state lists of concern has created a need to balance thinning targets with conservation of these species. The objective of this study was to document avian community changes following thinning prescriptions at two geographically distinct pinyon-juniper woodlands in New Mexico (NM). We stratified our random sampling into thinned and unthinned plots and conducted point count surveys during the breeding seasons of 2018 and 2019 at a site in Lincoln County, NM and a site in Socorro County, NM ($n = 2,040$ samples). We observed 60 species, with over half considered moderate or high conservation concern in the State of North America's Birds 2016. Preliminary results indicate that avian species richness and diversity was similar between thinned ($S = 30.0$, $H = 3.7$) and unthinned plots ($S = 30.7$, $H = 3.7$), while species composition varied. Future analysis includes determining detection probabilities for species with sufficient detections (> 60) to better describe compositional changes and densities of species of conservation concern.

48. How Many Locations Are Needed to Determine the Home Range of Ocelots and Bobcats?

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ABSTRACT Habitat use of wildlife is influenced by a multitude of variables including environmental cues, energy tradeoffs, resource quality, and predator-prey dynamics. Many species exhibit fidelity to certain portions of the landscape, confining their movement to an area typically referred to as a home range. Within this home range, an animal will generally be familiar with locations of landscape features such as water sources or patches of cover, presence of conspecifics, and availability of prey. Understanding the location and characteristics of an animal's home range is vital to proper management. However, the amount of monitoring time necessary to accurately estimate an animal's home range may be open to debate. Our objective was to determine the proportion of the total home range that can be estimated from 4 days, 7 days, and 30 days of data compared to the full monitoring period (4 months). Between 2014 and 2019, we captured and collared 11 ocelots (*Leopardus pardalis*) and 16 bobcats (*Lynx rufus*) on the East Foundation's El Sauz Ranch in Southern Texas. Locations were collected every 30 minutes. Using high-frequency GPS

data, we described the home range of each animal using kernel density estimates based on all locations obtained (over 4 months). We then compared home range size to estimates obtained from 4, 7, and 30 days. Determining the amount of monitoring time necessary to understand habitat use of a species can improve allocation of resources and potentially provide results of comparable accuracy in less time.

49. Effectiveness of Wildlife Exits in Reducing Road Mortalities Along a South Texas Highway

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ABSTRACT Movement is a key component of survival for many species for reproduction and access to resources. This need for movement often causing animals to cross heavily trafficked roads and highways and can result in road mortalities. In Cameron County, Texas, wildlife crossings, gates, guards, and continuous fencing along State Highway 100 (SH100) are being used to mitigate these wildlife mortalities. In February 2019, the Texas Department of Transportation added ten wildlife exits along an 11.9 km stretch of SH100 between Los Fresnos, TX and Laguna Vista, TX in an effort to reduce wildlife road mortalities for species that cross onto the highway and need an option to exit the right-of-way. In order to measure the effectiveness of these exits, we installed two cameras at each of the ten exits, one on the roadside and one on the habitat side, to capture animal activity. One of the primary goals of this study is to determine if the addition of wildlife exits to continuous fencing will reduce the number of road mortalities observed, and we hypothesize that there will be fewer road mortalities in areas near exits. Results of this study will provide information on the effectiveness of wildlife exits that can be useful in developing additional mitigation structures in highly trafficked areas. From this information, we can determine the locations of mortality hotspots as well as species that will benefit from installation of wildlife exits.

50. Community Ecology and Habitat Relationships of Medium and Large-Sized Mammals along the U.S.-Mexico Border

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ABSTRACT Many medium to large-sized mammals are considered sympatric across much of the North American continent. As a result, conservation paradigms have shifted from single to multi-species approaches for assessing and conserving mammals and the habitats that they occupy. The relationships among many of these species can differ relative to parameters such as resource availability, habitat characteristics, and population density. Medium and large-sized mammals play important roles in overall ecosystem ecology; therefore, understanding the interactions among these species is imperative to science-based conservation and applied management. We will determine species presence, abundance, and community composition of medium and large-sized mammals on Rancho La Union® (Zapata County, Texas, USA) using remote camera trapping. We hypothesize that community composition will differ greatly along a gradient of brush cover, habitat composition, and landscape change. Additionally, we hypothesize that mammals will use habitats in relation to

weather patterns and season. Results of this study will aid in understanding mammalian interactions, dynamics, and habitat relationships along the US-Mexico border, which is essential to the ecological stability of the area.

51. Assessing Winter Survival of Scaled Quail in the Rolling Plains of Texas

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ABSTRACT Scaled quail (*Callipepla squamata*) populations have declined precipitously over the past four decades, with several factors including habitat loss and fragmentation, increased predation, and disease believed to explain the decline. However, the underlying mechanisms driving this decline are still poorly understood. Scaled quail demographics are influenced by extreme variations in annual weather observed in semi-arid ecoregions such as the Rolling Plains of Texas. Scaled quail follow predictable seasonal routines within their home range from morning feedings, loafing, evening feedings, to roosting. Consequently, negotiating similar routes and knowing where important resources are located is essential to quail survival, especially during unfavorable weather. Likewise fragmentation has severe implications on scaled quail populations due to increases in edge habitats which allow predators more efficiency to locate prey at higher densities in fragmented landscapes. To understand the influence of density independent and dependent factors on scaled quail demographics we evaluated the winter survival rates of scaled quail within the Rolling Plains and High Plains of Texas. We radio-marked and GPS tagged 82 scaled quail on 2 study sites with stable populations and 2 study sites with intermittent populations. We estimated weekly survival during winter (Oct-Mar), 2018-2019, using the Nest Survival Model in Program MARK. Understanding overwinter survival rates of scaled quail among stable and intermittent population will provide critical information for long term conservation and management, as well as aid our understanding of the factors associated with decline of scaled quail.

52. Cataloging and Population Trends of Birds on East Foundation Ranches: An Analysis of Ten Years of Data

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ABSTRACT For the last ten years bird surveys have been conducted on East Foundation properties. Both breeding and non-breeding surveys have been conducted on three of the South Texas properties, specifically San Antonio Viejo, El Sauz, and Santa Rosa. The non-breeding surveys are conducted from August-April to document bird species occurrence, richness, and abundance through the use of transect surveys. During the months of May and June, breeding bird surveys are

conducted to document bird species occurrence, richness, and abundance, but through the use of point counts. The East Foundation properties have a unique mix of avian species and vast diversity of landscape types due to their varying locations. Both Santa Rosa and El Sauz are a part of the Gulf Coast Prairies and Marshes ecoregion. San Antonio Viejo is a part of the South Texas Plains ecoregion. Once the full data set is analyzed, comparisons will be able to be made between bird populations, vegetation types, and seasonal variables. In addition to comparing against our own data, the data will be compared to a concurrent study done by Texas A&M University on the same properties. Vegetation strongly influences avian distributions and dynamics, which is why it is important to assess how environmental changes are impacting species in long term data sets such as the one presented here.

53. Can Nilgai Be Trained to Consume Medicated Feed to Treat Cattle Fever Tick Infestations?

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ABSTRACT *Rhipicephalus (Boophilus) microplus* and *R. (B.) annulatus*, collectively known as cattle fever ticks (CFT), are vectors of the protozoan parasites causing bovine babesiosis. This disease is prevalent in Mexico, putting U.S. livestock herds at risk. In the borderlands of South Texas, wildlife have free access to Mexico, which increases the risk for disease transmission. Cattle are the preferred host, but white-tailed deer (*Odocoileus virginianus*) and nilgai antelope (*Boselaphus tragocamelus*) are suitable CFT hosts. Nilgai, an exotic species native to India, were first introduced to South Texas in 1924 and are now widespread throughout South Texas. Nilgai are a major concern as a host species due to their large home range sizes and ability to make long-distance movements. There are currently no methods for treating nilgai for CFT. Delivery of treatment through feed is a common practice for wild and domestic animals. Nilgai typically do not eat from supplemental feed sites, although they can be conditioned to eat from feeders when forage is lacking. Using a 250-acre pasture and 4 feed sites, we monitored the interactions of 6 nilgai naïve to feeder use and 6 nilgai conditioned to eat feed. The objectives of this research are to: 1) determine if naïve nilgai can be influenced by conditioned nilgai to use supplemental feed, and 2) assess the interactions of white-tailed deer and nilgai at supplemental feed sites. Preliminary data indicates that naïve nilgai were not

influenced by conditioned nilgai to eat supplemental feed and minimally interacted with deer at feeders.

