

# *51<sup>st</sup> Annual Meeting*

of the

## Texas Chapter

of

## The Wildlife Society



“The Next 50 Years of Wildlife Management  
Challenges and Opportunities”

19–21 February 2015

Corpus Christi, Texas

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## **PROGRAM**

MICHAEL TEWES AND NOVA SILVY

## **LOCAL ARRANGEMENTS**

WILLIAM KUVLESKY

## **POSTERS**

WHITNEY GANN AND HEATHER MATHEWSON

## MEETING SCHEDULE

### Wednesday, 18 February

8:00 a.m.–5:00 p.m.	Exhibitors	<i>Henry Garrett C</i>
11:00 a.m.–5:00 p.m.	Registration	<i>Watergarden A Pre-function Space</i>
12:00 p.m.–5:00 p.m.	Techniques and Technology	<i>Henry Garrett C</i>
12:00 p.m.–5:00 p.m.	Wildlife Tracking Identification	<i>Henry Garrett D</i>
5:00 p.m.–9:00 p.m.	Range Plant Contest Set-up Period	<i>Harborview A&amp;B</i>

### Thursday, 19 February

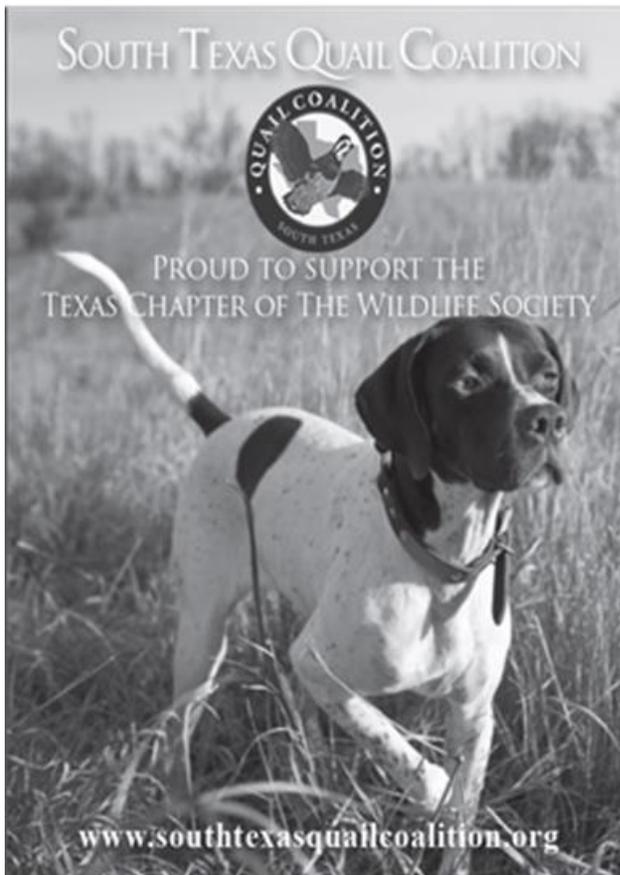
8:00 a.m.–7:00 p.m.	Registration	<i>Watergarden A Pre-function Space</i>
8:00 a.m.–12:00 p.m.	Exhibitors	<i>Henry Garrett C</i>
8:00 a.m.–12:00 pm	Techniques and Technology	<i>Henry Garrett C</i>
8:00 a.m.–12:00 p.m.	TCTWS Executive Board meeting	<i>Room 226</i>
8:00 a.m.–1:00 p.m.	AgriLife Extension meeting	<i>Room 104</i>
8:00 a.m.–2:00 p.m.	James G. Teer Leadership Institute	<i>Room 102</i>
11:00 a.m.–1:00 p.m.	Student Plant ID Competition	<i>Harborview A&amp;B</i>
11:00 a.m.–3:00 p.m.	Poster Session Se-up Period	<i>Henry Garrett Pre-function Space</i>
12:00 p.m.–9:00 p.m.	Exhibits—Breaks	<i>Watergarden B</i>
1:00 p.m.–6:00 p.m.	Presentation Submissions	<i>Registration Desk— Watergarden A Pre-function Space</i>
1:00 p.m.–6:30 p.m.	Submit for Art & Photo Contest	<i>Harborview D</i>
1:00 p.m.–4:00 p.m.	TCTWS Business Meeting	<i>Harborview C</i>
1:00 p.m.–3:30 p.m.	Texas Quiz Bowl	<i>Room 227</i>
1:00 p.m.–6:30 p.m.	Raffle & Silent Auction	<i>Watergarden B</i>
2:30 p.m.–3:30 p.m.	Wildlife Conservation Camp Meeting for former staff and interested individuals	<i>Room 102</i>
4:00 p.m.–5:00 pm.	Conservation Affairs Committee	<i>Room 104</i>
4:00 p.m.–6:00 p.m.	Posters Session Judging	<i>Henry Garrett Pre-function Space</i>
5:00 p.m.–6:00 p.m.	TPWD Wildlife Meeting	<i>Room 103</i>
5:00 p.m.–6:00 p.m.	Southwest Section TWS Women of Wildlife (WOW) Reception	<i>Henry Garrett Ballroom C</i>
6:00 p.m.–6:30 p.m.	Student Mentor Mixer	<i>Henry Garrett Pre-function Space</i>
6:00 p.m.–10:00 p.m.	President's Reception	<i>Henry Garrett Pre-function Space</i>

### Friday, 20 February

6:30 a.m.–8:00 a.m.	Student Breakfast	<i>Henry Garrett C</i>
7:30 a.m.–5:00 p.m.	Raffle & Silent Auction	<i>Watergarden B</i>
7:30 a.m.–5:00 p.m.	Registration	<i>Watergarden A Pre-function Space</i>
7:30 a.m.–10:00 a.m.	Submit for Art & Photo Contest	<i>Harborview D</i>
7:30 a.m.–11:59 p.m.	Exhibits—Breaks	<i>Watergarden B</i>
8:00 a.m.–6:00 p.m.	Presentation Submissions	<i>Registration Desk— Watergarden A Pre-function Space</i>
8:00 a.m.–11:59 p.m.	Posters up	<i>Henry Garrett Pre-function Space</i>
8:00 a.m.–10:00 a.m.	Plenary Session	<i>Henry Garrett A&amp;B</i>
9:00 a.m.–12:00 p.m.	Focus Group—Stakeholder Attitudes Toward Grassland Birds	<i>Room 102</i>
10:30 a.m.–12:00 p.m.	Cottam Award Papers	<i>Henry Garrett A&amp;B</i>
10:30 a.m.–4:00 p.m.	Popular vote for Art & Photo Contest	<i>Harborview D</i>
12:00 a.m.–1:30 p.m.	Past President's Luncheon	<i>Rotunda</i>
12:00 p.m.–1:30 p.m.	Lunch— <b>On Your Own</b>	

1:30 p.m.–5:00 p.m.	Concurrent Technical Sessions	<i>Harborview A, C, E, and Rooms 226 and 227</i>
2:00 p.m.–5:00 p.m.	Photo Critique Session and Annual Meeting of Professional Photographers	<i>Harborview D</i>
6:00 p.m.–7:00 p.m.	Pre-Banquet Social ( <b>cash bar</b> )	<i>Henry Garrett Pre-function Space</i>
6:00 p.m.–7:00 p.m.	TWA, Women of the Land Reception ( <b>cash bar</b> )	<i>Rotunda</i>
7:00 p.m.–11:00 p.m.	Awards Banquet	<i>Henry Garrett A–D</i>
<b>Saturday, 21 February</b>		
7:00 a.m.–7:45 a.m.	Fellowship of Christian Conservationists	<i>Room 102</i>
7:30 a.m.–11:00 a.m.	Registration	<i>Watergarden A Pre-function Space</i>
8:00 a.m.–11:30 a.m.	Exhibits–Breaks	<i>Watergarden B</i>
8:00 a.m.–10:00 a.m.	Posters are to be taken down	<i>Henry Garrett Pre-function Space</i>
8:00 a.m.–12:00 p.m.	TCTWS Executive Board Meeting	<i>Harborview B</i>
8:00 a.m.–11:15 p.m.	Concurrent Technical Sessions	<i>Harborview A, C, E, and Rooms 226 and 227</i>
1:00 p.m.–2:00 p.m.	Ocelot Translocation Working Group Meeting	<i>Harborview B</i>
12:00 p.m.	Adjourn 51 <sup>st</sup> Annual Meeting	

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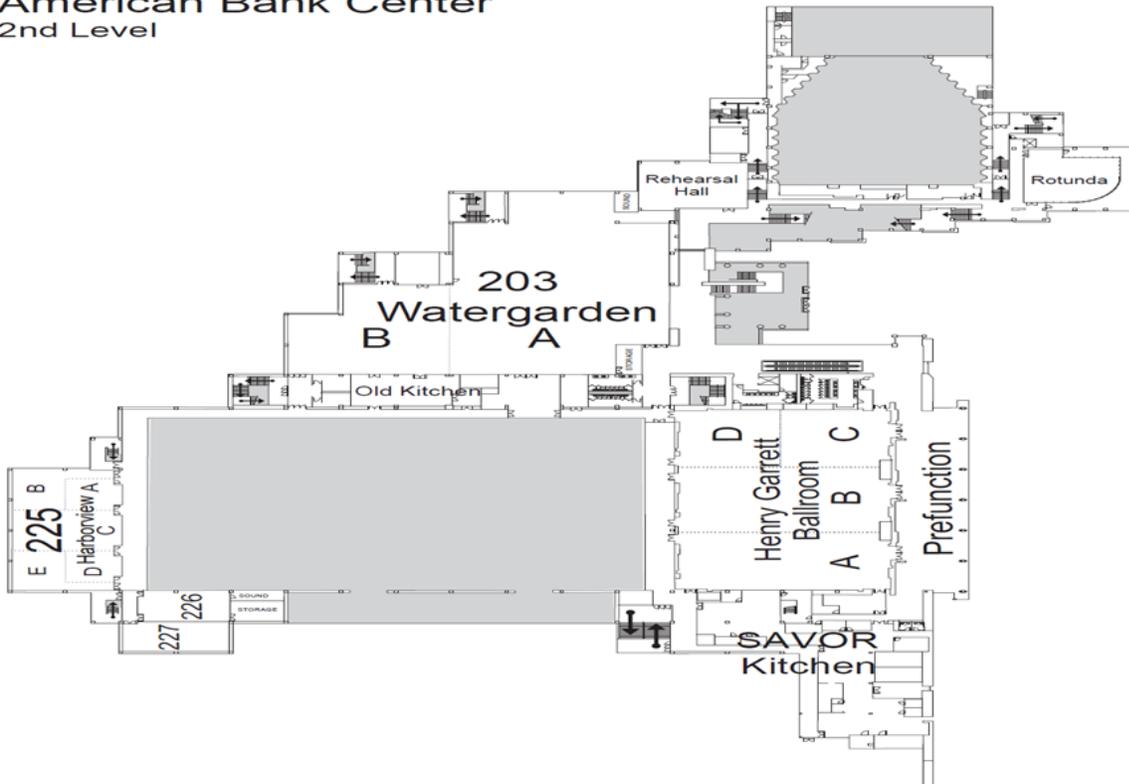
### About South Texas Quail Coalition:

The mission statement of Quail Coalition is “to sustain and restore huntable wild quail populations, to encourage and educate interested youth, and to celebrate our quail hunting heritage in this region”. Quail Coalition works toward this mission by minimizing overhead, and targeting approximately \$1 million annually towards quail research and conservation. The Rolling Plains Quail Research Ranch, Caesar Kleberg Wildlife Research Institute, The Quail-Tech Alliance, and The Wildlife Habitat Federation count themselves among the beneficiary groups working to solve the puzzling decline of the bobwhite quail in our region.

American Bank Center  
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# **Friday, 20 February 2015**

## **PLENARY SESSION**

**HENRY GARRETT A&B**

**MODERATOR: MICHAEL TEWES**

- 8:00: Opening Remarks – 50<sup>th</sup> and 51<sup>st</sup> Anniversary Meetings, – Michael Tewes, Program Co-Chair, Texas Chapter of The Wildlife Society**
- 8:05: Welcome and Introduction, – Dave Hewitt, President, Texas Chapter of The Wildlife Society**
- 8:20: The Wildlife Society – Where We Are and Our Future – Ken William, Executive Director, The Wildlife Society**
- 8:40: Demographic Trends and Implications for Wildlife Management – Mike Cline, Associate Director, Hobby Center for the Study of Texas, Rice University**
- 9:00: The Future of the Wildlife Profession – Training the Next Generation, Roel Lopez, Director, Institute of Renewable Natural Resources**
- 9:20: James G. Teer Leadership Institute, – Selma Glasscock, Assistant Director, Welder Wildlife Foundation**
- 9:25: Overview of the James G. Teer Conservation Leadership Institute Early Career Professional Program, Tucker Slack**
- 9:35: Presentation of James G. Teer Leadership Institute Certificates, Selma Glasscock**
- 10:00: Break–30 MINUTES**

## **CLARENCE COTTAM AWARD COMPETITION**

**HENRY GARRETT A&B**

**MODERATOR: ALFONSO ORTEGA-SANCHEZ, JR.**

- 10:30: White-tipped dove detection probability, occupancy, and distribution in the Lower Rio Grande Valley, Texas, Thomas A. W. Enright, Thomas W. Schwertner, and Jeffrey B. Breeden**
- 10:45: Prioritizing mottled duck habitat for conservation along the western Gulf Coast, Anastasia Krainyk, Bart M. Ballard, Michael G. Brasher, Barry C. Wilson, Mark W. Parr, and Jena A. Moon**
- 11:00: Estimating golden-cheeked warbler immigration: implications for conservation, Adam Duarte, Floyd W. Weckerly, and Jeff S. Hatfield**
- 11:15: Behavioral response of northern bobwhite to simulated predator attack, William Newman and Kelly Reyna**
- 11:30: Using a double observer approach to distance sampling during aerial surveys for large mammals, Mary K. Annala, Andrew N. Tri, David G. Hewitt, Randy W. DeYoung, Charles A. DeYoung, and Tyler A. Campbell**
- 11:45: Estimating capacity of available forage to sustain pronghorn in the Trans-Pecos, Justin French, Louis A. Harveson, Ryan O'Shaughnessy, Bonnie J. Warnock, Brian Campbell, and Shawn S. Gray**
- 12:00: LUNCH–ON YOUR OWN**

## **SESSION 1A: ECOLOGY OF COLD-BLOODED ANIMALS**

### **Harborview A**

**MODERATOR: MARK LANGE**

- 1:30: Nuisance American alligators: an investigation into trends and public opinion**, Cord B. Eversole, Scott E. Henke, Jacob L. Ogdee; David B. Wester, and Amos Cooper
- 1:45: Growth, condition, and age of American alligators in a high density population**, Cord B. Eversole, Scott E. Henke, Bart M. Ballard, and Randy L. Powell
- 2:00: Effects of agriculture on snake diversity and abundance in northeastern Swaziland**, Jacob D. Owen, Jesse M. Meik, and T. Wayne Schwertner
- 2:15: The influence of fire on a herpetofaunal community in eastern Texas**, Ashley C. Tubbs, Richard T. Kazmaier, and A. Tucker Slack
- 2:30: Evaluation of translocating wild-caught Texas horned lizards into formerly occupied habitat on the Muse Wildlife Management Area**, Devin R. Erxleben and Nathan D. Rains
- 2:45: Reptile and amphibian baseline surveys on the East Wildlife Foundation**, Connor S. Adams, Toby J. Hibbitts, and Tyler Campbell
- 3:00: Break–30 MINUTES**

## **SESSION 1B: ECOLOGY AND MANAGEMENT OF UNGULATES**

### **Harborview C**

**MODERATOR: DAVID F. VEALE**

- 1:30: Effect of location on the physical characteristics of unmanaged white-tailed deer in South Texas**, Kory R. Gann, David G. Hewitt, Alfonso Ortega-Sanchez, Jr., Timothy E. Fulbright, Alfonso Ortega-Sanchez, Randy W. DeYoung, Tyler A. Campbell, and Thomas W. Boutton
- 1:45: Is sexual segregation in Roosevelt elk influenced by male density**, Leah M. Peterson and Floyd W. Weckerly
- 2:00: Utilization distributions and movement of translocated desert bighorn sheep in the Bofecillos Mountains, Texas**, Thomas S. Janke, Louis A. Harveson, and Froylán Hernández
- 2:15: Evaluation of the efficacy of nalbuphine-medetomidine for immobilization of white-tailed deer and the reversal using naltrexone and atipamezole**, Lauren D. Balderas, Leslie M. Bowman, Clayton D. Hilton, David G. Hewitt, and William R. Lance
- 2:30: Density and fawning season effects on home range size of female white-tailed deer**, John H. Clark, David G. Hewitt, Timothy E. Fulbright, Charles A. DeYoung, Kim Echols, Andrew N. Tri, and Don Draeger
- 2:45: Are antler restriction regulations influencing breeding chronology?**, Rusty Wood, Micah Poteet, Sean Willis, and Gary Calkins
- 3:00: Break–30 MINUTES**

## **SESSION 1C: ECOLOGY AND MANAGEMENT OF CARNIVORES**

### **Room 226**

**MODERATOR: Chip Ruthven**

- 1:30: Edaphic factors as a measurement of spatial division between ocelot and bobcat habitat in South Texas**, Justin P. Wied, Jon S. Horne, and Michael E. Tewes
- 1:45: Ocelot population status and comparison of population estimates using 2 estimation techniques**, Eric L. Rulison, Justin Wied, Arturo Caso, John Leonard, Daniel J. Kunz, Andrew N. Tri, Alfonso Ortega-Sanchez, Jr., Tyler Campbell, and Michael E. Tewes

- 2:00: Landscape effects on bobcat genetic structure across ecoregions in west Texas**, Imogene A. Davis, Rocky Ward, and Richard T. Kazmaier
- 2:15: Habitat selection of bobcats in a Texas High Plains ecosystem**, Lena M. Thurmond, Raymond S. Matlack, Richard T. Kazmaier, and James D. Ray
- 2:30: Bobcat population drivers in South Texas**, G. Wesley Watts III, Justin P. Wied, Arturo Caso, Sasha Carvajal, Alfonso Ortega-Sanchez, Jr., and Michael E. Tewes
- 2:45: A synopic model of ocelot and bobcat space use**, John P. Leonard, Eric L. Rulison, Tyler Campbell, Alfonso Ortega-Sanchez, Jr., Justin P. Wied, G. Wesley Watts III, and Michael E. Tewes
- 3:00: Break–30 MINUTES**

## **SESSION 1D: WILDLIFE IN MEXICO**

**ROOM 227**

**MODERATOR: CULLEN HANKS**

- 1:30: New regional focus of Mexico’s wildlife conservation and sustainable use program**, Jorge Maksabedian de la Roquette (invited)
- 1:45: Monarch butterfly conservation actions in Mexico**, Gloria Tavera-Alonso
- 2:00: Morelet’s crocodile monitoring in Tamaulipas**, Alejandro Garza Peña
- 2:15: Jaguar monitoring in Tamaulipas**, Alejandro Garza Peña
- 2:30: Contribution of citizen’s science to track the monarch butterfly migration in Mexico**, Martin Sánchez-Vilchis
- 2:45: Behavior patterns of tropical cats in the Tamaulipan Biotic Province**, Shelby Carter, Michael Tewes, William Stasey, Arturo Caso, and Sasha Carvajal
- 3:00: Break–30 MINUTES**

## **SESSION 1E: LAND TRENDS AND LANDSCAPE PLANNING**

**Harborview E**

**MODERATOR: BILL BARTUSH**

- 1:30: Texas land trends: status update and trends of Texas rural working lands and implications for future conservation**, Addie Engeling
- 1:45: Landscape conservation design 101: a product oriented process for conservation in the southern grasslands**, James Broska, Cynthia Kallio Edwards, and Aimee Roberson
- 2:00: The Gulf Coast Vulnerability Assessment: informing adaptation options in landscape conservation design**, John M. Tirpak, Amanda Watson, Cynthia Kallio Edwards, Rua Mordecai, Steve Traxler, James W. Pahl, and Blair E. Tirpak
- 2:15: Intergrating grassland bird conservation and human landscape in central Texas**, Jon Hayes and James Giocomo
- 2:30: Conservation Planning Atlas: a tool for landscape conservation design**, Blair E. Tirpak and Cynthia Kallio Edwards
- 2:45: Using effective mesh size to calculate terrestrial fragmentation in Texas**, Blair E. Tirpak and Cynthia Kallio Edwards
- 3:00: Break–30 MINUTES**

## **SESSION 2A: ECOLOGY AND MANAGEMENT OF NONGAME BIRDS**

### **HARBORVIEW A**

**MODERATOR: FRED BRYANT**

- 3:30: Migratory connectivity of Texas and continent-wide purple martin populations**, James D. Ray, Louise Chambers, John Barrow, Kevin C. Fraser, Bridget J.M. Stutchbury, and John Tautin
- 3:45: Regional variation in nest site selection by golden cheeeked-warblers**, Melanie R. Colón, Ashley M. Long, Kathryn N. Smith, Heather A. Mathewson, and Michael L. Morrison
- 4:00: Grassland songbird and pollinator response to large-scale native-grassland restoration**, Anthony K. Henehan, Danielle E. Belleny, Fidel Hernandez, Eric D. Grahmann, Timothy E. Fulbright, Andrew N. Tri, and David B. Wester
- 4:15: Habitat associations of black-shouldered kites in agroecosystems of Swaziland**, Kate Howard, Thomas W. Schwertner, James P. Muir, and Ara Monadjem
- 4:30: Survival and the effects of capture on crested guineafowl at Mbuluzi Game Reserve, Lubombo, Swaziland**, Chelsea C. Taylor, T. Wayne Schwertner, Jeff B. Breeden, and Roger D. Wittie
- 4:45: Bird diversity, vegetation coverage, and house prices in Lubbock, Texas**, Katherine P. Leuenberger, Samantha S. Kahl, Michael Farmer, and Robert D. Cox

## **SESSION 2B: ECOLOGY AND MANAGEMENT OF UNGULATES**

### **Harborview E**

**MODERATOR: ANNALIESE SCOGGIN**

- 3:30: Dietary energy influences in growth and development of white-tailed deer**, Ryan L. Reitz, Don B. Frels, Jr., Justin A. Foster, David G. Hewitt, and Randy W. DeYoung
- 3:45: Aldo Leopold's cow: can cattle be used as a habitat management tool for white-tailed deer habitat in South Texas**, Stacy L. Hines, Timothy E. Fulbright, J. Alfonso Ortega-Sanchez, David G. Hewitt, Thomas W. Boutton, and Alfonso Ortega-Sanchez, Jr.
- 4:00: White-tailed deer ear tag retention**, Emily Belser, David Hewitt, John Lewis, and Mickey Hellickson
- 4:15: Effects of white-tailed deer densities and supplemental feeding on woody shrub canopy cover and volume**, Lindsey M. Phillips, Timothy E. Fulbright, David G. Hewitt, Charles A. DeYoung, Lindsay D. Roberts, Kim N. Echols, and Don A. Draeger
- 4:30: Ecology of adult female Rocky Mountain mule deer following habitat enhancements in north-central New Mexico**, Grant E. Sorensen, Mark C. Wallace, Philip S. Gipson, Robert D. Cox, and James W. Cain III
- 4:45: Prediction of pronghorn stress during translocation**, Ryan O'Shaughnessy, Scott Jaques, Louis A. Harveson, and Shawn S. Gray

## **SESSION 2C: ECOLOGY AND MANAGEMENT OF MAMMALS**

### **HARBORVIEW C**

**MODERATOR: RANDY W. DEYOUNG**

- 3:30: Assessing biodiversity of small mammals, ticks, and tick-borne pathogens in South Texas**, Aleyda P. Galán, Hunter A. Folmar, Sarah A. Hamer, Tyler A. Campbell, and Jessica E. Light
- 3:45: Small mammal response to wildfire on the Marfa Grasslands, Texas**, Robert A. Allcorn and Bonnie J. Warnock

- 4:00: Using camera traps to investigate mammal communities at Independence Creek Preserve,** Mark J. Cancellare, Richard T. Kazmaier, and Corbin Neill
- 4:15: Molecular gender identification and landscape effects of gene flow of porcupines in the Texas Panhandle,** Erica D. Thomas and Rocky Ward
- 4:30: Linking population estimates with landscape factors: assessing density of large mammals in a spatial context,** Andrew N. Tri, Mary K Annala, David G. Hewitt, Randy W. DeYoung, Charles A. DeYoung, and Tyler A. Campbell
- 4:45: Rio Grande beaver survey in Big Bend National Park,** Howland J. Reich, Thomas R. Simpson, Floyd W. Weckerley, M. Clay Green, and Raymond Skiles

## **SESSION 2D: ECOLOGY AND MANAGEMENT OF QUAIL**

**ROOM 226**

**MODERATOR: STEPHEN J. DEMASO**

- 3:30: Reducing fire ants to increase northern bobwhite abundance,** James W. Caldwell, Nova J. Silvy, Roel R. Lopez, Michael E. Morrow, and Fred E. Smeins
- 3:45: Evaluation of a GPS backpack transmitter for quail research in north central Texas,** Dean Marquardt, Luke Scroggs, Collin Weise, Kevin Skow, Robert Perez, Kevin Mote, and Brian L. Pierce
- 4:00: Rotational cattle grazing effects on northern bobwhite population dynamics,** Shannon Cain and Kelly S. Reyna
- 4:15: Habitat utilization and weather effects on scaled quail before and during the nesting season in the Trans-Pecos, Texas,** Ernesto Garcia-Ortega, Ryan S. Luna, and Louis A. Harveson
- 4:30: Probability of bobwhite habitat use in response to operative temperature and soil surface temperature,** Monika L. Burchette, Landen Gulick, Timothy E. Fulbright, Fidel Hernández, Eric D. Grahmann, and David B. Wester
- 4:45: Weather, temperature, and realized niche space for northern bobwhites at the western periphery of their range,** John M. Tomeček, Brian L. Pierce, Kelly S. Reyna, and Markus J. Peterson

## **SESSION 2E: ENDANGERED SPECIES RESEARCH**

**ROOM 227**

**MODERATOR: MICHAEL E. MORROW**

- 3:30: Indirect effects of red imported fire ants on Attwater's prairie-chicken brood survival,** Rebecca E. Chester, Michael E. Morrow, Sarah E. Lehnen, Bastiaan M. Drees, and J. E. Toepfer
- 3:45: Comparison study of stable isotope values in museum and contemporary feathers from the endangered Attwater's prairie chicken,** Zaria Torres, Miguel A. Mora, Nova J. Silvy, Ayumi Hyodo, Michael E. Morrow, and Rebecca Chester
- 4:00: Post-fledging habitat use of black-capped vireos,** Marisa T. Martinez
- 4:15: Listing decisions under the Endangered Species Act: science, salience, and special interests,** Kathryn N. Smith-Hicks
- 4:30: The influence of temperature on black-capped vireo habitat use and nest site selection,** Ronnisha S. Holden
- 4:45: Habitat suitability model for eastern Bell's vireo in northeast Texas** Amanda Turley and Jeffery Kopachena