54. Bat Population Abundance, Inhabitation and Identification of White-Nose Syndrome in East Texas

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ABSTRACT Bat (*Chiroptera*) species face many threats in Texas including habitat loss, diseases (white-nose syndrome), wind energy development and climate change. We need more information about bats species in northeastern Texas to know their current status and develop strategies that will be helpful for the conservation of the species. Based on geographical records we can find at least 8 species of bats in this region. We propose to sample the species of bats that are in this area and document to what functional groups they belong (insectivores, frugivorous). We will also have an estimation of their density and will mark and recapture individuals to estimate population sizes of the different species present in the area. In addition, we want to know if the white nose disease is present in this area. We hope to document the bats species in our prairies, estimate their abundance and population size. As well as to assess the health and environmental variable that affect bat population in order to restore and provide habitat for these species.

55. The Use of Organic Herbicide and Prescribed Fire to Re-Introduce and Restore Native Plants in Blackland Prairie Wetlands

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ABSTRACT The Blackland Prairie Ecoregion of Texas formerly were vast, but have diminished greatly as time has progressed. Today only 1% of Blackland Prairie remains and it exists in fragments, unlike the large ecoregions that they once were. This being said, it is important to preserve and restore any parts that we can so the Blackland Prairie Ecoregion is not entirely lost and puts many native species at risk. To build on the already-existing knowledge of restoring and preserving these regions, we will re-establish the natural vegetation of the region with two species of native grasses, *Tripsacum dactyloides* and *Panicum virgatum*, and conduct a study using organic herbicide, prescribed burning, and combination of the two. To examine this, I will look at two different prairie/wetland sites that contain a significant amount of invasive species and assign randomized blocks with one of the three treatments listed above. Samples will be collected before and after the treatment of these blocks to identify the number of invasive species that are present. I hypothesized that the combination of prescribed burning and organic herbicide application will result in successful native species growth and the riddance of invasive species. Results from this test are relatively short-termed and this study will provide a baseline for future studies on the restoration of native prairies.

56. Avian Communities Respond to Restoration Treatments in East Texas Pine Forests

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ABSTRACT Forests in the southeastern United States have experienced extensive habitat alteration due to decades of fire suppression. Recent efforts to restore historical conditions in these forests have occurred through the use of prescribed fire and other silvicultural practices to manipulate forest vegetation structure and composition. We evaluated avian community composition response as a measure of restoration treatment effectiveness in upland pine ecosystems. Automated audio recorders were used to sample breeding bird communities at 18 different sites, burned and unburned forests, in the Pineywoods ecoregion East Texas. Bird calls were identified to species and forest vegetation strata were characterized at each site. In general, sites that were burned tended to have a lower hardwood midstory density and basal area and a greater proportion of grassy understory vegetation than unburned sites. Several bird species were exclusive to either the burned or unburned sites. A two-way cluster analysis demonstrated that bird communities were more similar within treatment type than between treatments, suggesting that restoration efforts influenced changes in bird assemblages within pine forests. In addition to difference in bird community structure, recently burned sites had greater avian species richness than unburned sites. Understanding how avian communities respond to restoration treatments can help better inform future management decisions.

57. A Comparison of Benthic Invertebrate Composition Between Ephemeral Pools and Permanent Pools Along Upper Leon Creek

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ABSTRACT Ephemeral pools can be considered small natural aquatic habitats with large ecological roles. These habitats are common on most continents but are most prevalent and ecologically important in arid and semi-arid regions where water sources may be scarce. Ephemeral pools are typically characterized by their relatively small size and abundance across hydrologically influenced landscapes, and are highly variable in shape, structure, and depth due to hydrological changes. Due to extremes in their period of inundation, or hydroperiod, ephemeral pools harbor unique communities of organisms with adaptations for highly inconsistent environmental conditions. Leon Creek within San Antonio, Texas, serves as a tributary within the San Antonio River Basin. It is composed of fragmented flowing water sections interspersed with isolated pools that connect during significant precipitation. These isolated pools are ephemeral and have been studied very little, if at all. This study examines the community composition of aquatic invertebrates within upper Leon Creek using a semi-quantitative method between the months of June 2019 to September 2019. Benthic invertebrate samples and water quality parameters were collected each month from eight ephemeral pools and two permanent pools of differing size, depth, and hydroperiod. Invertebrate specimens were identified to genus and species diversity was compared between sample sites. Invertebrate community composition within these pools can help us understand how invertebrate communities change in relation to the ephemerality of urban streams. Further, results from this study can provide insight into the environmental health of Leon Creek and allow for more informed management strategies within the area.

58. Deep Convolutional Neural Networks Land Cover Classification for Wildlife Habitat in South Texas

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ABSTRACT Recent advancements in remote sensing have paved the way for artificial intelligence algorithms known as machine learning. From these advancements in machine learning, Deep Learning is an approach that relies on multiple layers of nonlinear processing for feature identification and patterns. This approach can potentially save time and effort, as compared to current image classification protocols. Our goals for this study is to create Deep Learning protocols that can be used to classify NAIP imagery in South Texas. Our specific objectives are to 1) Create a functional code model; 2) Create an accurately classified landscape image; and 3) Validate created model using field accuracy assessments. Using a created python coded model, we expect to be able to perform an image classification on an image with over 95% accuracy for each cover class. The implications of performing faster image processing is that we can continually input up to date imagery and receive up to date landscape changes to assess larger temporal areas. A successful Deep Learning, landscape classification model can assist with wildlife habitat studies by allowing researchers to cover more area of the species range in a fraction of the time as compared to the current methodologies. Once the protocols are developed we plan to use these to apply to satellite platform as well as unmanned aerial vehicle imagery.

59. Helminths Within Two Sympatric Game-Bird Hosts in South Texas

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ABSTRACT Northern bobwhite (*Colinus virginianus*) and scaled quail (*Callipepla squamata*) have been experiencing long-term declines throughout Texas, and it is unclear what role parasitism plays, if any. Both bobwhite and scaled quail live sympatrically in portions of south Texas; however, most research on helminth communities in scaled quail have been conducted in west Texas. To learn more about both quail host-helminth systems in south Texas, we examined helminths in sympatric bobwhite and scaled quail host populations over a period of three hunting seasons (2016-2019). Bobwhite (n= 94) and scaled quail (n=114) carcasses were obtained from south Texas via hunter donation from La Mesa I Ranch in Zapata County and La Mesa II Ranch in Jim Hogg County during 2016-2017, 2017-2018, and 2018-2019. Helminth species richness, prevalence, and mean intensity were calculated for each host species. The bobwhite helminth community consisted of 4 species; however, the scaled quail helminth community consisted of 11 species. Both helminth communities were numerically dominated by the cecal nematode (*Aulonocephalus pennula*). The remaining species rarely occurred (each species <25% prevalence and <152 individuals in both host-helminth communities) and included *Oxyuris petrowi*, *Tetrameres pattersoni*, *Oncicola canis*, *Dispharynx*

nasuta, and several cestode species. A notable finding was the larval cestode in the genus *Mesocestoides*, which was the first occurrence of this cestode reported in scaled quail. This cestode is of public concern because of its potential to infect humans, hunting dogs, and other susceptible wildlife.

60. Roosting Habitat for Rio Grande Wild Turkeys During Breeding Season

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ABSTRACT Rio Grande Wild Turkey (*Meleagris gallopavo intermedia*) habitat is a great concern in south Texas due to climate change. Increased risk of a drier climate may have a negative effect on older mature trees such as honey mesquite (*Prosopis glandulosa*) and live oak (*Quercus virginiana*). These trees are an important roosting habitat for Rio Grande wild turkeys and assessing their distribution across the landscape is essential to maintain or enhance their habitat. The loss or uneven distribution of roosting trees can clearly be observed where the Turkeys use telephone poles or other man-made structures in the absence of suitable tree cover. To supplement the loss of these tall mature trees in South Texas man-made roost have been constructed as a potential solution. The objective of our research is to assess the current distribution of viable roosting space within the landscape during the breeding season. We are using unmanned aerial vehicles to develop 3-D models to measure tree heights across the landscape. We are using a threshold of 4m above-ground level to identify trees that are suitable (>10m) or not suitable (<10m) roosting areas. Once the threshold is applied, we will be able to quantify the amount and distribution of potential roosting areas in the landscape. This will provide important information to landowners for assessing the roosting habitat. Combined with breeding, and winter habitat, this information could help develop better habitat suitability models for Rio Grande wild turkeys in South Texas.