**Saturday, 21 February 2015**

**SESSION 3A: ECOLOGY AND MANAGEMENT OF MAMMALS**

**HARBORVIEW A**

**MODERATOR: DENISE HARMEL-GARZA**

- 8:00: Seasonal diets of sable antelope at Mason Mountain Wildlife Management Area**, Amanda C. Hargrave, Thomas R. Simpson, Floyd W. Weckerly, Dittmar Hahn, and James Gallagher
- 8:15: Home range estimates of Roosevelt elk in Redwood National Park, California**, Nicholas R. Kolbe and Floyd W. Weckerly
- 8:30: Birth mass scaling in elk**, Gayatri Bhaskar and Floyd W. Weckerly
- 8:45: Where the pronghorn play: pronghorn habitat suitability and connectivity in the Texas Panhandle**, Nathan P. Duncan, Samantha S. Kahl, and Shawn S. Gray
- 9:00: Movements of translocated pronghorn in Trans-Pecos, Texas**, Taylor O. Garrison, Louis A. Harveson, Ryan O'Shaughnessy, and Shawn S. Gray
- 9:15: Survival of translocated pronghorn in Trans-Pecos, Texas**, Taylor O. Garrison, Louis A. Harveson, Ryan O'Shaughnessy, and Shawn S. Gray
- 9:30: Break–30 MINUTES**

**Session 3B: ECOLOGY AND MANAGEMENT OF WILDLIFE**

**HARBORVIEW C**

**MODERATOR: LINDA CAMPBELL**

- 8:00: Maximum entropy habitat suitability model for conservation management of the Texas tortoise, defining its status in the Coastal Prairies and eastern range**, Anjana Parandhaman, Shawn F. McCracken, and Michael R. J. Forstner
- 8:15: Does microclimate explain regional variation in lesser prairie-chicken nest survival?**, Alixandra J. Godar, Blake A. Grisham, Clint W. Boal, and David A. Haukos
- 8:30: A range-wide assessment on the influence of weather on lesser prairie-chicken demographic parameters**, Cody P. Griffin, Alixandra J. Godar, Blake A. Grisham, Clint W. Boal, David A. Haukos, Jim C. Pitman, and Christian A. Hagen
- 8:45: Micro-siting method for oil and gas development within northeastern Texas Panhandle populations of lesser prairie-chicken**, Amanda Miller, Kristina Dick, Karl Kosciuch, and Jimmy Huddleston
- 9:00: Parasitological survey of scaled quail from west Texas**, Kelsey A. Bedford, Alan M. Fedynich, Dale Rollins, and Fidel Hernández
- 9:15: Seasonal diets of the collared peccary in the Llano Uplift Ecological Region, Texas**, Meredith Hominick, Thomas R. Simpson, M. Clay Green, and James F. Gallagher
- 9:30: Break–30 MINUTES**

**Session 3C: ECOLOGY AND CONSERVATION OF BIRDS**

**ROOM 226**

**MODERATOR: JARED TIMMONS**

- 8:00: (Un) natural history: what genetics is not telling us about northern bobwhites**, Jeffrey G. Whitt and Kelly S. Reyna
- 8:15: Breeding bird community and habitat associations in bottomland hardwood forests of east Texas**, Meredith P. Wilson, Christopher E. Comer, Warren C. Conway, Christopher Farrell, and Scott Bosworth

- 8:30: Daily temporal variation in white-tipped dove calling activity**, Cullom S. Simpson, Thomas A. Enright, Thomas W. Schwertner, and Jeff B. Breeden
- 8:45: Transmitter influences on raptor agility and prey capture**, Rebecca Perkins and Clint Boal
- 9:00: Predicting songbird abundance and habitat use using a fire severity index**, Kristin P. Davis
- 9:15: Effects of landscape characteristics on nesting ecology of cavity-nesting birds**, Sara E. Harrod, M. Clay Green, Floyd. B. Weckerly, and Thomas R. Simpson
- 9:30: Break–30 MINUTES**

### **SESSION 3D: VEGETATION RESEARCH AND MANAGEMENT**

#### **HARBORVIEW E**

**MODERATOR: JIM MUELLER**

- 8:00: Effects of non-native invasive grasses on the native seed bank in South Texas**, Matthew N. Wojda, Timothy E. Fulbright, Fidel Hernández, David B. Wester, Eric D. Grahmann, Mike Hehman, and Forrest Smith
- 8:15: Seasonal herbaceous biomass and nutrient value at Fossil Rim Wildlife Center, Texas**, Drew A. White, Jeffrey B. Breeden, Roger D. Wittie, and James P. Muir
- 8:30: Improving establishment of mast-producing species in the Texas Blackland Prairie**, Luke Oliver, Jeremy Stovall, Chris Comer, Hans Williams, and Matt Symmank
- 8:45: Slender rush-pea morphology and community responses to competition removal**, Ashley C. McCloughan, Sandra Rideout-Hanzak, and David B. Wester
- 9:00: Influences of vegetation type on grassland nest predators**, Helen T. Davis
- 9:15: Invertebrate and seed bank potential of moist soil management units in west Texas and the Lower Rio Grande Valley**, Ryan S. Anthony, Ryan O'Shaughnessy, Louis A. Harveson, Dan P. Collins, and Ryan S. Luna
- 9:30 BREAK–30 MINUTES**

### **Session 3E: MANAGEMENT OF WATER RESOURCES**

#### **ROOM 227**

**MODERATOR: HEATHER A. MATHEWSON**

- 8:00: Vegetation classification with unmanned aerial system to support management and constructed wetland**, Kristina M. Tolman, Kristy A. Kollaus, Thomas C. Heard, John H. Fletcher, Matthew Symmank, Michael C. Frisbie, and Thomas B. Hardy
- 8:15: Human dimensions of urban water body usage in Lubbock, Texas**, K. J. Young, S. S. Kahl, M. Farmer, and K. Griffis-Kyle
- 8:30: Evaluation of a low-cost unmanned aerial system to support management and conservation efforts of Texas coastal resources**, Kristy A. Kollaus, Thomas C. Heard, Kristina M. Tolman, Timothy Birdsong, and Thomas B. Hardy
- 8:45: Utilizing hunter harvest for disease surveillance**, John T. Stone and Christopher M. Ritzi
- 9:00: JGTCLI Early Career Professional Development case study: assessment of the Carrizo Wilcox aquifer and recommendations for sustainable ground water management**, Jamie L. Killian, Chase Currie, Derek Broman, Tara Korzekwa and Tim Siegmund
- 9:15: Groundwater conservation education in the Carrizo-Wilcox: public benefits of rural working lands**, Mike Marshall, Whitney J. Gann, Samantha S. Kahl, Sarah Kahlich, and John Kinsey
- 9:30: Break–30 MINUTES**

## **Session 4A: ECOLOGY AND MANAGEMENT OF MAMMALS**

### **HARBORVIEW A**

**MODERATOR: JOHN SILOVSKY**

- 10:00: Preliminary survey results and distance analysis from pronghorn antelope aerial surveys in Texas,** Caroline L. Ward, Randy W. DeYoung, David G. Hewitt, Timothy E. Fulbright, Shawn S. Gray, and Andrew N. Tri
- 10:15: Environmental contamination of *Baylisacaris procyonis* eggs by infected raccoons,** Jacob L. Ogdee, Scott E. Henke, and David B. Wester
- 10:30: Ecological preferences of dama gazelle bucks in west Texas,** Elizabeth Cary Mungall and Susan M. Cooper
- 10:45: Mesocarnivore density, occurrence, and detectability in a small, southeastern urban area,** Jason V. Lombardi, Christopher E. Comer, and Daniel G. Scognamillo
- 11:00: Are antler restriction regulations influencing age and antler characteristics in the Pineywoods?,** Daniel Price, Micah Poteet, and Gary Calkins

## **SESSION 4B: ECOLOGY AND CONSERVATION OF BIRDS**

### **HARBORVIEW C**

**MODERATOR: JUSTIN WIED**

- 10:00: Snowy plover exposure to metals in sediment and water from saline lakes of the southern Great Plains,** Hannah M. Ashbaugh, Warren C. Conway, Daniel P. Collins, David A. Haukos, and David Klein
- 10:15: Nesting behavior of the reddish egret on Green Island, Texas,** R. D. Bracken and M. C. Green
- 10:30: Forecasting recovery opportunities for the red-cockaded woodpecker using a spatial model of tree age,** Amanda Dube, Roel Lopez, Rusty Feagin, Sorin Popescu, and R. Neal Wilkins
- 10:45: Applying the integrated waterbird management initiative to national wildlife refuges in Texas, New Mexico, and Oklahoma,** Kristen Linner, Blake Grisham, Warren Conway, and William P. Johnson
- 11:00: Identification of migratory paths and new breeding grounds of greater sandhill cranes in the Lower Colorado River Valley,** Courtenay M. Conring, Blake A. Grisham, and Daniel P. Collins

## **SESSION 4C: ECOLOGY AND MANAGEMENT OF GAME BIRDS**

### **ROOM 226**

**MODERATOR: BART BALLARD**

- 10:00: Habitat, climate, and raptors as factors in the northern bobwhite decline,** John T. Edwards, Fidel Hernández, David B. Wester, Leonard A. Brennan, Chad J. Parent, and Robert M. Perez
- 10:15: Using GIS to develop priority areas for the restoration of eastern wild turkeys in Texas,** Jason A. Estrella, Jason Hardin, and David O'Donnell
- 10:30: Habitat selection, incubation, and incubation recess ranges of nesting female Rio Grande wild turkeys in Texas,** Mason D. Conley, Jesse G. Oetgen, Jennifer Barrow, Michael J. Chamberlain, Kevin L. Skow, and Bret A. Collier
- 10:45: Pre-nesting movements of Rio Grande wild turkey in the Cross Timbers and Prairies, Texas,** Mason D. Conley, Jesse G. Oetgen, Jennifer Barrow, and Bret A. Collier
- 11:00: Survival and reproduction of translocated wild bobwhites into the Rolling Plains of Texas,** Michelle C. Downey, Dale Rollins, Fidel Hernández, Eric D. Grahmann, Bradley W. Kubečka, and Lloyd M. LaCoste

**11:15: Modeling wind turbine collision risk for migrating Swainson's hawks at an international scale,** Laurie Croen, Clint Boal, James D. Ray and Jimmy Walker

## **SESSION 4D: RESEARCH AND MANAGEMENT**

**ROOM 227**

**MODERATOR: THOMAS R. SIMPSON**

- 10:00: Thermal environment and exotic grasses influence habitat selection by scaled quail in South Texas,** Holley Kline, Richie Sinclair, Timothy Fulbright, Fidel Hernández, Eric D. Grahmann, David B. Wester, and Leonard Brennan
- 10:15: Dietary analysis of overwintering populations of Brazilian free-tailed bats in central Texas, United States,** Lynsey M. Ramirez, Thomas R. Simpson, M. Clay Green, and Chris Nice
- 10:30: Bat occupancy in bottomland hardwood forests managed for wildlife in the Mississippi Alluvial Valley,** Lorraine P. Ketzler, Christopher E. Comer, Daniel J. Twedt, Roger J. Masse, and Brian P. Oswald
- 10:45: Modeling bat occupancy and abundance in a bottomland hardwood forest of east Texas,** Carla J. Weinkauff, Christopher E. Comer, Warren C. Conway, Chris Farrell, and Scott Bosworth
- 11:00: Association of small mammal communities and urban land cover in San Marcos, Texas,** Lauren C. Cody, Thomas R. Simpson, M. Clay Green, and Ivan Castro-Arellano

## **SESSION 4E: ECOLOGY AND MANAGEMENT**

**HARBORVIEW E**

**MODERATOR: GENE T. MILLER**

- 10:00: Analysis of motion-captured pictures located on man-made water sources in the southern High Plains of west Texas,** Trevor Gicklhorn, Nicholas Pirus, and Clint Boal
- 10:15: Smart-phones lead to smart zoo patrons,** April A. T. Conkey and Marybeth Green
- 10:30: Agricultural conservation easements: a tool for preventing loss of open space and associated wildlife habitat on private lands,** Kenneth A. Cearley, Blair Calvert Fitzsimons Allison Elder, Todd Snelgrove, and Roel Lopez
- 10:45: Aflatoxin: a needle in a haystack,** Brent C. Newman, Scott E. Henke, Greta Schuster, Alan M. Fedynich, and James C. Cathey
- 11:00: The Texas Chapter of The Wildlife Society's Wildlife Conservation Camp, a look at long-term effects,** Kelsey Griffin, T. Wayne Schwertner, Wayne Atchley, and Selma Glasscock
- 11:15: The consultant's role in wildlife protection,** Vanessa Pina

## **POSTER SESSION**

**THURSDAY, 19 FEBRUARY 2015: 4:00-6:00 P.M.**

**HENRY GARRETT PRE-FUNCTION SPACE**

**CONTACTS: WHITNEY GANN & HEATHER MATHEWSON**

- 1. \*Are mint-scented trash bags a "waste",** Justin Plata and Scott E. Henke
- 2. \*A preliminary evaluation of aging criteria for Montezuma quail from hunter bags in Arizona,** C. Zachary Johnson, John M. Tomeček, Charles J. Randel, Roel R. Lopez, Pedro M. Chavarria, Brian L. Pierce, and Nova J. Silvy

3. **\*Spring and summer diet of Rio Grande wild turkey in the northern Rolling Plains**, Bradley W. Kubecka, Becky Ruzicka, and Dale Rollins
4. **\*Pelage growth rates in white-tailed deer in southern Texas**, Ramon Saenz, Stacy L. Hines, Timothy E. Fulbright, J. Alfonso Ortega-Sanchez, David G. Hewitt, Thomas W. Boutton, and Alfonso Ortega-Sanchez, Jr.
5. **\*Feed site visitation of female deer during and post pregnancy**, Ty E. Higginbotham, David G. Hewitt, Timothy E. Fulbright, Charles A. DeYoung, Kim N. Echols, and Don A. Draeger
6. **\*Obtaining white-tailed deer forage diet using video collars**, Landen R. Gulick, David G. Hewitt, Michael J. Lavelle, and Kurt C. VerCauteren
7. **\*Germination and decay rates of figs seeds selected by Wahlburg's epauletted fruit bats**, Cody J. Vavra, Sean R. Clawson, Thomas W. Schwertner, Ara Monadjem, and Phillip D. Sudman
8. **\*Using mobile and wireless technology to remotely monitor male white**, Darrion Crowley, David Hewitt, and F. Scott Mitchell
9. **\*Wintering grassland songbird response to ongoing native grassland restoration**, Danielle E. Belleny, Anthony K. Henehan, Fidel Hernandez, Eric D. Grahmann, Timothy E. Fulbright, Andrew N. Tri, and David B. Wester
10. **\*Laying the foundation for stable isotope research: cattle switch tail hair growth pattern**, Katelyn E. Allred, Dillan J. Drabek, Stacy L. Hines, Timothy E. Fulbright, J. Alfonso Ortega-Sanchez, David G. Hewitt, Thomas W. Boutton, and Alfonso Ortega-Sanchez, Jr.
11. **\*Pronghorn fawn survival in the Trans-Pecos region of Texas**, Michael McKay, Taylor Garrison, Ryan O'Shaughnessy, Louis A. Harveson, and Shawn s. Grey
12. **\*Energy requirements and diet items for American alligators in Texas**, Greg Lujano, Brent Newman, Cord Eversole, and Scott E. Henke
13. **\*Comparison of bottomland forest along the Texas Colorado River to Cross Timbers and Edwards Plateau bottomland forests**, Keagan Lowey, Kimberly Hogan, and Allan Nelson
14. **\*Physiologically relevant assays of dietary energy on white-tailed deer**, Lauren D. Balderas, Leslie M. Bowman, David G. Hewitt, Clayton D. Hilton, Ryan L. Reitz, Don B. Frels, Jr., Justin A. Foster, and Randy W. DeYoung
15. **\*Modeling probability of occurrence for feral swine**, Jesse C. Alegria, Mary K. Annala, Andrew N. Tri, David G. Hewitt, and Tyler A. Campbell
16. **\*\*Impacts of Eagle Ford shale exploration on quail habitat use and abundance**, Kelsey R. Dsvis, Eric D. Grahmann, Fidel Hernández, Chase Currie, and Fred C. Bryant
17. **\*\*Habitat stratification of barn swallows, cave swallows, and cliff swallows nesting on highway structures in northeast Texas**, Ashleigh P. Tynes and Jeff G. Kopachena
18. **\*\*Testing ontogenetic variation in the relationship between cranial morphology and total body length in the American alligator**, Cord B. Eversole, Scott E. Henke, David B. Wester, Bart M. Ballard, and Randy L. Powell
19. **\*\*Temporal influences on American alligator nighttime surveys**, Cord B. Eversole, Scott E. Henke, David B. Wester, Bart M. Ballard, and Randy L. Powell
20. **\*\*Lack of human awareness toward the emerging zoonotic parasite, *Baylisascaris procyonis***, Jacob L. Ogdee, Scott E. Henke, and David B. Wester
21. **\*\*Development and evaluation of prototype feral pig toxicants**, Grant S. Lawrence, Ryan S. Luna, Justin A. Foster, and John C. Kinsey
22. **\*\*Modeling sea level rise using a SLAMM model and its effects on colonial water-bird islands**, Corey J. Lange, Bart M. Ballard, Kris L. Metzger, and Daniel P. Collins
23. **\*\*Impacts of wind energy on wintering redheads along the Lower Texas Coast**, Corey J. Lange, Bart M. Ballard, Daniel P. Collins, and Randy W. DeYoung
24. **\*\*Survival and nesting success in pen-reared and translocated northern bobwhites**, William Newman, and Kelly Reyna
25. **\*\*Overwinter space use of greater sandhill cranes in the Lower Colorado River Valley**, Courtenay M. Conring, Blake A. Grisham, and Daniel P. Collins

26. **\*\*The effects of habitat and lure on bobcat detection**, G. Wesley Watts, III, Justin P. Wied, Arturo Caso, Sasha Carvajal, Alfonso Ortega-Sanchez, Jr., and Michael E. Tewes
27. **\*\*Abundance and land cover associations of migrant and wintering birds of prey in the southern Great Plains**, Natasia Mitchell, Benjamin Skipper, and Clint Boal
28. **\*\*The effects of vegetation and elevation on mountain lion hunting behavior in western Colorado**, Kendall J. AuBuchon, Thomas R. Simpson, L. Mark Elbroch, and Floyd W. Weckerly
29. **\*\*Estimating energetic carrying capacity for nonbreeding waterfowl on ranching stock ponds in the Rolling Plains, Texas**, Lisa A. Clark, Samantha S. Kahl, Blake Grisham, and Dan Collins
30. **\*\*Identifying habitat features supporting eastern wild turkey populations in Texas**, Kyle T. Hand, Christopher E. Comer, and Jason B. Hardin
31. **\*\*Primary feather molt in incubating snowy plovers in the southern High Plains**, Laura E. Duffie, Warren C. Conway, Christopher E. Comer, Hannah M. Ashbaugh, David A. Haukos, and Daniel P. Collins
32. **\*\*Vaginal implant transmitters as a tool to capture pronghorn fawns**, Emily R. Conant, Mark C. Wallace, Warren C. Conway, Stewart G. Liley, and Ryan L. Darr
33. **\*\*Activity patterns of black bears and other mammals in the Chisos Mountains of Big Bend National Park, Texas**, Skyler Stevens, Patricia M. Harveson, Cameron Goebel, and Michael Stangl
34. **\*\*Things are looking up for rangeland birds in South Texas**, Maia L. Lipschutz, Leonard A. Brennan, Thomas Langschied, and Tyler Campbell
35. **\*\*Movements of satellite GPS collared pronghorn in the Texas Panhandle in relation to barriers and agriculture**, Caroline L. Ward, Randy W. DeYoung, David G. Hewitt, Timothy E. Fulbright, and Shawn S. Gray
36. **\*\*Evaluation of an avian radar system to differentiate bird targets**, Taylor J. Yerrick, Bart M. Ballard, Suzanne Contreras, and David B. Wester
37. **\*\*New capture technique for northern bobwhite and scaled quail**, Byron R. Buckley, Drew Arnold, John McLaughlin, Mark Thomas, Thomas L. Warren, Derek Wiley, Sean R. Yancey, and C. Brad Dabbert
38. **\*\*The large ungulate dinner table: who's competing with whom for forages in South Texas?**, Stacy L. Hines, Timothy E. Fulbright, J. Alfonso Ortega-Sanchez, David G. Hewitt, Thomas W. Boutton, and Alfonso Ortega-Sanchez, Jr.
39. **\*\*An analysis of bobwhite home range size in response to large scale restoration efforts**, Monika L. Burchette, Landen Gulick, Timothy E. Fulbright, Fidel Hernández, Eric D. Grahmann, and David B. Wester
40. **\*\* Monitoring bird migration along the Lower Texas Coast: a comparison of coastal and inland sites**, Suzanne Contreras Walsh and Bart M. Ballard
41. **\*\*The influence of camera-trap settings on capture success in desert wildlife species**, Dakota P. Neel, Warren C. Conway, Mark C. Wallace, and Stewart G. Liley
42. **\*\*Habitat characteristics associated with wild turkey use of constructed roosts in South Texas**, Brandon Mitchell, Shannon M. Hall, William P. Kuvlesky, Jr., Alfonso Ortega Sanchez, and Leonard A. Brennan
43. **\*\*Spatial analysis of constructed Rio Grande wild turkey roost sites relative to food and water sources**, Shannon M. Hall, Brandon Mitchell, Alfonso Ortega Sanchez, William P. Kuvlesky, Jr., and Leonard A. Brennan
44. **Effects of broadcasting supplemental feed to northern bobwhites on survival and population growth in the southern Rolling Plains, west Texas**, John W. McLaughlin, Derek S. Wiley, and Brad C. Dabbert
45. **Effects of prescribed fire, tillage, and herbicide to re-establish native vegetation on old fields within the Blackland Prairie Ecoregion of Texas**, Audrey M. Whaley, Jeffrey G. Kopachena, and Jim Eidson
46. **Is chronic exposure to low levels of aflatoxins involved in the quail decline?**, Susan. M. Cooper

47. **Spatial distribution of dama gazelle males on a west Texas ranch**, Susan M. Cooper and Elizabeth Cary Mungall
48. **Comparative habitat selection of feral hogs and northern bobwhites in shrub-dominated rangeland**, Susan M. Cooper
49. **Dynamic interaction within ocelot and bobcat male-female pairs**, John P. Leonard, Eric L. Rulison, Tyler Campbell, Alfonso Ortega-Sanchez, Jr., Justin P. Wied, G. Wesley Watts III, and Michael E. Tewes
50. **Deer densities and supplemental feed have minimal effect on forb communities in South Texas**, Lindsay D. Roberts, Timothy E. Fulbright, David B. Wester, David G. Hewitt, Charles A. DeYoung, Kim N. Echols, and Don A. Draeger
51. **An examination of flock dynamics of the black-crested titmouse in the Edwards Plateau, Texas**, Rebekah J. Rylande and M. Clay Green
52. **Grade point average as a method to gauge undergraduate student market ability for employment as a wildlife professional**, Scott E. Henke, Alan M. Fedynich, and La Vonne Fedynich
53. **Potential ocelot and bobcat dietary partitioning: vegetation preferences of rodents on East El Sauz Ranch**, Eric L. Rulison, Justin Wied, Alfonso Ortega-Sanchez, Jr, Tyler Campbell, and Michael E. Tewes
54. **Golden eagle nesting in southern Nevada**, Sarah Weber, Thomas R. Simpson, John T. Baccus, and M. Clay Green
55. **Avian response to brush management on the Welder Wildlife Refuge**, Olivia A. Kost, Clint Boal, and Terry Blankenship
56. **Bringing back the dead: molecular sexing of avian carcasses**, Lianne M. Koczur, Damon Williford, Bart M. Ballard, and Randy W. DeYoung
57. **Most chronology and the effects of molt intensity on somatic protein reserves in northern pintails wintering along the Lower Texas Coast**, Matthew J. Garrick, Bart M. Ballard, David G. Hewitt, and Clay D. Hilton
58. **Effects of neonicotinoid exposure on embryonic development and cardiovascular health in northern bobwhite**, Amanda D. Gobeli and Kelly S. Reyna
59. **Avian diversity in early to mid-rotation eucalyptus plantations in southwest Louisiana**, Elizabeth J. Messick, Christopher E. Comer, Michael Blazier, and T. Bently Wigley
60. **An evaluation of strip-transects for wintering waterfowl on national wildlife refuges**, William P. Johnson, Paige M. Schmidt, Dustin P. Taylor, Levi Feltman, and Philip P. Thorpe
61. **Analyzing environmental drivers and their effects on movement and connectivity of northern bobwhite**, Robert L. Peterson and Kelly S. Reyna
62. **Invertebrate and seed bank potential of moist soil management units in west Texas and the Lower Rio Grande Valley**, Ryan S. Anthony, Ryan O'Shaughnessy, Louis A. Harveson, Dan P. Collins, and Ryan S. Luna
63. **Season of prescribed burning on Old World bluestem mortality**, Adam E. Toomey, Sandra Rideout-Hanzak, and David B. Wester
64. **Conserving South Texas birds through GK-12 education and citizen science**, Janel L. Ortiz, April A.T. Conkey, Leonard A. Brennan, and La Vonne Fedynich
65. **A comparison of the arboreal behavior of Old World, New World, and hybrid Colubrid snakes**, Jerrod G. Tynes and Lani Lyman-Henley
66. **Northern bobwhite use of woody cover in the southern Edwards Plateau**, Josh Pearson, Eric Grahmann, Fidel Hernández, and Tim Fulbright
67. **Effects of predator abundance on northern bobwhite nest success**, William L. Lutz, Jr., Fidel Hernández, Eric D. Grahmann, Leonard A. Brennan, Patrick Clark, and Josh Pearson
68. **Habitat-suitability bounds of woody and herbaceous cover for northern bobwhites**, J. Patrick Clark, William L. Lutz, Josh D. Pearson, Eric D. Grahmann, Fidel Hernandez, and Timothy E. Fulbright

69. **Invasive spotted knapweed introduced to Texas through native grass seeding**, James M. Mueller, Chuck Sexton, and Stephan L. Hatch
70. **Internet media as a tool for quail conservation and outreach**, James Cathey, Mason M. Lee, Morgan N. Osborn, James S. Cash, and Rebekah Ruzicka
71. **Prevalence of the lethal raccoon roundworm and implications for northern bobwhites**, Shannon Mansfield and Kelly S. Reyna
72. **Grassland-dependent sparrows and King Ranch bluestem on small isolated prairies in southern Texas**, Richard R. Schaefer, D. Craig Rudolph, Josh B. Pierce, J. Howard Williamson, Clifford E. Shackelford, Rusty Plair, and Dan Jones
73. **An examination of gene flow between distinct management units of the reddish egret**, Golya Shahrokhi and Clay M. Green
74. **Rotational cattle grazing effects on northern bobwhite population dynamics**, Shannon Cain and Kelly S. Reyna

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\*Undergraduate student posters to be judged

\*\*Graduate student posters to be judged

## ABSTRACTS

### Cottam Abstracts

#### 10:30: WHITE-TIPPED DOVE DETECTION PROBABILITY, OCCUPANCY, AND DISTRIBUTION IN THE LOWER RIO GRANDE VALLEY, TEXAS

**Thomas A. W. Enright**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Box T-0050, Stephenville, TX 76401, USA

**Thomas W. Schwertner**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Box T-0050, Stephenville, TX 76401, USA

**Jeffrey B. Breeden**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Box T-0050, Stephenville, TX 76401, USA

**Abstract:** The white-tipped dove (*Leptotila verreauxi*) is an elusive, resident Columbidae that reaches its northernmost distribution in south Texas. Since its designation as a game species in 1984, there has been little effort directed toward monitoring or managing the species. Research defining white-tipped dove occupancy and distribution, critical to effective monitoring program design, has not been undertaken. The objectives of this study were to model white-tipped dove detection probability and multi-scale habitat-occupancy, and predict species distribution across the Lower Rio Grande Valley. A time-of-detection protocol, incorporating both passive and playback methods, was used to determine detection probability and occupancy of white-tipped doves at 490 survey locations. Detection probability and habitat-occupancy models, integrating patch and landscape metrics, were developed through UNMARKED and assessed through AIC. The best generalized multi-mixture model resulted in an estimated detection probability of 0.82 that declined with ambient noise ( $P \leq 0.0001$ ). Playback calls significantly increased detection probability ( $t_{1730} = 3.71$ ,  $P \leq 0.0001$ ). Based on the best model, riparian forest and citrus had the greatest occupancy probability,  $>0.80$ , while urban and wetland had the lowest at 0.20. Occupancy probability increased with patch size and latitude, and decreased with distance to the nearest suitable patch, indicative that occupancy is contingent upon riparian habitat and citrus, a suitable substitute, while negatively impacted by fragmentation. The model and distribution provide a foundation for assessing species abundance, as well as guidance for future land management and the development of a targeted monitoring program for the white-tipped dove by USFWS and TPWD.