61. Habitat Selection and Nest Success Response of Lesser Prairie-Chicken to Various Prescribed Burning and Grazing Treatments

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ABSTRACT The lesser prairie-chicken (*Tympanuchus pallidicinctus*) is an iconic endemic species of the North American plains. Historically, combinations of wildfires and grazing from free-ranging herbivores directed plant community composition and created heterogeneous mosaics of habitats, that met the annual lifecycle needs of lesser prairie-chickens (LEPC). Alteration of these natural disturbances from anthropogenic causes, including row-crop agricultural expansion, domestic livestock grazing regimes, wind-energy development, hydrocarbon exploration, fire suppression, urban expansion, coupled with natural influences, including invasive species encroachment and severe droughts, have contributed to fragmentation and degradation of historic LEPC habitats. Severe reductions of LEPC occupied range and population level declines 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 areas of the Sand Shinnery Oak (*Quercus havardii*) Prairie Ecoregion, dominant area vegetation consists of sand shinnery oak, sand sagebrush (*Artemisia filifolia*), mixed and shortgrass assemblages. While habitat selection and nesting success of LEPC in eastern New Mexico has been documented; vegetation community composition and LEPC response to variations in prescribed-fire and grazing regimes have not been quantified. Our research uses 22-g GPS satellite telemetry transmitters to monitor nesting success and habitat selection of female lesser prairie-chickens. Our research will quantify standing herbaceous biomass, develop production models for standing herbaceous vegetation, quantify plant community composition, and estimate invertebrate assemblages and biomass in response to prescribed-fire and grazing treatments.

62. Microbiomes across Body Sites in Desert Bighorn Sheep and Aoudad in Texas

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ABSTRACT Bighorn sheep (*Ovis canadensis*) inhabit the western United States, northwestern Mexico, and some of southwestern British Columbia and Alberta. Many herds have encountered die-off events thought to be caused by a group of bacterial species referred to as the pneumonia complex, and this complex has been identified as transmissible to bighorn sheep from domestic sheep (*Ovis aries*) and goats (*Capra hircus*). Aoudad (*Ammotragus lervia*), an invasive species to Texas, occupy the same habitat as desert bighorn sheep (*Ovis canadensis nelsoni*) and are classified in the same subfamily of Caprinae, as bighorn sheep, domestic sheep and goats. Microbiomes have not been studied in bighorn sheep or aoudad, but identifying typical microbial compositions will inform the

baseline from which diseased state microbiomes will depart. For example, some members of the pneumonia complex are often found in healthy bighorn sheep, but how such microbiome communities are structured is unknown. Also, social behavior in animals is thought to influence microbial compositions through direct and indirect transmission, and microbiota may disperse between aoudad and bighorn sheep through shared resources. Nasal, throat and fecal microbiomes are being characterized for bighorn sheep and aoudad in Texas. Results are anticipated to inform healthy microbiome compositions, the presence and relative abundances of pneumonia complex bacteria in both bighorn sheep and aoudad as well as microbial dispersal potential between aoudad and bighorn.

63. Spatio-Temporal Dynamics, Habitat Use, and Survival of Desert Bighorn Sheep, Mule Deer, and Aoudad

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ABSTRACT Desert bighorn sheep (*Ovis canadensis sp.*) and mule deer (*Odocoileus hemionus*) have experienced widespread declines in distribution and abundance in the Trans-Pecos region of Texas. While translocation efforts have been successful in reviving these species, the ongoing expansion of aoudad (*Ammotragus lervia*) populations across the region have raised concern for the native species survival. Little is known about the ecological role aoudad bear in North American landscapes; or how this species competes with native wildlife. We initiated this study to fill gaps in the knowledge of habitat use, spatial overlap and survival between desert bighorn, mule deer, and aoudad when cohabiting a landscape. The objectives of this study include: 1.) Investigating spatio-temporal dynamics between species, 2.) identifying habitat use between species, and 3.) analysis of survival and cause-specific mortality between species. 39 bighorn sheep, 48 mule deer, and 20 aoudad were fixed with satellite collars in the Van Horn Mountains, Texas. Data collection is still underway; however, preliminary analyses reveal strong correlations in habitat use between the three species, considerable spatial overlap between desert bighorn and aoudad, and indication that aoudad possess lower mortality rates than either two species. These preliminary results suggest aoudad may threaten the survival of desert bighorn and mule deer. Monitoring and data collection will resume to provide quantifiable answers to these objectives and better inform management decisions regarding desert bighorn, mule deer, and aoudad in Texas.

64. Nest Site Selection by Scaled Quail Hens in Potter County, Texas

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ABSTRACT Scaled quail (*Callipepla squamata*) populations in the Rolling Plains of Texas have exhibited an overall decrease since the mid-1980s. Reasons for declines are not well understood, although research suggests a combination of several factors, including habitat fragmentation, weather patterns, nest predation, and woody vegetation encroachment. Scaled quail primarily nest in bunchgrasses and shrubs. This vegetation helps conceal nests from predators and provide thermal refuge. We used GPS and radio transmitters to track hens from April - August, 2019, in Potter County, Texas to assess nest and brood ecology. We documented vegetation type of selected nesting substrates, cardinal direction of nest openings, and maximum temperature around each nest bowl; all three measurements were replicated at a paired random location. We examined variables for 17 nests, of which only 8.2% successfully hatched out. We assessed differences in temperature using Ibutton dataloggers, between the nest bowls and random locations, with a paired t-test. The maximum nest bowl temperature was 54.5°C, 2 degrees cooler than random locations ($p < 0.01$). 59% of the 17 nests, were constructed underneath yucca (*Yucca glauca*), 17.6% under little bluestem (*Schizachyrium scoparium*), 17.6% under cholla (*Cylindropuntia imbricata*) and 5.8% were underneath catclaw acacia (*Senegalia greggii*). Cardinal directions of nest openings were predominantly oriented towards the south. Our results highlight the potential thermal impacts of nest site selection on egg incubation. Hens selected nest sites that likely maximized concealment from predators and the elements, quantifying these attributes could potentially aid in future management recommendations and overall understanding of the species.

65. Use of DNA from Museum Specimens and Trophy Mounts to Reconstruct the Genetic Profile of Texas Bighorn Sheep

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ABSTRACT Bighorn sheep (*Ovis canadensis*) inhabit montane regions spanning the western third of North America. Within Texas, desert bighorn sheep (DBS) historically were found in 16 mountain ranges in the Trans-Pecos Region. Vernon Bailey described *O. c. texianus* in 1912; however, overharvesting as well as competition and diseases from domestic sheep and goats led to the extirpation of the subspecies by the early 1960's. Following a 50+ year effort of restoration and translocation (source-stocks from three states and Mexico) by Texas Parks and Wildlife Department, DBS populations increased from 14 individuals in 1959 to >1,500 individuals distributed among 11 mountain ranges in 2019. Due to the extinction of *O. c. texianus*, obtaining bone fragments, dried muscle, skin clip, horn shaving, or hair samples from museum specimens and trophy mounts is the only method in which the genetic profile of this subspecies may be surmised. Recovery of known *O. c. texianus* dated pre- and post-1960 and additional present-day samples from museum collections (i.e., Smithsonian; Natural Science Research Laboratory at the Museum of TTU) and private individuals are necessary to determine: 1) a genetic profile for *O. c. texianus* and degree of genetic similarity between *O. c. texianus* and both *O. c. nelsoni* and *O. c. mexicanus* and 2) the degree of variation in *O. c. texianus* compared to present-day DBS in Texas. Genetic data such as these are crucial to provide insight into the phylogenetic relationships of DBS populations in Texas, New Mexico, and Mexico to infer genetic management and conservation plans.

Poster Session 2 Watergarden

1. Estimates of Latency to Initial Detection for Mammalian Species in Upland Mixed Pine-Hardwood Forests in Eastern Texas

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ABSTRACT Biologists and wildlife managers recognize the benefits of trail cameras in large-scale studies to estimate abundance of mammals. Latency to initial detection (*LTD*), defined as the time (in days) until initial detection of a species at a survey site, has been identified as particularly valuable in assessing species occupancy and relative abundance of mammalian species. However, *LTD* depends on a number of factors, including, habitat type, species abundance, and foraging behavior. To estimate *LTD* of forest dwelling mammals, we conducted a pilot study in a mixed pine-hardwood forest in eastern Texas. We set 20 un-baited camera stations for 400 survey nights, and detected 10 mammalian species: white-tailed deer (*Odocoileus virginianus* *LTD*=8.5), Northern raccoon (*Procyon lotor*, *LTD*=12.2), feral pig (*Sus scrofa*, *LTD*=10.8), nine-banded armadillo (*Dasyops novemcinctus*, *LTD*=9.9), coyote (*Canis latrans*, *LTD*=3.6), bobcat (*Lynx rufus*, *LTD*=2), squirrel (*Sciurus sp.*, *LTD*=11.5), Southern flying squirrel (*Glaucomys Volans*, *LTD*=10), Eastern cottontail (*Sylvilagus floridanus*, *LTD*=17), and Virginia opossum (*Didelphis virginiana*, *LTD*=15). Our estimates of *LTD* offer baseline information for future study design using trail cameras and trapping efforts needed to estimate mammal relative abundance.