## **10:45: PRIORITIZING MOTTLED DUCK HABITAT FOR CONSERVATION ALONG THE WESTERN GULF COAST**

**Anastasia Krainyk**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363.

**Bart M. Ballard**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363.

**Michael G. Brasher**, Ducks Unlimited, Inc., Gulf Coast Joint Venture, Lafayette, LA 70506

**Barry C. Wilson**, U.S. Fish and Wildlife Service, Gulf Coast Joint Venture, Lafayette, LA 70506

**Mark W. Parr**, U.S. Fish and Wildlife Service, Gulf Coast Joint Venture, Lafayette, LA 70506

**Jena A. Moon**, U.S. Fish and Wildlife Service, 1035 Buccaneer Drive, Winnie, TX 77665

**Abstract:** The mottled duck (*Anas fulvigula*) is a year-round resident of the Gulf of Mexico Coast. Its steady population decline has made the mottled duck a species of concern among state and federal agencies. Nesting and brood-rearing habitat loss and degradation are the most important threats to the western Gulf Coast population. Decision Support Tools (DST) aide stakeholders in decision making processes by consolidating available biological and ecological knowledge while taking into account temporal and spatial variation at the landscape level. Our objective was to use available biological knowledge of mottled duck nesting and brood rearing requirements to develop a DST that will aid managers in targeting areas for conservation and management. We developed 3 spatially explicit models that identify (1) currently suitable mottled duck nesting and brood-rearing habitat prioritized for protection, (2) areas prioritized for grassland establishment, and (3) wetland basins prioritized for freshwater enhancement. We tested the accuracy of our model results with 7 years of mottled duck survey data. Preliminary results indicate that mottled ducks consistently choose landscapes with higher priority nesting habitat, as defined by our model, than landscapes around randomly generated points. Our models provide a biologically based framework to guide habitat conservation for mottled ducks throughout the western Gulf Coast.

## **11:00: ESTIMATING GOLDEN-CHEEKED WARBLER IMMIGRATION: IMPLICATIONS FOR CONSERVATION**

**Adam Duarte**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Floyd W. Weckerly**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Jeff S. Hatfield**, U.S. Geological Survey, Patuxent Wildlife Research Center, Laurel, MD, 20708, USA

**Abstract:** Understanding the factors that drive population dynamics is fundamental to species' conservation and management. Since the golden-cheeked warbler (*Setophaga chrysoparia*) was first listed as endangered in 1990, much effort has been devoted to monitor warbler abundance, occupancy, reproduction, and survival. Yet, the rate of movement among habitat patches has not been estimated for the species despite repeated evidence of the likely impact it has on local population dynamics. We used a recently developed extension of Bayesian integrated population models to investigate warbler population dynamics in central Texas over a 15-year time series, and estimate the first movement parameter for the species. Further, using a deterministic matrix projection model, we examined the response required by vital rates to maintain a stable population across varying levels of immigration. Warbler abundance fluctuated with an overall positive trend across years. In the absence of immigration, the population would have decreased. However, the population could maintain stability without immigration if both adult and juvenile survival increased by almost half or if juvenile survival more than doubled. We also investigated the response required by fledging rates across a range of immigration in order to maintain a viable population. Overall, we found that immigration was important in order to stabilize warbler populations, indicating warbler conservation and management programs need to be implemented at larger

spatial scales to be effective. This study also demonstrates that by using limited data within integrated population models, biologists are able to monitor multiple key demographic parameters simultaneously to gauge the efficacy of strategies designed to maximize warbler viability in a changing landscape.

### **11:15: BEHAVIORAL RESPONSE OF NORTHERN BOBWHITE TO SIMULATED PREDATOR ATTACK**

**William Newman**, UNT Quail, University of North Texas, Denton, TX, 76203, USA.

**Kelly Reyna**, UNT Quail, University of North Texas, Denton, TX, 76203, USA.

**Abstract:** Isolated populations of northern bobwhites (*Colinus virginianus*) have declined causing many quail managers to attempt population restoration by releasing pen-reared birds. These attempts have resulted in high mortality rates, which we hypothesize is caused by pen-reared birds exhibiting different predator avoidance behavior than wild birds. Pen-reared and wild-trapped bobwhites were subjected to independent predator simulations and their responses were recorded on high definition video. Threat recognition time, reaction type, and reaction time was recorded for comparative analysis. Pen-reared birds recognized the simulated raptorial and terrestrial predator threats quicker than wild-trapped birds ( $P = 0.002$ ), but reaction times were not different among groups ( $P = 0.646$ ). However, the type of reaction was different among groups where pen-reared birds typically flushed immediately upon recognizing either simulated predator as compared to wild-trapped birds which typically ran or held when subjected to the raptorial threat and showed little to no observable reaction to the terrestrial threat. These results reveal a potential loss of a holding trait in pen-reared birds, resulting in a quicker revealing of their position in the presence of a threat, thereby increasing their risk of predation.

### **11:30: USING A DOUBLE OBSERVER APPROACH TO DISTANCE SAMPLING DURING AERIAL SURVEYS FOR LARGE MAMMALS**

**Mary K. Annala**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Andrew N. Tri**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Randy W. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Charles A. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Tyler A. Campbell**, East Wildlife Foundation, San Antonio, TX 78216

**Abstract:** Aerial surveys are an efficient technique for observing animals over large areas. The East Wildlife Foundation (EWF) seeks to use aerial surveys to monitor large mammals on their properties in south Texas. During aerial surveys only 15 – 80% of the population is counted, biasing population estimates low, making attention to observer bias crucial. Distance sampling can be used to account for animals unseen, but only under the assumption that all animals on the transect are observed. Because sighting probability on the transect is not 100% during aerial surveys, distance sampling conducted in conjunction with a double observer technique is an approach that has been used to correct for the undercount in marine mammals, wild horses (*Equus ferus*), and white-tailed deer (*Odocoileus virginianus*). This approach can be achieved by recording separate observations of the front and rear observers in an aircraft. To execute this technique, surveys were flown on the EWF properties. During the surveys, we counted white-tailed deer, nilgai (*Boselaphus tragocamelus*), collared peccary (*Pecari tajacu*), and feral hogs (*Sus scrofa*). We recorded species, sex, age class, number in group, activity level,

GPS location, and distance from the transect line. After evaluating the double observer technique for distance sampling, we will provide the EWF with information to guide them in establishing a long-term monitoring program for large mammals.

#### **11:45: ESTIMATING CAPACITY OF AVAILABLE FORAGE TO SUSTAIN PRONGHORN IN THE TRANS-PECOS**

**Justin T. French**, Borderlands Research Institute, Sul Ross State University, Alpine, TX, 79832, USA  
**Louis A. Harveson**, Borderlands Research Institute, Sul Ross State University, Alpine, TX, 79832, USA  
**Ryan O'Shaughnessy**, Borderlands Research Institute, Sul Ross State University, Alpine, TX, 79832, USA  
**Bonnie J. Warnock**, Borderlands Research Institute, Sul Ross State University, Alpine, TX, 79832, USA  
**Brian Campbell**, Southern Piedmont Center, Virginia Tech University, Blackstone, VA, 23824, USA  
**Shawn S. Gray**, Texas Parks & Wildlife Department, Alpine, TX, 79830, USA

**Abstract:** To counter long term population decline, large scale efforts were initiated in 2011 by the Texas Parks and Wildlife Department to restore pronghorn (*Antilocapra americana*) to the Trans-Pecos region of Texas. These efforts have focused on the translocation of surplus animals from the Texas Panhandle population. The need to evaluate the capacity of potential release areas to support pronghorn quickly became evident. In January 2013, we began a study to quantify the seasonal diets as well as protein and energy intake of pronghorn on the Marfa Plateau and the Marathon Basin and assess habitats. Seasons were defined based on Newhall Soil Climate Models and the pronghorn breeding season, as Warm-Dry (April–June), Warm-Wet (July–October), and Cool (November–March). The combination of diet data and nutritional values of the forages consumed were used to estimate the amounts of protein and energy consumed per day. Diets were determined using fecal microhistology and corrected for differential digestibility. Protein and energy intake was estimated for each season. Forage availability was assessed using a combination of dry weight rank sampling and a modified Robel pole. We estimated the capacity of the Marathon Basin and Marfa Plateau study areas for each season. For the warm-dry season, we estimated the capacity of the Marfa and Marathon study areas to be 8.59 and 4.80 ha/pronghorn, respectively. For the warm-wet season, we estimated capacities to be 3.17 and 3.24 ha/pronghorn, and the cool season to be 4.19 and 5.17 ha/pronghorn.

## **Session Abstracts**

### **SESSION 1A: CONSERVATION AND MANAGEMENT OF COLD BLOODED ANIMALS**

#### **1:30: NUISANCE AMERICAN ALLIGATORS: AN INVESTIGATION INTO TRENDS AND PUBLIC OPINION**

**Cord B. Eversole**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA  
**Scott E. Henke**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA  
**Jacob L. Ogden**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA  
**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA  
**Amos Cooper**, Texas Parks and Wildlife Department, Port Arthur, TX, 77640, USA

**Abstract:** The population rebound of the American alligator (*Alligator mississippiensis*; hereafter,

alligator) with the rapid growth of populations throughout its range has caused an influx of human–alligator conflicts. We quantified 5,838 nuisance alligator reports from 2000 to 2011 to develop more site-specific strategies of management and to determine where management should be focused to minimize the conflict. We also surveyed the general public’s attitude toward and knowledge of the American alligator ( $n = 98$ ) as a technique to better understand human dimensions of nuisance alligator management in Texas. Counties that received the largest numbers of nuisance alligator reports were Jefferson (16%), Fort Bend (14%), Matagorda (11%), Brazoria (10%), Harris (7%), Jackson (5%), Orange (5%), Chambers (5%), Calhoun (5%), and Liberty (3%) counties. We found that of the nuisance alligators reported 45% were male, 18% were female, and 38% were reported as unknown. There was a significant interaction ( $F = 24.51$ ;  $df = 63, 1100$ ,  $P < .0001$ ) between the top 10 counties and situation type and conflict resolution ( $F = 4.63$ ;  $df = 54, 1,100$ ;  $P < 0.0001$ ). The majority of residential situations that occurred in Fort Bend County, while more roadway and worksite situations occurred in Jefferson county, and more livestock depredation occurred in Matagorda County. Conflict resolution differed by alligator size ( $F = 21.22$ ;  $df = 14, 5,821$ ;  $P \leq 0.001$ ). Most alligators  $<1.5$  m in length were relocated (41%), and most alligators  $>1.5$  m in length were removed through lethal means (66%). Most of survey responders (93%) would support an alligator removal program that conducted capture and relocation but were unwilling to have alligators relocated near their homes. Only 15% of survey responders would support an alligator management program that utilized lethal removal. Visitors with more education (bachelor’s degree or higher) were more willing to support lethal control of alligators. We determined that survey responders had some knowledge of alligators and that an alligator educational program targeted to the residents of the northern Texas Gulf Coast could help reduce the number of human–alligator conflicts.

#### **1:45: GROWTH, CONDITION, AND AGE OF AMERICAN ALLIGATORS IN A HIGH DENSITY POPULATION**

**Cord B. Eversole**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA

**Scott E. Henke**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA

**Bart M. Ballard**, Caesar Kleberg Wildlife Research Institute, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA

**Randy L. Powell**, Department of Biological and Health Sciences, Texas A&M University- Kingsville, Kingsville, TX, 78363, USA

**Abstract:** We present results of growth, condition, and age of American alligators (*Alligator mississippiensis*) from an inland, freshwater, high density population. Total mean annual growth rate was (mean  $\pm$  SE)  $20.9 \pm 1.7$  cm/year irrespective of size or sex of alligators. However, annual growth rates did differ among size classes ( $F_{2, 32} = 36.07$ ,  $P < 0.0001$ ). Mean annual growth rates for size classes 1 ( $<50$  cm total length), 2 (50.1–100 cm total length), and 3 (100.1–150 cm total length) were  $30.6 \pm 1.2$ ,  $12.6 \pm 1.5$ , and  $15.7 \pm 3.3$ , respectively. The mean body condition without regard to size or sex was  $2.6 \pm 0.05$ . Body condition did not differ among lakes of capture ( $F_{2, 270} = 0.07$ ,  $P = 0.9279$ ), but did differ among size classes ( $F_{4, 268} = 79.08$ ,  $P < 0.0001$ ) and sex ( $F_{1, 210} = 13.69$ ,  $P = 0.0003$ ). Using the von Bertalanffy model, age was estimated only for small alligators, of which total length ranged from 33.0 to 151.0 cm. Age estimates ranged from 0.03 years to 13.64 years of age. The results of this study demonstrate that life history parameters are influenced by geographic and local habitat conditions, which coincides with results from previous studies. These results substantiate the necessity to determine threshold influences of habitat and population parameters on life history of American alligators. Research and management should be conducted throughout the entirety of the alligators range in order to better manage and conserve the species, rather than rely on a “one-size-fits-all” management strategy.

## **2:00: EFFECTS OF AGRICULTURE ON SNAKE DIVERSITY AND ABUNDANCE IN NORTHEASTERN SWAZILAND**

**Jacob D. Owen**, Department of Biological Sciences, Tarleton State University, Stephenville, Texas, USA  
**Jesse M. Meik**, Department of Biological Sciences, Tarleton State University, Stephenville, Texas, USA  
**T. Wayne Schwertner**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, Texas, USA

**ABSTRACT:** The conversion of natural habitat to agricultural use likely has detrimental effects on biodiversity; however, information for many groups, including snakes, remains limited. Using highways as a sampling transect, we compared diversity and relative abundance of snake assemblages between protected areas and plantations in northeastern Swaziland, a small African nation where much of the subtropical Lowveld region has been converted to sugarcane monoculture. We encountered 20 of the 61 species of snakes reported from the country. Although species richness was similar between the two habitats, snakes were encountered over 3 times more frequently in protected areas than in sugarcane plantations. The threatened Southern African python (*Python natalensis*) was the most frequently encountered species along the transect, and was found exclusively in bushveld habitat. Although sample size was small, at the family level only elapids were more abundant in sugarcane. Our data indicate that overall, snake communities in northeastern Swaziland are adversely affected by intensive agriculture, but elapids may benefit from human-modified habitats.

## **2:15: THE INFLUENCE OF FIRE ON A HERPETOFAUNAL COMMUNITY IN EASTERN TEXAS**

**Ashley C. Tubbs**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX, 79016, USA  
**Richard T. Kazmaier**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX, 79016, USA  
**A. Tucker Slack**, Gus Engeling Wildlife Management Area, Texas Parks and Wildlife Department, Tennessee Colony, TX, 75861, USA

**Abstract:** Herpetofauna are well known to be critical links in the functioning of ecosystems. Despite this, herpetofauna are declining worldwide and more research is necessary to evaluate their declines and evaluate how various land management practices impact populations. Fire is a natural part of the savannahs of eastern Texas, but fire suppression has significantly altered landscapes in this region. As a result, controlled burning is being increasingly implemented in many areas to help restore the natural community. The goal of this study was to determine how 3 burning treatments that differed by season and year of the burn influenced the herpetofaunal community of Gus Engeling Wildlife Management Area in eastern Texas. We sampled herpetofauna with pitfall traps in summer of 2013 and both pitfall and funnel traps in summer of 2014. We captured 80 individuals of 14 species in 2013 and 109 individuals of 19 species in 2014. We then compared diversity, evenness, richness, and abundance using ANOVA with month and treatment as main effects. We found there to be no difference among the various community characteristics across the burning treatments or months. At present, the burning regime used by Gus Engeling WMA appears to have minimal effects on the herpetofaunal community, but further monitoring will be needed to evaluate longer term trends.

## **2:30: EVALUATION OF TRANSLOCATING WILD-CAUGHT TEXAS HORNED LIZARDS INTO FORMERLY OCCUPIED HABITAT ON THE MUSE WILDLIFE MANAGEMENT AREA**

**Devin R. Erxleben**, Texas Parks and Wildlife Department, 114 Center Avenue, Suite 300, Brownwood, TX 76801, USA

**Nathan D. Rains**, Texas Parks and Wildlife Department, 917 Hemphill Drive, Cleburne, TX 76033, USA

**Abstract:** The Texas horned lizard (THL, *Phrynosoma cornutum*) has been in decline throughout much of Texas. Declines have primarily been attributed to habitat loss, introduction of red imported fire ants (*Solenopsis invicta*), environmental contaminants, and other factors that merit further study. Personal communication with neighbors indicates the Muse Wildlife Management Area (MWMA) once held abundant THL with the last observations occurring approximately 20 years ago, prior to Texas Parks and Wildlife Department ownership. Due to an overwhelming interest in reintroducing THL, researchers translocated 15 lizards from private property in Irion County to the MWMA in northeastern Brown County to evaluate the feasibility and success of reintroduction efforts. The lizards were released via soft release methods into a portion of the MWMA where habitat improvements had been made and where soils, vegetation, and density of red-harvester ants appeared appropriate to support THL. Each lizard was fitted with a 1.5 g backpack-style VHF radiotelemetry transmitter and was tracked daily from 12 June 2014–28 October 2014, at which time all remaining lizards were hibernating. Location data were collected to evaluate habitat use, home range size, dispersal distance, and causes of mortality. Eight lizards were tracked  $\geq 30$  days and 6 lizards survived until hibernation. Data analyses are still in progress; however, minimum convex polygons indicate home ranges varied from 63–392,266 m<sup>2</sup> and dispersal distance ranged from 40–761 m. Researchers observed the majority of locations within 5 m of woody brush; however, habitat use analyses have not been conducted. One THL was found dead inside the research enclosure prior to release, and lab results indicate it died from stress. One transmitter with remnants of a carcass was found in a tree, indicating the likelihood of avian predation. Five carcasses were found with missing appendages, indicating the likelihood of small mammal predation. Only the transmitters were found from 2 lizards, indicating mortalities were possibly caused by larger predators. Researchers observed mating behavior occurring in the research enclosure prior to release; 2 nests were later established. One nest containing 19 eggs was unsuccessful; however, the other nest hatched 21 eggs. Three hatchlings were observed during tracking operations on 16 September 2014. During 2015, researchers will release 30 additional THL and emphasis will be placed on collecting habitat use and survivability information. Such data will help evaluate the feasibility of restoring THL populations back to areas they once existed.

## **2:45: REPTILE AND AMPHIBIAN BASELINE SURVEYS ON THE EAST WILDLIFE FOUNDATION**

**Connor S. Adams**, Biodiversity Research and Teaching Collections, Texas A&M University-College Station, College Station, TX, 77840, USA

**Toby J. Hibbitts**, Biodiversity Research & Teaching Collections, Texas A&M University-College Station, College Station, TX, 77840

**Tyler Campbell**, East Wildlife Foundation, San Antonio, TX, 78216

**Abstract:** The East Wildlife Foundation is comprised of over 215,000 acres of South Texas rangeland located in the Dead Horse Plains of the Rio Grande Valley. This land is operated as six separate ranches in parts of Jim Hogg, Starr, Willacy, and Kenedy counties. As part of the East Foundation's Terrestrial Vertebrate Biodiversity and Scientific Collections Project that began in the spring of 2013, we conducted herpetofaunal surveys to assess the baseline occurrence of reptiles and amphibians across EWF properties. Using drift fences with pitfall traps, road cruising, and time-constrained surveys, we have collected 239 specimens that will be used in a natural history collection at the EWF. The species total includes 46 reptiles and 13 amphibians. In addition, we have documented the presence of 11 Texas Parks and Wildlife Department's listed species, and have discovered 5 county records.

## **SESSION 1B: ECOLOGY AND MANAGEMENT OF UNGULATES**

### **1:30: EFFECT OF LOCATION ON THE PHYSICAL CHARACTERISTICS OF UNMANAGED WHITE-TAILED DEER IN SOUTH TEXAS**

**Kory R. Gann**, Caesar Kleberg Wildlife Research Institute, Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Alfonso Ortega-Sanchez, Jr.**, East Wildlife Foundation, Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Alfonso Ortega-Sanchez**, Caesar Kleberg Wildlife Research Institute, Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Randy W. DeYoung**, Caesar Kleberg Wildlife Research Institute, Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Tyler A. Campbell**, East Wildlife Foundation, San Antonio, TX. 78216, USA

**Thomas W. Boutton**, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX 77843, USA

**Abstract:** Rangelands in South Texas follow an east to west gradient of precipitation and soil properties that leads to a diverse landscape across the South Texas Plains. This diversity of biotic and abiotic variables can have major impacts on the physical characteristics of white-tailed deer. To examine these impacts across southern Texas, we captured 2,775 white-tailed deer in autumn, from 2011–2014, on 4 East Wildlife Foundation properties that range in location from the Gulf Coast to 160 km inland, and where deer are not managed. Average body mass of both females and males varied among ranches by age class ( $P \leq 0.01$ ). Body mass of middle aged and mature deer exhibit a moderate east to west gradation with females and males on the western-most ranch having 12% and 17–22% greater mass, respectively, than deer on the coast. However, this trend may be confounded among ranches due to variation in soil properties and precipitation. Body mass of younger deer did not show this same trend suggesting that initial growth rates are similar, but growth ceases at an earlier age along the coast. Antler size of males showed a similar trend to body mass and varied among ranches by age class ( $P = 0.09$ ), with middle aged and mature males on the western-most property having a 9–17% greater Gross Boone and Crockett score than males on the coastal property. These results will benefit deer management by illustrating, even at a regional scale, the impacts of abiotic habitat components on physical characteristics of white-tailed deer in South Texas.

### **1:45: IS SEXUAL SEGREGATION IN ROOSEVELT ELK INFLUENCED BY MALE DENSITY?**

**Leah M. Peterson**, Department of Biology, Texas State University, San Marcos, TX 78666, USA

**Floyd W. Weckerly**, Department of Biology, Texas State University, San Marcos, TX 78666, USA

**Abstract:** Sexual segregation is ubiquitous among many large ungulate species and is defined for this study as the different use of space by sex. Though this behavior may be influenced by many factors, we suggest that segregation among Roosevelt elk (*Cervus canadensis roosevelti*) can be greatly influenced by the density of males in a population. Because males are the socially dominant sex, a large number of males in a female group may negatively affect foraging patterns and female social interactions. We hypothesized that a high density of males in the population may increase the size of male-only groups. Furthermore, a large male-only group may create a greater disturbance when merging into an all-female group, to which the sexes respond by segregating. In order to explore the influence of male density on

sexual segregation, we collected data within Redwood National Park during the month of January from 1997 to 2014 on an elk population that ranged in abundance from 37 to 130. Group size and the sex counts of each group were recorded and from these data we calculated the sexual segregation and aggregation coefficient (SSAC) to determine if groups were segregated, aggregated, or randomly associated. Results indicated male group size was positively related to male abundance and that sexual segregation occurred with large population sizes whereas males and females were randomly associated with smaller population sizes. Additionally, a partial correlation analysis suggested a positive correlation between male abundance and SSAC when controlled for female abundance. Our results supported our hypothesis that the degree of segregation is influenced by the male density. Sexual segregation is of great ecological concern because high degrees of sexual segregation may demand each sex to be viewed as a separate species. Therefore, knowing the key stimuli for sexual segregation is useful to wildlife management.

## **2:00: UTILIZATION DISTRIBUTIONS AND MOVEMENTS OF TRANSLOCATED DESERT BIGHORN SHEEP IN THE BOFECILLOS MOUNTAINS, TEXAS**

**Thomas S. Janke**, Borderlands Research Institute, Sul Ross State University, Alpine, TX, 79832, USA  
**Louis A. Harveson**, Borderlands Research Institute, Sul Ross State University, Alpine, TX, 79832, USA  
**Froylán Hernández**, Texas Parks and Wildlife Department, Alpine, TX, 79830, USA

**Abstract:** Knowledge and understanding of an animal's movements and home range is crucial to the management and conservation of that species. Limited management information exists on home ranges, utilization distributions (UDs), and movements of bighorn (*Ovis canadensis*) in Texas. In 2010 and 2011, 141 bighorn (31 M, 110 F) were captured from the Elephant Mountain Wildlife Management Area (EMWMA) and Sierra Diablo meta-population (SDMP) respectively, and translocated to the Bofecillos Mountains in Big Bend Ranch State Park (BBRSP). Seventy eight (24 M, 54 F) were fitted with GPS radio collars designed to collect locations every 3–5 hours (release year dependent) and stay on animals for  $\leq 25$  months. Objectives of this study were to describe and compare: (1) seasonal and annual UD, (2) movement rates, and (3) dispersal distances from the release site of 2 populations of bighorn translocated to BBRSP. Programs R and ArcGIS were used to analyze movements, UD, and dispersal distances of the 2 groups of bighorn. Normality and analysis of variance (ANOVA) tests were conducted for sexes, release years, and seasons with alpha levels set at 0.05. Usable recovered collars ( $n = 48$ ) collected 97,806 locations for analyses. Data suggests seasonal and yearly UD of bighorn translocated to BBRSP are associated with respective daily movements. Bighorn from EMWMA tended to move and occupy less space than SDMP bighorn. Source location may affect translocation movements, UD, and dispersal distances. Knowledge gained from this study can aid biologists and managers in strategies for future conservation, restoration, and management efforts.

## **2:15: EVALUATION OF THE EFFICACY OF NALBUPHINE-MEDETOMIDINE OR NAPBUPHINE-AZAPERONE-MEDTOMIDINE FOR IMMOBILIZATION OF WHITE-TAILED DEER AND THE REVERSAL USING NALTREXONE AND ATIPAMEZOLE**

**Lauren D. Balderas**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA  
**Leslie M. Bowman**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA  
**Clayton D. Hilton**, Department of Animal, Rangeland, and Wildlife Sciences, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville TX, 78363, USA  
**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,

Kingsville, TX, 78363, USA.

**William R. Lance**, Wildlife Pharmaceuticals, Inc., Windsor, CO, 80550, USA

**Abstract:** This research is intended to evaluate the quality of anesthesia delivered by a combination of nalbuphine (a non-Drug Enforcement Administration [DEA]) controlled opiate agonist/antagonist) and medetomidine (a very potent alpha-2 agonist) and a combination of nalbuphine, azaperone (a butyrophenone neuroleptic sedative) and medetomidine. The combinations, not yet patented, are known by NM and NAM respectively. In addition, this investigation will evaluate the reversal effects of this combination of anesthesia using naltrexone and atipamezole. Previous studies have demonstrated positive results with elk (*Cervus canadensis*) in Colorado but this study focuses on white-tailed deer (*Odocoileus virginianus*) in Texas. Characterization of the response of white-tailed deer to NM/NAM and their reversal will contribute to the published literature as well as benefit wildlife veterinarians and biologists with information regarding a reversible anesthetic protocol in this species that does not contain a DEA controlled drug. The effective anesthesia protocols that currently are in use contain a DEA controlled substance which puts field biologists and wildlife veterinarians under currently-increasing DEA regulatory constraints regarding record keeping, storage, and distribution to non-veterinarians. An effective nalbuphine combination would eliminate this current roadblock and help to diminish further constraints on field use of effective drug combinations in white-tailed deer.