2. A Policy Analysis of the Endangered Species Act

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ABSTRACT The Endangered Species Act (ESA) represents the first major act of protection for endangered species in North America. After a species is listed under the ESA, the species and its habitat immediately receive protection and the US Fish and Wildlife Service (USFW) develops a recovery plan for the species that identifies and protects critical habitat for the recovery of the species. The law continues to be controversial, with champions complaining that the act does not go far enough in its effort to help species recovery, and detractors seeing the ESA as too powerful and with the potential to stifle economic growth in areas with endangered species. We designed this study to analyze the effectiveness of the ESA based on population trends of the species protected and determine if the ESA has had a significant impact on the recovery of these species. Using population trend data gathered from the USFW biannual reports to congress on species recovery, we will determine if a species population is “improving”, “declining”, or “stable”. We will determine with logistic regression if the conservation status and the recovery of a species is affected by having a recovery plan, having designated critical habitat, and time listed. Finally, using the annual USFW expenditure reports to congress, we will run a multiple linear regression analysis to determine if there

is any association between species recovery and the annual amount of money spent on the protection of the species.

3. Detecting Helminth Eggs in a Gallinaceous Bird: Fecal Versus Cecal Droppings

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ABSTRACT The impact of helminth parasites on populations of gallinaceous birds, including Northern Bobwhite (*Colinus virginianus*) and Lesser Prairie-Chickens (*Tympanuchus pallidicinctus*), is unclear. Several species of helminth parasites have life-cycles in which the eggs are shed through the feces of the host. To diagnose helminth infections, fecal droppings of the host can be examined or molecularly tested for the presence of helminth eggs and/or larvae. Gallinaceous birds have well developed ceca and produce fecal and cecal droppings. Few studies have evaluated whether detection of helminth eggs differs between these sample types in free-ranging galliforms. From March to April 2018-2019, we collected fecal and cecal droppings from 9 leks of Lesser Prairie-Chickens in Sand Shinnery Oak Prairies in Texas and New Mexico. In 2018, droppings were examined for helminth eggs and larvae using fecal floatation, and in 2019, they were tested for the presence of *Oxyuris petrowi* and *Aulonocephalus pennula* eggs using PCR. In the 2018 samples, helminth eggs and larvae (species unverified) were detected in 44% (17/39) of the cecal droppings and none (0/21) of the fecal droppings. In the 2019 samples, eggs of *O. petrowi* and/or *A. pennula* were detected in 30% (10/33) of cecal droppings and none (0/9) of the fecal droppings using PCR. Our results indicate that helminth parasite eggs are more likely to be detected in cecal versus fecal droppings of Lesser Prairie-Chickens. When surveying the droppings of galliform hosts to determine the prevalence of helminth eggs, the collection of cecal over fecal droppings should be considered.

4. Conspecific Brood Parasitism in Black-Bellied Whistling-Ducks (*Dendrocygna autumnalis*)

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ABSTRACT The black-bellied whistling-duck (*Dendrocygna autumnalis*) is a species that uses conspecific brood parasitism (CBP) to increase individual fitness. The use of nest boxes by this species seems to exponentially increase rates of CBP, but the mechanisms behind this occurrence

are not well understood. High rates of CBP lead to lower nest success rates, as eggs are not able to be effectively incubated or can lead to nest abandonment. Relatedness of each individual and fitness outcomes of each host and parasite will be determined to evaluate the role of CBP in black-bellied whistling-duck populations. Nest boxes consisting of predator guards will be placed at four different sites. Using baited rocket nets, black-bellied whistling-ducks will be captured in order for PIT tags to be implanted and to compile a genetic roster of individuals at each site. A DNAeasy blood and tissue kit will be used to decipher the genotypes of both parents and offspring. PIT tag readers attached to data loggers will be used to identify each individual as they enter and leave nest boxes, indicating when incubation begins and which females, if any, are parasitizing the nests. Upon hatching, chorioallantoic membranes will be collected in order to assign parentage to each offspring and quantify the number of parasitic eggs laid in the nests. Relatedness between each of the adults will also be determined upon genetic analyses. Information involving the fitness outcomes and motivations behind CBP in black-bellied whistling-ducks could greatly benefit our understanding of population processes within the species.

5. The Effects of Feeder Density on White-Tailed Deer Dominance Hierarchies

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ABSTRACT White-tailed deer (*Odocoileus virginianus*) are a sought-after big game species in North America. Supplemental feed stations are used by managers to try and maximize the potential of antler growth and body mass. Dominant individuals may be discouraging more widespread use of supplemental feed, particularly dominant males restricting does and fawns. Increasing feed station density may alleviate competition between dominant and subordinate deer. We hypothesize that higher feeder density will provide greater accessibility for subordinate deer by lowering their chance of confrontation with a dominant individual. To test this, we are using motion-sensing infrared cameras at each feeder across two ranches in central Texas (Flat Top, and Sam Hill) from March 1st to January 31st. Each property bears different feeder densities. Sam Hill currently has 1 feeder per 833 acres, while Flat Top has one feeder per 2,500 acres (acquired using ArcGIS mapping software). Understanding dominance behavior at feeders will assist managers in providing supplemental feed for the maximum number of individuals.

6. Native and Exotic Ungulate Species at Feed Sites

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ABSTRACT Texas has the most privatized land compared to any other state in the United States. Texas' history has aided in the introduction of various practices not commonly found elsewhere. Two of these practices include the use of supplemental feeders and the intentional introduction of exotic species. Private ranches in Texas bring exotic wildlife species onto their property as a source of income through hunting and wildlife viewing. These ranches also use supplemental feed to provide additional sources of nutrients for the wildlife to use. Understanding species' feeder preferences along with interactions between native and exotic wildlife at feeders can help landowners make decisions regarding best management practices. The objectives for this project are to (1) quantify individual species' use at each feeder, and (2) assess white-tailed deer (*Odocoileus virginianus*) and exotic interactions at supplemental feed sites. We used a 654 acre ranch in south Texas with 6 supplemental feed sites that supplied feed to 11 different ungulate species. Ten of the 11 species are exotic to North America, with the only native species being white-tailed deer. We examined roughly 251,000 photos from the 6 feeders from February to May 2019. We recorded the number of individuals of each species present at each feeder and analyzed them for interactions. The data from this study will provide land managers potential insight on feeder use and interactions of various species.

7. Impacts of Changes in Land Cover on Population Trends of High Conservation Priority Bird Species Within the Gulf Coast Joint Venture Region

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ABSTRACT Monitoring trends in avian population abundance is a critical component of modern wildlife science, management and conservation. Relating such trends to changes in land cover is essential for identifying potential drivers responsible for long-term changes in bird population abundance. We assessed relationships between land cover changes from 1992 to 2006 to long-term data from Breeding Bird Surveys and Christmas Bird Counts in the Gulf Coast Joint Venture Region in the northwestern part of the coastal and inland regions of the Gulf of Mexico. Northern bobwhite (*Colinus virginianus*) population trends were negatively correlated with changes in Grassland-Herbaceous cover. Hooded merganser (*Lophodytes cucullatus*) population trends were negatively correlated with changes in amount of Emergent Herbaceous Wetlands and Redhead (*Aythya americana*) population trends were positively correlated with changes in the amount of Open Water. The largely non-significant and highly variable relationships between bird species trends in population abundance and changes in land cover indicate a variety of factors are probably

responsible for this pattern, including perhaps abiotic factors not related to changes in land cover. Most likely, (1) either local land cover dynamics are not being detected by the National Land Use Cover Dataset (NLCD) data, or (2) high variation in bird species count data (e.g., results from a companion study by Sands et al. (2017) masked our ability to detect major impacts of land cover changes on most of the high conservation priority bird species within the Gulf Coast Joint Venture Region.

8. Economic Model of Nature-Focused Photography in Texas

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ABSTRACT Nature photography is a growing market that may provide a worthwhile business opportunity for private lands willing to host photographers. Unfortunately, the current potential for economic returns is neither well quantified nor understood. Thus, we propose to investigate the economic viability of nature-focused photography enterprises operating on private lands. The study objectives are: 1. Determine the current economic impact of nature-focused photography on private lands currently operating photo tourism enterprises. 2. Conduct a cost-benefit analysis of enterprises detailing variables incurred from the creation and operation of nature-focused photography on private lands. 3. Summarize the literature on wildlife community responses to provisional feed and human interaction from non-consumptive wildlife recreation. A wildlife management plan incorporating nature photography may bolster revenue by utilizing resources non-consumptively. Surveying Texas landholders currently catering to nature photographers will clarify the economic potential of nature-focused photography. This project will fill a much needed void by providing timely information regarding the costs and benefits of nature-focused photography enterprises. Creating or expanding photographic opportunities as a revenue source for landowners may have far-reaching implications for landowners, stakeholders, wildlife, and its enthusiasts.