## **2:30: DENSITY AND FAWNING SEASON EFFECTS ON HOME RANGE SIZE OF FEMALE WHITE-TAILED DEER**

**John H. Clark**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX, 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX, 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX, 78363, USA

**Charles A. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX, 78363, USA

**Kim Echols**, Caesar Kleberg Wildlife Research Institute, Texas A&M University– Kingsville,  
Kingsville, TX, 78363, USA

**Andrew N. Tri**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX, 78363, USA

**Don Draeger**, Comanche Ranch, Eagle Pass, TX, 78852, USA

**Abstract:** White-tailed deer (*Odocoileus virginianus*) females have been reported to spatially isolate themselves during fawning by decreasing their home range (HR) size immediately preceding or up to 2 weeks prior to parturition; this behavior was not consistently observed in southern Texas. To better understand changes in HR size during fawning 35 does were fitted with GPS collars in 81-ha enclosures on 2 South Texas ranches. Each ranch had one high density (60 deer) and one low density (20 deer) enclosure. Nineteen does were collared in high density enclosures (10 and 9/ranch), and 16 does were collared in low density enclosures (8/ranch). Collars recorded locations every 30 min. and were deployed for 27–29 weeks beginning 29 March 2014. Fifty percent local convex hull nonparametric kernel HRs were generated. Weeks 2–7 were averaged for each deer and when an animal's HR dropped below the associated 95% *CL* during weeks 11–19 for at least 2 consecutive weeks the first week was estimated to be the week the doe gave birth. HR size varied across weeks ( $P < 0.001$ ) and was larger before 28 June than after. Twenty-seven of 35 females decreased their HRs. Averaging across all weeks, low density HRs were 43% larger ( $P < 0.001$ ). At parturition low density HRs averaged 52% larger. Decreased HRs

could result in a lowered nutritional plane causing decreased milk production resulting in lowered fawn survival and growth rates, which could negatively impact mature body size.

## **2:45: ARE ANTLER RESTRICTION REGULATIONS INFLUENCING BREEDING CHRONOLOGY?**

**Rusty Wood**, Texas Parks and Wildlife Department, Rusk, TX, 75785, USA

**Micah Poteet**, Texas Parks and Wildlife Department, Lufkin, TX, 75901, USA

**Sean Willis**, Texas Parks and Wildlife Department, Lufkin, TX, 75901, USA

**Gary Calkins**, Texas Parks and Wildlife Department, Jasper, TX, 75951, USA

**Abstract:** State mandated antler restrictions designed to improve both the number, and age structure of bucks in the population have been implemented in many (117) counties in Texas. The objective of this study is to monitor the breeding chronology and reproductive potential of white-tailed deer (*Odocoileus virginianus*) during pre- and post-implementation of antler restriction regulations enacted in 2006. An unrelated statewide breeding chronology study was conducted in the early 1990s. This study indicated high conception rates and defined the breeding chronology for the Pineywoods ecological area. In order to acquire more recent and site specific breeding chronology data to be used as a pre-regulation baseline, another study was initiated in 2005. The study site was the Davy Crockett National Forest (DCNF) in Houston County, Texas. During the period from 2005-2007 a total of 73 does were collected from the study site. Data/samples collected from harvested does included date of kill, age of doe, ovaries, and the number, sex, and crown-rump measurements of fetuses present. Analysis of conception dates indicated that the pre-regulation breeding chronology was similar to the 1990's data. The documentation of post-regulation breeding chronology began in 2011 with the collection of 100 adult does from the DCNF and some adjacent private properties. Analysis of conception dates indicated that breeding activity peaked earlier in the breeding season than that observed in both the 1990s data and the pre-regulation baseline data. The data also indicated a better defined peak in breeding activity when compared to the previous data sets. This preliminary data suggests that antler restriction regulations may be positively influencing breeding chronology. However, it is difficult to ascertain if the antler restrictions were solely responsible for the differences. Additional data will be collected in 2016.

## **SESSION 1C: ECOLOGY AND MANAGEMENT OF CARNIVORES**

### **1:30: EDAPHIC FACTORS AS A MEASUREMENT OF SPATIAL DIVISION BETWEEN OCELOT AND BOBCAT HABITAT IN SOUTH TEXAS**

**Justin P. Wied**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Jon S. Horne**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Michael E. Tewes**, Feline Research Center, Caesar Kleberg Wildlife Research Institute Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Abstract:** Precipitation patterns, disturbance regimes, and soil characteristics are major influences in the type of habitat that occurs on a site. The endangered ocelot (*Leopardus pardalis*) shares habitat with the bobcat (*Lynx rufus*) in South Texas. Two known ocelot populations live in Willacy and Cameron counties, Texas. In 1997, collared ocelots and bobcats were radio tracked at Laguna Atascosa National Wildlife Refuge in Willacy and Cameron counties, Texas. Once the cats left a resting point, soil samples were taken and sent for chemical and physical analysis. Our objective is to compare soil pH, salinity,

texture and fertility with ocelot and bobcat use. Ocelots and bobcats were both found on sites with loamy soils. Ocelots preferred sites with higher clay levels, while bobcats preferred sites with sandier soils. In addition, ocelots were tracked on slightly more acidic soils with lower salinity. We will juxtapose vegetation and prey species associated with each site through ongoing research. This information can be used to identify sites with ideal soils to reestablish habitat and corridors best suited for ocelot use.

#### **1:45: OCELOT POPULATION STATUS AND COMPARISON OF POPULATION ESTIMATES USING 2 ESTIMATION TECHNIQUES**

**Eric L. Rulison**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Justin Wied**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Arturo Caso**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**John Leonard**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Daniel J. Kunz**, Texas Parks and Wildlife Dept., Alice, TX, 78333, USA

**Andrew N. Tri**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA

**Alfonso Ortega-Sanchez, Jr.**, East Wildlife Foundation, Kingsville, TX, 78363, USA

**Tyler Campbell**, East Wildlife Foundation, Kingsville, TX, 78363, USA

**Michael E. Tewes**

**Abstract:** The ocelot (*Leopardus pardalis*) is an endangered, medium-sized felid that occurs in a few disjunct populations in South Texas. The population on the East El Sauz Ranch was monitored with 2 camera trap grids. The northern grid comprises 15 stations and the southern grid 13 stations. Two cameras are placed opposite of each other at each station to increase the capture success and the probability of identifying each individual. Monitoring began on 8 February 2011 on the northern grid (16 trap sessions) and on 28 July 2011 on the southern (14 trap sessions). Program CAPTURE population estimates in the northern grid ranged from 12 individuals (48.4 /100 km<sup>2</sup>) in 2011 to 3 individuals (12.10/100 km<sup>2</sup>) in fall 2014, varying in that time. CAPTURE population estimates in the southern grid ranged from 4 individuals (19.8/100 km<sup>2</sup>) in 2011 to 4 individuals (19.8/100 km<sup>2</sup>) in fall 2014, varying in that time. These population estimates vary greatly considering camera monitoring documented  $\geq 4$  and averaged 7.4 individuals on the northern grid and  $\geq 2$  and averaged 4.2 on the southern grid. Population estimates varied by length of encounter period, length of sampling period and choice of population estimation model. Spatial capture-recapture methods are emerging as new methods to estimate populations and densities by including spatial movements that eliminate the *ad hoc* effect of calculating sampling area that influences density estimations. We tested spatial capture-recapture models with program CAPTURE and the minimum number of unique individuals for each session to determine spatial model effectiveness. We held encounter period, session time, and model type constant in CAPTURE to control varying model and session time effects. Researchers and landowners may use these results to develop a cost-effective and efficient monitoring program.

#### **2:00: LANDSCAPE EFFECTS ON BOBCAT GENETIC STRUCTURE ACROSS ECOREGIONS IN WEST TEXAS**

**Imogene A. Davis**, Department of Life, Earth, and Environmental Sciences, West Texas A&M University, Canyon, TX, 79016, USA

**Rocky Ward**, Department of Life, Earth, and Environmental Sciences, West Texas A&M University,

Canyon, TX, 79016, USA

**Richard T. Kazmaier**, Department of Life, Earth, and Environmental Sciences, West Texas A&M University, Canyon, TX, 79016, USA

**Abstract:** Analyses in landscape genetics combine landscape ecology and population genetics, where examinations include considerations of both historical and contemporary effects on genetic structure. While generalist species are often less sensitive to changes on a landscape, panmictic species can exhibit landscape-mediated genetic structure. The bobcat (*Lynx rufus*) is a generalist, continuously ranging species in the United States, yet population processes on local and continental scales can be impacted by Pleistocene, ecological, and anthropogenic effects. In western Texas, the processes driving genetic structure are not well known, particularly within and between the diverse ecoregions of the state. We used microsatellite markers to examine bobcat genetic structure across several ecoregions in West Texas to determine if population structure corresponds to changes between defined ecoregions. Tissues were collected from 140 bobcats across several ecoregions in Texas. Variation in nine microsatellite loci were employed to generate composite multilocus genotypes. We conducted individual-based analyses and coarse ecosystem analyses to determine if bobcat genetic structure is impacted by specific landscape features or if gradient changes are due to isolation by distance. While preliminary results suggest the Caprock Escarpment does not obstruct bobcat gene flow between the High Plains and Rolling Plains ecoregions, we expect that a north to south gradient change in allele frequency in western Texas may represent isolation by distance. We also consider the effect of evolutionary landscape ecology on local bobcat population processes.

## **2:15: HABITAT SELECTION OF BOBCATS IN A TEXAS HIGH PLAINS ECOSYSTEM**

**Lena M. Thurmond**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX 79016, USA

**Raymond S. Matlack**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX 79016, USA

**Richard T. Kazmaier**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX 79016, USA

**James D. Ray**, Consolidated Nuclear Security, L.L.C., U.S. Department of Energy/National Nuclear Security Administration Pantex Plant, P.O. Box 30020, Amarillo, TX, 79120, USA

**Abstract:** We studied bobcats (*Lynx rufus*) on and around the 7,289-ha Pantex Plant in Carson County, Texas. This region of the Southern High Plains is primarily shortgrass prairie and agricultural lands with minor topographic relief and little natural structure or vertical cover. We captured 23 individual bobcats a total of 34 times. Eleven of these individuals were females (8 adults) and 12 of the individuals were males (10 adults). Adults (age > 1 year) were fitted with a GPS-GSM collar. Radiotelemetry efforts resulted in 17,478 viable locations for the 13 bobcats used in habitat selection analyses. We used compositional analysis to investigate habitat selection at 2 spatial scales. For second-order selection, use was defined as the habitat within 100% MCPs generated around each bobcat's radiolocations. Availability was defined as habitat within the study area which was an MCP that included all bobcat radiolocations. For third-order selection, use was defined by the habitat composition at each bobcat's radiolocations and availability was defined as the habitat within each bobcat's 100% minimum convex polygon (MCP). We also evaluated both second and third-order habitat selection for proximity to defined habitat types by calculating buffer increments for each habitat. Bobcats demonstrated high preference for anthropogenically-impacted areas in third-order selection and high preference for prairie dog towns in second-order selection. They exhibited avoidance of roads and railroads in both second and third-order selection. Preference for anthropogenic areas is likely a response to the lack of natural structure in the area. The selection preferences for artificial habitat features may indicate a lower quality habitat for bobcats.

## 2:30: BOBCAT POPULATION DRIVERS IN SOUTH TEXAS

- G. Wesley Watts III**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA
- Justin P. Wied**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA
- Arturo Caso**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA
- Sasha Carvajal**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA
- Alfonso Ortega-Sanchez, Jr.**, East Wildlife Foundation, Kingsville, TX, 78363, USA
- Michael E. Tewes**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Abstract:** Large area requirements and trophic level position of carnivores allow them to serve as indicators of community health for the habitat they occupy. The generalist resource selection of bobcats (*Lynx rufus*) makes these carnivores a suitable indicator of lower trophic level community health. In February 2012, we initiated camera surveys of the carnivore communities on three ranches of the East Wildlife Foundation: Buena Vista, San Antonio Viejo, and Santa Rosa. Each sampling grid was composed of 24-30 camera stations. Our main objective was to examine the influence of coyotes (*Canis latrans*), drought, and habitat on bobcat population density. This information will be relevant to landowners who want to manage for biodiversity or control predators.

## 2:45: A SYNOPTIC MODEL OF OCELOT AND BOBCAT SPACE USE

- John P. Leonard**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA
- Eric L. Rulison**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA
- Tyler Campbell**, East Wildlife Foundation, Kingsville, TX 78363, USA
- Alfonso Ortega-Sanchez, Jr.**, East Wildlife Foundation, Kingsville, TX 78363, USA
- Justin P. Wied**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA
- G. Wesley Watts III**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA
- Michael E. Tewes**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Abstract:** The ocelot (*Leopardus pardalis*) is a federally-listed endangered species whose range in the United States is confined to 2 isolated breeding populations in South Texas. The ocelot is sympatric with the bobcat (*Lynx rufus*) throughout its range in the United States. We developed several synoptic models of ocelot and bobcat space use using telemetry data collected from 2011 to 2014 with GPS and VHF collars. We used these synoptic models to simultaneously estimate home range size, habitat selection, and inter/intra-specific relationships. From 2011 to 2014, we captured and collared 11 ocelots (6M, 5F) and 14 bobcats (8M, 6F) on the East El Sauz Ranch, Willacy County, Texas. We attached VHF collars to 7 ocelots and 12 bobcats, and GPS collars to 4 ocelots and 2 bobcats. We subsampled GPS points to include no more than one location point per individual per diel, and used remaining GPS points to verify our models. Covariates included in our models were land cover type, canopy cover, distance to water sources, and distance to roads. All models were ranked using Information-Theoretic criteria.