9. The Delineation of Two Subspecies, the Desert Massasauga and the Prairie Massasauga: A Problem That Must Be Addressed

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ABSTRACT Subspecies boundaries between the Desert Massasauga (*S.t. edwardsii*) and the Prairie Massasauga (*S.t. tergeminus*) remains a problematic area. Currently, *S.t. tergeminus* has no federal conservation status, while *S.t. edwardsii* is petitioned for listing under the U.S. Endangered Species act. However, previous genetic work shows little genetic differentiation between the two, and that the differences observed did not fall along the line currently recognized as dividing the subspecies. The main goal for this project is to gain a better understanding of how these two subspecies differ, if at all, by evaluating their genomic makeup, ecology, and morphological characteristics, in order to develop better conservation and management practices going forward. New molecular techniques applied incorporate genomic approaches, including whole genome sequencing, assembly, and annotation of each taxon from samples across the range of the Western Massasauga (*S. tergeminus*). Observations of *S. tergeminus* were aggregated for a species distribution model (SDM), using climate variables to predict their distribution. We will project the SDM under future climate change scenarios to predict how climate change may impact *S. tergeminus*. Driving surveys are being conducted to fill gaps in our sampling distribution for both the genomic analyses and SDMs, with 7 new *S. tergeminus* observations recorded May through October 2019. Finally, computed tomography (CT) scans and measurements of multiple morphological characteristics of 130 specimens are utilized to compare the morphology of these populations across this distribution.

10. Ways to Age Nilgai Antelope

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ABSTRACT Nilgai antelope (*Boselaphus tragocamelus*) were introduced into Texas in the 1930s. There is a lack of data on aging this exotic species. The horns of nilgai are a factor in determining age in nilgai, with many of the largest having horns with lengths between 15-20 cm. We captured 22 nilgai and collected measurements (cm): horns, skull width, skull length, eye to jaw, and width between horns. We believe nilgai can be aged using premolars and molars as most other ungulates are. Incisors may aide with the aging process by aging nilgai like mountain goats (*Oreamnos americanus*)

and bighorn sheep (*Ovis canadensis*) are aged. Premolars and molars of nilgai seem to age in similar ways as other ungulates. The incisors of nilgai age similar to mountain goats and bighorn sheep, but there is no known age of when nilgai lose their deciduous teeth, which creates the belief that they might not be the best aging protocol at this time. The body of a nilgai seems to be an effective way to age the nilgai, similar to its use in other ungulates. Distance between the horns does seem to be of importance in aging the nilgai, however, as with the incisors, we lack the data to know at this juncture when the rate horns first grow farther apart. Further research needs to be completed. Learning about this skittish species is important so that we can better manage any effects of it spreading throughout South Texas, wildlife interactions, and the spread of diseases.

11. Effectiveness of Landscape Enhancements in Attracting Beneficial Birds to Agroecosystems

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ABSTRACT Birds have the capability to provide vital ecosystem services, like pest control. Landscape enhancements, such as nest boxes, can attract birds to agricultural areas to provide these services. Birds of prey could be particularly beneficial, given their consumption and deterrence of vertebrate pests. However, we lack information on the ecological contexts in which landscape enhancements are most likely to attract pest-detering vertebrates and result in reduced abundance of crop pests. Our previous work showed that nest boxes can attract American kestrels (*Falco sparverius*; hereafter, kestrel), a small falcon, to cherry orchards. To investigate if providing nest boxes could increase kestrel presence in another fruit production region, we installed nest boxes in or near blueberry growing operations in western Michigan in 2015 and 2016. We surveyed transects from 2015 to 2018, recording kestrel absence or presence. We constructed an occupancy model to investigate the effect of nest boxes on kestrel presence, along with other factors that could influence kestrel presence and detection. We found that nest boxes led to an increase in kestrel presence, although the effect was weaker than our study in sweet cherries. Box occupancy rates were also lower than the sweet cherry study system, while reproductive success was similar. Our results show that nest boxes can serve as effective landscape enhancements to attract beneficial species of birds to agricultural landscapes. However, the degree to which boxes affect kestrel presence, box occupancy, and reproductive success is likely influenced by factors such as crop type and geographic region.

12. International Assessment of State-Level Grassland Conservation Programs to Support Full Annual Cycle Grassland Bird Conservation

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ABSTRACT A recent report showed over 3 billion birds have been lost since 1970, where 25% (720 million) were grassland birds. In Texas, some of our most common grassland birds like Northern Bobwhite (*Colinus virginianus*), Eastern Meadowlark (*Sturnella magna*), and Loggerhead

Shrike (*Lanius ludovicianus*) have declined by about 75% since the 1970's. Since a significant proportion of our intact grasslands are privately owned, conservation efforts must involve local communities in the design, implementation, and evaluation of intended investments and outcomes. The American Bird Conservancy working with the Association of Fish and Wildlife Agencies Grassland Working Group is conducting a state-by state gap analysis to map tri-national grassland habitat programs and bird conservation efforts. Our goal is to develop a snap-shot of current projects collectively addressing declines in the broad suite of grassland species. We are asking participants in each state or province to take a short survey and use an online mapping tool to draw polygons around project locations or program focal areas in order to visually piece together grassland conservation efforts across the nations. The ten-question survey is aimed at state fish and wildlife agency SWAP coordinators, private lands program leads, as well as partners such as NGOs and federal agencies. We conducted a pilot project to test our survey method in the Mississippi Flyway, and seven states responded showing efforts varied significantly across states. This gap analysis will assist states, provinces, Joint Ventures, and Flyway Councils to coordinate full annual cycle international grassland conservation efforts and develop work plans.

13. Determining Texas Horned Lizard Snout-to-Vent Length From Their Scat

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ABSTRACT Texas horned lizards were once abundant throughout Texas. However, their distribution and numbers have been declining and today they are listed as a Texas threatened species. Detection of Texas horned lizards can be difficult because their populations are now sporadic and due to their cryptic nature. Using indirect sign such as scat to determine occupancy is a widely practiced survey technique. However, it is unknown if scat size also could be used to determine the age structure of Texas horned lizards within a region. Our objective was to determine if scat length and diameter could be used as an indicator of lizard size, which in turn, could determine population age structure. We collected 43 Texas horned lizards from LaSalle County, Texas, measured them for snout-to-vent length (SVL; mm), held them in captivity (< 24 hr) until they defecated, measured (mm) their scat for length and diameter, and then released the lizards at site of capture. Simple log-log regression models were developed to predict SVL from scat length and from diameter for hatchling, juvenile, and adults lizards. Slopes were similar among age classes, but intercepts differed as expected. An additional 29 Texas horned lizards were captured from three central Texas counties, handled similarly as before, and used to validate the regression models. Predictive models performed well for hatchling and adult horned lizards, but were less accurate for predicting length of juvenile horned lizards. Refinement of the models will continue in order to improve predictability of lizard size from their scats.

14. The Effects of Social Behavior on Supplemental Feed Use By Free-Ranging White-Tailed Deer in Central Texas

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ABSTRACT White-tailed deer (*Odocoileus virginianus*) are a popular game animal in North America, because of the economics and hunter interest, deer herds are intensively managed to promote optimal health and large antlers. In management programs, nutrition can be supplemented using grains, pelleted feed, or planted food crops. Little scientific information is available assessing the effectiveness of supplemental pelleted feed in free-ranging deer populations and how social hierarchies may affect feeder accessibility. Dominant individuals may limit access for subordinates, particularly females and yearlings. Dominant animals may be those of greater maturity or with greater antler size. The proportion of bucks to does actually consuming pelleted feed may differ as a result of dominance hierarchies. In order to test these hypotheses, we will conduct a camera survey at established feed stations across 2 ranches in central Texas. Social interactions displayed within the parameter of a feeder will be recorded. Age, sex, and antler size will be documented for each identifiable individual. Investigating the proportion of the deer population that is consuming feed on a regular basis could aid in the delivery of medicated feed for disease control. Further research may indicate that free-ranging white-tailed deer are less dependent on supplemental pelleted feed than those residing in a pen setting. Landowners and hunters could greatly benefit from the information this study could provide on managing free-ranging deer populations.

15. Determining Presence of a Secretive Lizard and Factors Affecting Detection of Desert Grassland Lacterillians

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ABSTRACT The spot-tailed earless lizard (STEL) is a small, wary, diurnal lizard occurring in The Edwards Plateau and the Texas South Plains (Axtell, 1954). The lizard has dorsal rows of chevron-like blotches, though its name is derived from the ventral spots running down the tail. The Balcones Escarpment delineates its two subspecies, but recent genetic work supports elevation for two separate species; *Holbrookia lacerata* and *Holbrookia subcaudalis* (Laduc et al., 2019). STEL inhabits areas described as flat, historic grasslands with low woody encroachment, sparse vegetation, and reserving some form of disturbance (Axtell, 1954). STEL is thought to be threatened by habitat degradation by land-use change, red-imported fire ants, and agricultural pesticide use (Hammerson et al. 2007). The lizard's once native grassland habitat now faces invasions of Buffelgrass and King Ranch bluestem (Hibbits and Hibbits, 2015). STEL is currently under review by the USFWS to be listed as threatened or endangered, but a lack of population data exists (DOI, 2011). Per-person detection rates during visual encounter surveys (VES) when surveying for the lizard are often quite low making data collection more difficult. My research aims to determine the presence of STEL in 15 South and central Texas counties. I will also be investigating the escape responses of all lizards encountered (including STEL) during VES surveys in efforts to understand how this affects surveyor detection. For this poster presentation I aim to converse with other herpetological researchers to receive critique and comments on this future research.

16. Antler Growth and Anomalies Observed in Captive White-Tailed Deer (*Odocoileus Virginianus*)

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ABSTRACT Antlers are an important part of the male anatomy in species of the Cervidae family. The structure is replaced annually which allows an individual to express their updated status of health, maturity, quality to females, dominance to other males, and defense against predators. Antler growth, shedding of velvet, hardening of antlers, and antler shedding take place in approximately an annual cycle. I hypothesized that white-tailed deer (*Odocoileus virginianus*) observed long-term would not vary in the timing of rubbing into hard antler in the fall and shedding of antlers in the spring. In white-tailed deer, individuals across the population go through the antler cycle simultaneously. As males become more mature and compete for dominance, they run the risk of damaging antlers and pedicles. I am focusing strictly on damaged or removed pedicles, the most observed cause of antler anomalies. I hypothesized that males that damaged pedicles would grow a new antler the following year, but that they would not be symmetrical. These observations took place at the Albert and Margaret Alkek Ungulate Facility, Kingsville, Texas, where our captive males are held in 1.1-acre pens separate from females. Any males that were observed to have damaged or removed pedicles were treated by the attending veterinarian, photographed, and monitored during the growing season of the antlers to record growth.

17. An Overview and Use of Species Status Assessments in Endangered Species Management and Population Viability

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ABSTRACT The Species Status Assessment (SSA) framework is intended to be an in-depth review of a species of concern's biology and threats, as well as an evaluation of its biological status and an assessment of the resources and conditions needed to maintain long-term viability. For the purpose of an SSA, viability is generally described as the ability of a species of concern to sustain resilient populations over time. Using the SSA framework, we consider and evaluate the current and future viability of a species of concern by assessing a range of conditions to characterize its resiliency, representation, and redundancy (together, the 3Rs). Resiliency is characterized as a species' ability to withstand stochastic events at the population level, while representation and redundancy characterize the ability of a species to adapt to and/or withstand changing environmental conditions and catastrophic events at the species level: the number and distribution of populations contribute to species persistence by ensuring that the loss of a population does not lead to the loss of representation or the loss of the species entirely. As such, by spreading the risks associated with such events across multiple resilient populations, a species of concern has a stronger ability of maintaining long-term viability across its extant range.

18. Austin Urban Coyote Study: Preliminary Investigations

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ABSTRACT The Austin TX metropolitan area is the fastest growing in the United States and it has been the fastest growing for the last eight years. As people move to Austin, they also move into suburban areas, increasing sprawl. This growth of the city area creates new urban habitats for wildlife including predator species. Coyotes (*Canis latrans*) are natural predators that have adapted well to urban areas. Studies of urban coyotes in Chicago show that coyotes thrive in urban environments, and that they appear to avoid human areas and activities. Is this true in Austin as well? Despite the large amount of urban habitat developing in Texas, we lack information about the home ranges of Texas' urban coyotes, their diets and behavior, and whether their proximity to humans may result in higher exposures to environmental contaminants. We began a pilot study to trap and collar urban coyotes in Austin to begin answering these questions. We identified a suitable field site restricted from public use and evaluated it for the presence of coyotes, then began trapping. We also collected coyote scat for diet analysis. We plan to use our findings to understand how urban coyotes in Austin are faring, and to help members of the public better understand their coyote neighbors.

19. Questions About Birds From the General Public: A Case Study About Participation in a Live Radio Show

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ABSTRACT In 2013, National Public Radio's (NPR) affiliate Red River Radio (RRR), based in Shreveport, LA, began hosting a new live call-in radio show about birds. The show's hosts fielded live questions asked by the public about birds, which were broadcast over the radio or streamed online to a live listening audience. RRR's listening area is one of our nation's largest NPR stations and serves East Texas, nearly half of Louisiana, and small portions of Arkansas and Mississippi. The listening area serves over 2.5 million residents, in addition to those who stream it over the internet from other locations. Demographic data about the callers were gathered from nearly 500 calls. Results revealed that 73% of the callers were male. Calls were fielded from 11 states with Texas and Louisiana being the most common. The cities with the most calls included Shreveport; Nacogdoches, TX; and Bossier City, LA. Callers' questions covered a wide array of topics, with the identification of unknown birds as the most common followed by questions about diurnal raptors, woodpeckers, hummingbirds, and owls. Topics often resulted in an "infectious effect" which encouraged subsequent callers to ask a related question over the same topic, although this effect, known as carryover, was not statistically significant. The traditional news and information outlets of radio and newspapers now compete with television, magazines, computers, and personal cellular devices. Radio is still an effective way to reach diverse audiences, especially older rural ones.

20. Quantifying Wild Pig Damage at Different Crop Growth Stages with Remote Sensing Techniques

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ABSTRACT Feral Swine (*Sus scrofa*) were first introduced into Texas as livestock over 300 years ago by Spanish explorers. Later, other captive and wild stocks, including “Russian boars” were introduced for trophy and recreational purposes. Over time, swine were released or escaped fenced properties and became feral, leading to a rapid spread and population growth. Feral swine are presently classified as an exotic, invasive species because they cause major damage to properties, cropland, livestock, and native species and ecosystems. All told, feral swine cost the U.S. around \$1.5 billion each year in damage and control costs. In this study, we compared different methods for monitoring feral swine damage in corn fields. From April 1-August 28, 2019, we flew 5 drone missions at an altitude of 100 m, and captured imagery during different stages of corn growth: planting/seed stage, vegetative stage, blister stage, milk stage, and harvest. To verify damage detected through drone flights, we ground-truthed sites by walking transects and recorded damage using a sub-meter GPS unit. Finally, we evaluated a machine-learning algorithm that uses multiple layers to progressively extract higher-level features from remotely sensed imagery. We will compare damage detected via drone imagery and ground transects to the outputs of machine learning. Our objective is to find a practical means for the detection and monitoring of crop damage at a larger scale, with the ultimate goal of patterning damage temporally to assist in more efficient control efforts to protect crops.

21. The Efficacy of Karst Invertebrate Monitoring Using Camera Trap Technology

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ABSTRACT In cave systems that lack primary production, troglobitic karst invertebrates rely on allochthonous inputs for energy. Camel crickets in the genus *Ceuthophilus* serve as the primary energy provider in many Central Texas caves. Crickets, as a keystone species, are monitored to provide an indication of overall ecosystem health for caves that contain endangered karst invertebrates. Traditionally, cricket monitoring was carried out by humans counting crickets as they exited caves to forage, however, the use of humans for this activity had many inherent challenges. This study evaluated the use of camera traps to overcome of these inherent issues and improve both accuracy and precision of insect surveys. We used both human observers and factory-focused camera traps to monitor crickets exiting 29 caves known to contain threatened and endangered invertebrate species

on Joint Base San Antonio-Camp Bullis, Bexar County, Texas during October 2019. We found that the presence of humans had a pronounced effect on cricket emergence ($P < 0.01$); while the use of camera traps, which did not alter cricket behavior during emergence, was more precise and accurate. This novel approach provides natural resource managers an alternative method for monitoring endangered species in Central Texas caves.

22. Effect of Prescribed Fire on the Viability of *Baylisascaris procyonis* Eggs

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ABSTRACT *Baylisascaris procyonis* is a zoonotic parasite that can cause serious health issues in its intermediate hosts. Eggs of the parasite are shed in the feces of raccoons (*Procyon lotor*), the definitive host, and can remain viable in the environment for years. Temperatures above 49°C are the LD50 for *B. procyonis*. Our objective was to determine the effect of prescribed fire as a lethal control of *B. procyonis* eggs. Aliquots of 1000 viable *B. procyonis* eggs were placed on the soil surface and at a depth of 2 cm below the surface within the burn area and at 0, 0.7, 1.2, and 1.8 m from the fire's edge of 10 m x 10 m grass plots consisting of approximately 2,000 kg/ha and 4,000 kg/ha fuel load, and within a 1 m² circle of bare ground on the leading edge, center of circle, and trailing edge of the fire of similar plots. Prescribed fire killed *B. procyonis* eggs on the soil surface up to 0.7 m from the fire's edge at fuel loads of 4,000 kg/ha, but was ineffective at depths of 2 cm. Fuel loads of 2,000 kg/ha killed only 50% of *B. procyonis* eggs on the soil surface at the fire's edge, but was not effective killing eggs at greater distances or at soil depths. Prescribed fire can be used to reduce the quantity of *B. procyonis* eggs on the soil surface within an environment, but will not be effective in eradicating the parasite eggs.

23. Land Use and Land Cover Classification with Change Detection Analysis of Chitwan National Park, Nepal Using Remote Sensing and GIS

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ABSTRACT Remote sensing and GIS technology has brought a revolution in the field of wildlife conservation and research that is instrumental for identifying appropriate conservation management strategies. Land use and land cover change (LULC) detection analysis in wildlife research has grown significantly due to its broad applications in wildlife-habitat relationship studies. The goal of this project is to understand magnitude and direction of LULC change in Chitwan National Park, Nepal as it relates to the prey species distribution in the park. We will use multi-temporal landsat imagery (TM 1988-2008, TIRS 2018) to detect changes between 1988 and 2018. We will use supervised classification-maximum likelihood algorithm in ERDAS IMAGINE to classify the study area into eight major LULC classes- Cultivated Area, Water Bodies, Settlement, Lowland Sal Forest, Riparian Forest, Hill Sal Forest, Flood Plain Grassland and Degraded Sal Forest. Identifying changes using

post classification comparison occurring in these LULC types will be useful in making future conservation management decisions.

24. Searching for a Needle in a Haystack: Using Computer Algorithms to Detect Reintroduced Louisiana Pinesnakes Captured With Camera Traps

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ABSTRACT Rare and secretive snake species with low occupancy and detection rates are expensive to monitor and study using traditional box traps. Advancements in camera trap technology have provided wildlife researchers with a more efficient technique to monitor such species, like the federally listed Louisiana Pinesnake (*Pituophis ruthveni*) which can be difficult to detect due to both rarity and a life history with secretive behaviors. However, the task of converting camera images to snake detections from extremely large image collections using these techniques is soul-crushing. Can computer algorithms help streamline the process? Here, we report the results of an eight-month camera trapping study using time-lapse triggered camera traps to detect snakes, in particular reintroduced *P. ruthveni*, in a Louisiana upland forest. We scored all camera images manually and then compared the manual snake detections to those generated using computer algorithms. We report the false positive and false negative rates from our computer algorithms for all snake species detected with camera traps. Future research will focus on refining species-specific detection protocols using this technique and computer algorithm.

25. Documentation of Alternate Reproductive Strategies and Rare Behaviors of the Black-Crested Titmouse in Hays County, Texas

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ABSTRACT Recent publications estimate that more than three billion birds have been lost over the past half-century due to anthropogenic causes. Though numerous declining species are already scarce regardless of human interference, many species experiencing a decrease in abundance are those that have previously been categorized as “common.” Thus, to fully understand how to better conserve and manage “common” birds, biologists need a comprehensive knowledge of a species’ natural history and reproductive cycle. The black-crested titmouse (*Baeolophus atricristatus*, hereafter BCTI), is a small residential passerine native to north, west, and south Texas, southernmost regions of Oklahoma, and into regions of northern Mexico. Even though this species is common

throughout most of its range, it has not had extensive research performed on its reproductive strategies and social behaviors. Between the spring of 2013 and 2019, we captured over 1,200 BCTI that utilized a system of nestboxes placed in urban and rural areas in San Marcos, Texas. At occupied nestboxes, we assigned adults and nestlings unique combinations of color-bands that allowed for individual identification in the field. After seven years of observation, we discovered behaviors that have not been documented for the BCTI. Most notably, we witnessed BCTI utilizing alternative reproductive strategies such as cooperative breeding (4%) and polygyny (>1%), and we documented bizarre behaviors such as one account of sibling incest and mate-switching. By understanding these rare BCTI behaviors, we can provide a more thorough foundation for research that will contribute to future conservation efforts.

26. Conquering a Prolific Invader- Optimal Herbicide Rates for Controlling Chinese Tallow

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ABSTRACT Invasive species in the U.S. cost around \$120 billion in economic damages each year, with a large portion of these costs going to control measures. One of the most difficult to control and widespread invasive plants in the southeastern U.S. is Chinese tallow (*Triadica sebifera*). Chinese tallow is hard to control due to its ability to readily resprout from stem and lateral root buds after chemical treatment with several commonly used herbicides. Additionally, peer reviewed research on the effectiveness of newer herbicides to control Chinese tallow is limited. The goal of this study was to determine the optimum herbicide and rate that maximizes Chinese tallow mortality to reduce control costs associated with repeat chemical treatments. We randomly applied herbicide treatments using aminocyclopyrachlor, imazamox, and triclopyr ester to individual Chinese tallow trees at three study sites using basal bark and foliar methods. Here, we describe the methods used to evaluate the effectiveness of the herbicides.

27. Effects of Non-Native King Ranch Bluestem on Small Mammal Occurrence at Small Blackland Prairies in Southeastern Texas

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ABSTRACT Invasive plants have altered grassland ecosystems worldwide, resulting in the degradation or displacement of native plant communities. Likely consequences include changes in small mammal assemblages occupying affected areas. We examined the effects of a non-native and highly invasive grass, King Ranch bluestem (*Bothriochloa ischaemum*), versus native grasses/forbs, on small mammal occurrence on the Sam Houston National Forest (SHNF) in southeastern Texas. Field work took place during February 2018 and 2019 on three small blackland prairies embedded within the SHNF. Two prairies had moderate amounts of King Ranch bluestem (~30-40% coverage), and one prairie had very little King Ranch bluestem (~5% coverage). Each trap transect (one per prairie) had 50 trap stations placed ten meters apart, and two traps per station. Each

transect ran through patches of both native and non-native vegetation. Habitat variables were measured at each trap station during each year. We captured a total of 377 small mammals of four species (230 *Sigmodon hispidus*, 87 *Baiomys taylori*, 58 *Reithrodontomys fulvescens*, 2 *Blarina carolinensis*). Within prairies, we compared habitat variables between trap stations with at least one capture, to stations with no captures. Vertical vegetation density (primarily grasses) appeared greater at stations with captures than at stations with no captures. The percent total grass ground cover appeared similar at stations with and without captures, but percent of King Ranch bluestem cover was less at stations with captures at the two prairies containing moderate amounts of the invasive grass, indicating small mammals may be avoiding patches of King Ranch bluestem.

28. Native Seed Viability and Cover Crop Considerations for Rangeland Restoration

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ABSTRACT Rangelands cover a large portion of earth's land surface. Over half of rangelands are degraded from natural and anthropogenic causes. Because disturbance can occur at any time, it is crucial to know how to manage land effectively despite seasonal limitations. In a previous study utilizing cover crops and native grasses, the cover crop reduced exotic grass biomass but had no effect of native grass biomass. Cover crops may act as a temporary placeholder to exclude exotic grasses until native seeding conditions are ideal. Our study will evaluate the use of cover crops and seeded native grasses during two different planting seasons by monitoring plant density, biomass and soil microbial communities on a recently installed pipeline in southern Texas. Additionally, a seed burial trial will be conducted to evaluate viability of seeds that differ in their successional status and diaspore morphology. The study will (1) expand our knowledge of how cover crops affect the establishment of native seed mixes when cover crops and permanent seed mixes are planted simultaneously or separately, and (2) quantify the long-term viability of seeds that represent different seral stages in rangelands. Ultimately, we hope to improve our understanding of the best practices for restoration of rangelands after disturbance by better understanding the role of cover crops, planting date, and seed viability.

29. Analysis of Breeding Mottled Duck Population Survey in Texas and Louisiana

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ABSTRACT The breeding population survey of the western Gulf Coast mottled duck population has shown a general decline over the last four decades. The breeding population survey typically utilizes fixed-wing aerial count method on a larger spatial extent that is then followed by a sample survey by helicopter to estimate a visibility correction factors (ratio of helicopter to fixed-wing counts). Conservation partners in the region have stressed the need to reduce the variance around population estimates produced by the current survey design. A constant visibility correction factor (VCF) is applied across large spatial extents for each state, this fails to account for finer-scale factors like spatial differences in habitat, densities of duck, weather and other covariates that may influence the visibility of the duck during the census. In the present work, we study the variability of VCF in the survey area to delineate the causes behind their fluctuations on a yearly basis. We will examine how local differences in habitat conditions and bird densities influence the VCF.

30. The Effects of Precipitation on Red-Cockaded Woodpecker Fledgling Success on the Kistachie National Forest in Louisiana

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ABSTRACT For the continued recovery of the endangered red-cockaded woodpecker *Dryobates borealis* (RCW), it is imperative to identify and, if possible, mitigate limitations to its reproduction. Possible limitation to RCW reproduction, outside of habitat availability, are the effects of precipitation events during the breeding season (April -July), particularly during the nesting stage. RCWs typically do not fly during rain showers, conserving energy until precipitation ends, but reducing time spent foraging to provision nestlings and themselves. Reductions in foraging effort may lead to reduced fitness and mortality of the hatchlings, a possibility that may be exacerbated by a lack of helpers. In this study, we evaluate the impact of cyclical rain patterns, such as El Niño and La Niña, on RCW fledgling success. By comparing RCW nesting data from 2014-2018 on the Kisatchie National Forest in Louisiana with precipitation data from adjacent Remote Automatic Weather Stations (RAWS), we aim to determine whether the frequency and/or timing of precipitation events can affect breeding success, specifically nestling mortality. Findings from this study could have implications for current translocation policies pertaining to the number of helpers to retain in a potential breeding group when selecting juveniles for translocation, while also identifying a previously undetermined stressor that may be mitigated, to improve the overall success of RCW nestling survival.

31. Circuit Theory to Estimate Road Crossings for the Endangered Ocelot

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ABSTRACT Ecosystems and landscapes must be permeable to support wildlife populations. With increasing road networks in natural areas, roads serve as barriers to animal movement. Inclusion of mitigation measures in transportation programs and project plans can help restore permeability to road networks across landscapes. Wildlife crossings can be an effective mitigation technique for the negative impacts of roads on species. However, high construction costs limit the number that can be implemented. It is therefore important to optimize the placement of crossing structures in road networks in a strategic fashion. Our project will evaluate models of landscape permeability for an endangered carnivore, the ocelot (*Leopardus pardalis*), as a function of road structure and habitat in southern Texas. We will build a circuit theory-based model from top identified resource selection functions (RSFs). We will build resistance surface scenarios based on the model predictions from the RSFs to develop a map informing landscape connectivity. We will develop three landscape resistance scenarios based on road crossing density and traffic volume. We predict the surface with the highest resistance to animal movement will have the greatest traffic volume and lowest crossing structure density. Additionally, we will assess resistance surfaces based on current and projected land use scenarios for the years 2050 and 2100. The goal of this research is to identify locations for potential road crossing structures based on available habitat that will help mitigate ocelot-vehicle collisions. Circuit theory can identify these locations based on resistance scenarios and can be used for crossing structure placement.

32. Out in the Open: Habitat Use, Movements, and Home Ranges in the Spot-Tailed Earless Lizards

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ABSTRACT *Holbrookia lacerata* and *H. subcaudalis* are small Phrynosomatid lizards found in central and south Texas. Our goals were to characterize habitat use, movements, and home range for *H. lacerata* and *H. subcaudalis*. During May-July 2017 and May-June 2018, we surveyed for *H. lacerata* in Crockett County, Texas and *H. subcaudalis* at Laughlin Air Force Base, Val Verde County, Texas. Walking and driving visual encounter surveys were conducted for lizards and captured adult lizards were fitted with a radio-transmitter and tracked three times/day. During each relocation we recorded its behavior and collected microhabitat data. We also quantified available microhabitats along transects across the study area. *Holbrookia lacerata* had relatively large, non-overlapping home ranges compared to other lizards with similar life history characteristics. *Holbrookia subcaudalis* home ranges were even larger, but exhibited more frequent and larger amounts of overlap. For *H. subcaudalis*, the

even larger home ranges may be due to the uniformity of the landscape as the airfields the species is found on is regularly mowed. Lizard relocation sites were more open, contained highly compact natural substrates with low grassy cover for both species compared to other sites available in the study area. Because these species prefer a more open grassland, disturbances like mowing, disking, or grazing may open (at least temporarily) more grassland patches and be a viable option for restoring populations. However, since *H. lacerata* and *H. subcandalis* are possibly attracted to roadsides, additional conservation issues from road mortality risk may create roadside population sinks.

33. Genetic Approaches Improve Our Understanding of Bat-Wind Turbine Impacts

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ABSTRACT Understanding the impacts of wind energy mortality on bats requires accurate assessments of species and sex, but this is not always possible in the field. This study applied a genetic approach to identify sex and species using bat carcasses collected during post-construction fatality monitoring from two wind energy facilities in south Texas in 2017 and 2018. This region has a diverse bat community with morphologically similar species, and early reports suggested that both *Lasiurus intermedius* and *L. ega* would be impacted. From these facilities, we obtained wing tissue samples from 440 bats identified as *L. intermedius* (66%) or *L. ega* (33%) in the field. Following DNA extraction, regions of the X and Y chromosomes were amplified using PCR to determine sex (n=412) and a region of the mitochondrial COI gene was sequenced to verify species identification (n=426). Field sex assignments were 18% female, 19% male, and 63% unknown, with no difference between species. Molecular data indicated a 53% female-biased sex ratio. *L. ega* had more field misidentifications than *L. intermedius* with 24% versus 8%, respectively. Sequencing data also revealed *L. xanthinus* (n=36) and *L. blossevillii* (n=33), two species that were not known to occur in this region of Texas. Our data indicate that molecular sex determination is necessary for studies investigating influences of sex on collision risk. We also recommend DNA barcoding be used for species identification in regions with morphologically similar bat species and where species of conservation concern could be impacted.

34. Can Wildlife Water Developments Increase Viewing Opportunities of Wildlife?

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ABSTRACT Wildlife watching is becoming an increasingly popular recreational activity, and wildlife managers often try to provide the public with opportunities to view wildlife. Wildlife-viewing opportunities can be facilitated through habitat manipulation if those changes increase visitation and occupancy of the area by wildlife. One form of habitat manipulation available to managers is the construction of wildlife water developments, such as guzzlers. However, the use of guzzlers as a means of increasing wildlife-viewing opportunities has received little attention. We

hypothesized that guzzlers would increase the visitation frequency and duration of occupancy by bison (*Bison bison*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and pronghorn (*Antilocapra americana*) at study sites, thus providing recreationists with increased viewing opportunities of these ungulates. We used camera trap images at 9 study sites before and after guzzlers were installed to evaluate changes in site occupancy. We hypothesized that the frequency and duration of visits to the site by animals would differ among species and sexes. We predicted that visitation frequency and duration for all ungulates would increase after guzzler installation. Results varied by species and sex, indicating the need for adaptive management based on species composition and objectives. Our data will improve our understanding of area occupancy by wildlife near guzzlers, which will help managers improve visitor experiences and appreciation of natural resources.

35. Spatial Analysis of Bobwhite Hunting Dynamics

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ABSTRACT The recommended harvest strategy for northern bobwhites (*Colinus virginianus*) is a sustained yield harvest. Under this strategy, managers prescribe a total harvest from a fall abundance estimate to meet a desired spring density. However, the frequency, timing, and spatial distribution of harvest pressure can influence bobwhite populations. The aim of this study is to analyze the spatial dynamics of quail hunts in southern Texas. The project is taking place on 6,118 hectares of East Foundation property in Jim Hogg County. We are prescribing monthly harvest quotas from November survey estimates, with hunts ongoing until harvest quotas are reached. During each hunt, we are collecting spatial hunting distributions using GPS units on trucks and hunting dogs, along with detailed hunting logs. In the 2018-2019 hunting season, cooperators conducted 59 half-day hunts (167.6 hrs.). We recorded 193 braces (i.e., pair of dogs hunting), 78 individual dogs, and over 600,000 GPS hunting locations. Hunting activity took place on 2,537.8 hectares, with 19% of the 6,118 hectares hunted on multiple occasions. Morning hunts covered 27.2 ± 0.73 hectares per hour, while evening hunts covered 24.6 ± 1.68 hectares per hour. Hunting parties encountered 2.8 ± 0.12 coveys per hour during morning hunts and 2.6 ± 0.32 coveys per hour during afternoon hunts.

36. Effects of Prescribed Fire on Butterfly Populations in Coastal South Texas

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ABSTRACT Plants are essential parts of an ecosystem providing many uses such as food and habitat for animals. For years land managers have used prescribed fire to manage vegetation. Fire can act as a useful tool to clear out debris, remove invasive species, and promote new plant growth. Virtually all the world's seed plants need to be pollinated and this can be done via pollinators. Pollinators are any species that visit flowers to drink nectar or feed off pollen, and transfer pollen grains while feeding. Approximately sixty-seven percent of flowering plants rely on insects for pollination, making insect pollinators, such as butterflies, vital in any ecosystem. With this knowledge, land managers should also consider managing for pollinators. The objective of this study is to determine effects of different prescribed burn intervals and seasons on butterfly populations. Our site is a private ranch in Willacy and Kenedy Counties, Texas, in the Coastal Marsh and Prairies ecoregion. Plots ranging from 500 to 1200 acres will be burned with different season and return intervals: summer and winter long return intervals, summer and winter short intervals, and no burn control plots. We will survey butterflies and larvae to determine effects of season of burn, return interval, and time since burning on butterfly communities. Our results will help land managers determine the proper burn season and return interval for maximizing butterfly populations. This is particularly crucial for threatened butterfly species, such as monarch (*Danaus plexippus*), which travel through southern Texas rangelands during their annual migrations.

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