## **SESSION 1D: WILDLIFE OF MEXICO**

### **1:30: NEW REGIONAL FOCUS OF MEXICO'S WILDLIFE CONSERVATION AND SUSTAINABLE USE PROGRAM**

**Jorge Maksabedian de la Roquette** (invited), Dirección General de Vida Silvestre, Av. Revolución 1425, México, D.F. 01040

**Abstract:** Mexico's UMAs (Unidades de Manejo y Aprovechamiento) are lands with wildlife management plans for conservation and sustainable use. The system became well established in northern Mexico, even in some "ejidos," but was less so in the interior of Mexico where regions much richer in biodiversity are found. To foster the UMA system in those regions, 51% of government support for the program has been directed to the southern region and 34% to the central region since 2010, with a special focus on indigenous groups such as Tarahumara, Mixteca and Zapoteca. In 2013, "Municipios de la Cruzada contra el Hambre" received priority as a means to combat rural poverty through habitat restoration projects and the sustainable use of flora and fauna for the economic benefit of the rural communities. The collaboration of several federal agencies to deliver a well-integrated suite of assistance represents a comprehensive approach that is yielding good results for the people and the wildlife of the target regions.

### **1:45: MONARCH BUTTERFLY: CONSERVATION ACTIONS IN MEXICO**

**Gloria Tavera-Alonso**, Director of the Monarch Butterfly Reserve and Technical Secretary of the Mexican Working Group for the Conservation of the Migratory Phenomenon, National Commission for Natural Protected Areas, CONANP, Mexico City, Mexico

**Abstract:** In December 2013, the number of monarch butterflies (*Danaus plexippus*) recorded in the wintering habitats in Mexico was the lowest ever documented since 1993. In response to this decline of the symbol of collaboration among Canada, Mexico, and the United States, the North American leaders agreed to establish, on 19 February 2014, a Tri-national High Level Working Group for the Conservation of the Monarch Butterfly Migratory Phenomenon. In March 2014, Mexico established its national working group (the GANMM), comprised of representatives from the government, academia and civil society, to coordinate and foster efforts to preserve the monarch's hibernation habitats as well as important sites along the migratory route in Mexico. The group defined six priority themes based on the North American Action Plan: (1) Restoration and conservation; (2) Research and monitoring; (3) Inspection and supervision; (4) Economics and conservation; (5) Social participation, outreach and education; and (6) Coordination and financing. So far the group has concentrated efforts on priority 5. To create public awareness of the importance of the flyway and encourage public participation in conservation actions, the group launched an outreach campaign called "Let's protect (the wings of) the Monarch" (Protejamos Alas Monarca), and created a new web site which contains or links to nearly all available information about the monarch (history of the flyway discovery, biology, reproduction, habitat, migration, conservation status, scientific articles, conservation decrees, visual aids, etc.). Another action is the dissemination of responsible tourism guidelines to promote sustainable recreational activities in the wintering habitats and responsible monarch watching both by guides and tourists.

### **2:00: MORELET'S CROCODILE MONITORING IN TAMAULIPAS**

**Alejandro Garza Peña**, Comisión Estatal de Vida Silvestre de Tamaulipas, Ciudad Victoria, Tamaulipas 87083, México

**Abstract:** The Tamaulipas State Wildlife Commission is responsible for ecosystems conservation and the protection and management of wildlife populations and their habitat. Monitoring and conservation projects for priority species such as Morelet's crocodile (*Crocodylus moreletii*) are being implemented. In March 2010, this species was down listed from CITES Appendix I to Appendix II for Mexico and Belize and is currently harvested only in breeding operations permitted by the federal government. Following the protocol prescribed by CONABIO, Mexico's scientific authority, the Commission launched a monitoring program that began with Vicente Guerrero Reservoir, where the numbers of individuals and nests seem to indicate a robust population.

## **2:15: JAGUAR MONITORING IN TAMAULIPAS**

**Alejandro Garza Peña**, Comisión Estatal de Vida Silvestre de Tamaulipas, Ciudad Victoria, Tamaulipas, México

**Abstract:** The Tamaulipas State Wildlife Commission is responsible for ecosystems conservation and the protection and management of wildlife populations and their habitat. Monitoring and conservation projects for priority species such as jaguar (*Panthera onca*) are being implemented. As jaguar sightings and predation of domestic animals increased near a town, the Commission undertook a monitoring project with cameras and satellite telemetry on four individuals, 2 male and 2 females. The objective is to understand the home range of the jaguar for its protection and the prevention of human-wildlife conflicts.

## **2:30: CONTRIBUTION OF CITIZEN SCIENCE TO TRACK THE MONARCH BUTTERFLY MIGRATION IN MEXICO**

**Martin Sánchez-Vilchis M.**, Galindo-Leal C. E. y G. F. Tavera-Alonso, National Commission for Natural Protected Areas, CONANP, Mexico City, Mexico

**Abstract:** The mission of Mexico's Commission on Natural Protected Areas, CONANP, is to conserve Mexico's biodiversity, including ecosystem services and goods, species and ecological processes such as the migratory phenomenon of the monarch butterfly (*Danaus plexippus*). Different initiatives had aimed to document the monarch's migratory route in Mexico. However, the lack of useful data and sharing thereof, plus the lack of funds for this project, had hampered data collection and analysis for sound decision-making in the conservation of this intriguing butterfly migration. Following the October 2013 meeting of the network of "Sister Protected Areas" along the path of the monarch's flyway, it was decided to increase collaboration in this area. CONANP's Priority Species Conservation Directorate pursued the tracking of the monarch taking advantage of "Citizen Science," through the "Naturalista" platform in coordination with CONABIO (Mexico's scientific authority). During the first year of the project, we gathered 203 records of monarchs through their flyway in 13 Mexican states. A major result of the monarch project is that the information is readily available for decision making and management to preserve their migratory path in Mexico's natural protected areas as well as other areas in Mexico.

## **2:45: BEHAVIOR PATTERNS OF TROPICAL CATS IN THE TAMAULIPAN BIOTIC PROVINCE**

**Shelby Carter**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, TX, 78363, USA

**Michael Tewes**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, TX, 78363, USA

**William Stasey**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, TX, 78363, USA

**Arturo Caso**, Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas  
A&M University-Kingsville, TX, 78363, USA

**Sasha Carvajal**, Feline Research Center, Caesar Kleberg Wildlife Research Institute,  
Texas A&M University-Kingsville, TX, 78363, USA

**Abstract:** Multiple cat species occupy the Tamaulipan Biotic Province (TBP). This study focuses on ocelot (*Leopardus pardalis*), jaguarundi (*Puma yagouaroundi*), mountain lion (*Puma concolor*), and jaguar (*Panthera onca*). The TBP occurs in northeastern Mexico where populations of each species have been documented. These felids are known to be solitary, therefore, any coexistence and occupancy of this cat community will be examined. Previous camera data collected in 2012 will be used to analyze how wild cats use artificial water devices and the activity patterns of each felid. It is predicted that the larger jaguar will be dominant over the mountain lion and smaller cats. Also, ocelot will be dominant over jaguarundi because ocelot is larger. Assessing the occupancy patterns and activity may provide insight into how the different cats can coexist in the same area. These species are the top predators roaming the TBP. Results from this study will help continue regulation of prey and other coexisting species. Information will be provided to help biologists understand their ecological role and assist with their future conservation.

## **SESSION 1E: LAND TRENDS AND LANDSCAPE PLANNING**

### **1:30: TEXAS LAND TRENDS: STATUS UPDATE AND TRENDS OF TEXAS RURAL WORKING LANDS AND IMPLICATIONS FOR FUTURE CONSERVATION**

**Addie Engeling**, Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77843, USA

**Todd Snelgrove**, Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77843, USA

**Amy Grones Snelgrove**, Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77843, USA

**Roel Lopez**, Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77843, USA

**Abstract:** Texas is comprised of 142 million acres of private farms, ranches and forests, leading the nation in land area devoted to privately-owned working lands. These working lands account for 83 percent of the state's entire land area and provide substantial economic, environmental, and recreational resources that benefit many Texans. Native landscapes and working lands are increasingly threatened by suburbanization, rural development and land ownership fragmentation driven by rapid population growth causing a fundamental change, one that has implications for rural economies, national security and food security, and conservation of water, wildlife, and other natural resources. The Texas Land Trends report is published every five years, following the availability of the USDA NASS Census of Agriculture data, and serves to describe the status and recent changes in land use, ownership size, and land values of privately owned Texas farms, ranches, and forests, collectively known as working lands. Findings from the 2014 report also are compared to previous time periods to determine current and historic land use trends. The goal of Texas Land Trends is to provide public and private decision-makers with timely information to support the conservation of Texas working lands in a spatially explicit context that identifies areas to target future conservation efforts based on potential for future ownership fragmentation along with other ecologically relevant factors.

### **1:45: LANDSCAPE CONSERVATION DESIGN 101: A PRODUCT ORIENTED PROCESS FOR CONSERVATION IN THE SOUTHERN GRASSLANDS**

**James Broska**, Great Plains Landscape Conservation Cooperative, U.S. Fish and Wildlife Service, Albuquerque, NM, 87113, USA

**Cynthia Kallio Edwards**, Gulf Coast Prairie Landscape Conservation Cooperative, Wildlife Management Institute Lafayette, LA, 70506, USA

**Aimee Roberson**, Desert Landscape Conservation Cooperative, Office of Arid Lands Studies, U.S. Fish and Wildlife Service, Tucson, AZ, 85721 USA

**Abstract:** In the spirit of Strategic Habitat Conservation (SHC), and with the intent of fulfilling its conservation design element, Landscape Conservation Design (LCD) stands as a partnership-driven method to: (1) assess current and anticipated future conditions, (2) offer a spatially-explicit depiction of a desired future condition, and (3) provide management prescriptions for achieving those conditions. LCD is both a process and a product; the process “to design” assures the collaborative effort achieves partners’ missions, mandates, and goals while the “spatially-explicit product” ensures sustainability of ecosystem services for current and future generations. LCD integrates societal values with ecological goals, using science based in landscape ecology to provide a variety of scenario plans that describe where conservation objectives can best be achieved. The LCD process results in a science-based, technologically-advanced, spatially-explicit product that identifies targets of interest to partners, articulates measurable objectives for those targets, and assesses current and projected landscape patterns and processes. The product can then used to identify desired future conditions, conservation/development trade-offs, and resultant implementation strategies. The authors will showcase examples of the value, process and product of SHC and LCD in the Desert Southwest, the Southern Great Plains, and the Gulf Coast Prairie, that can be delivered in a coordinated fashion to meet society needs and values, while maintaining ecological integrity and biodiversity.

## **2:00: THE GULF COAST VULNERABILITY ASSESSMENT: INFORMING ADAPTATION OPTIONS IN LANDSCAPE CONSERVATION DESIGN**

**John M. Tirpak**, Gulf Restoration Program, U.S. Fish and Wildlife Service, Lafayette, LA, 70506, USA

**Amanda Watson**, Northern Gulf Institute/Geosystems Research Institute, Mississippi State University, Stennis Space Center, MS 39522, USA

**Cynthia Kallio Edwards**, Wildlife Management Institute, Gulf Coast Prairie Landscape Conservation Cooperative, Lafayette, LA, 70506, USA

**Rua Mordecai**, U.S. Fish and Wildlife Service, South Atlantic Landscape Conservation Cooperative, Raleigh, NC 27606, USA

**Steve Traxler**, U.S. Fish and Wildlife Service, Peninsular Florida Landscape Conservation Cooperative, Vero Beach, FL 32960, USA

**James W. Pahl**, Planning and Research Branch, Planning and Research Division, Coastal Protection and Restoration Authority, Baton Rouge, LA, 70802, USA

**Blair E. Tirpak**, U.S. Geological Survey, National Wetlands Research Center, Lafayette, LA 70506, USA

**Abstract:** Climate, sea-level rise, and urbanization are undergoing unprecedented levels of change and are expected to have large effects on natural resources - particularly along the Gulf Coast. Intentional management decisions to address these effects (i.e., adaptation) require an understanding of the relative vulnerability of various resources to these stressors. To meet this need, the four Landscape Conservation Cooperatives along the Gulf partnered with the Gulf of Mexico Alliance to conduct the Gulf Coast Vulnerability Assessment (GCVA). The GCVA uses an expert-opinion approach to qualitatively assess the vulnerability of four pilot habitat types – mangroves, oyster reefs, tidal marsh, and island beaches and dunes as well as many of the wildlife species dependent on them. Vulnerability incorporates aspects of exposure, sensitivity, and adaptive capacity. Exposure to climate, sea-level rise, and urbanization were

depicted spatially within each of 6 subgeographies that captured the ecological and physical gradients across the Gulf. Sensitivity and adaptive capacity reflect natural history features of target organisms and systems. More than 40 individuals participated in the completion of the GCVA, facilitated by partners leading Ecosystem and Species Expert Teams. Preliminary results suggest that species demonstrate higher vulnerability than broader habitat types due to more specialized natural history requirements. In general differences among subgeographies were slight. Results for all systems and species will be presented. Implications and use of these results for landscape conservation design that incorporates adaptation options also will be discussed.

## **2:15: INTEGRATING GRASSLAND BIRD CONSERVATION AND THE HUMAN LANDSCAPE IN CENTRAL TEXAS**

**Jon Hayes**, Oaks and Prairies Joint Venture, Texas Parks and Wildlife Department,  
La Grange, TX 78945

**James Giocomo**, Oaks and Prairies Joint Venture, American Bird Conservancy, Round Rock, TX 78665

**Abstract:** In fragmented landscapes dominated by private lands, the challenge for landscape scale conservation is often one of compelling human behavior. This presentation will demonstrate how relevant social science research can be integrated into a strategic habitat conservation framework, namely the conservation of grassland bird species that are dependent on frequent fire to maintain habitat suitability, in a way that can help to better achieve conservation gains. By integrating relevant social science research (i.e., demographics, economic theory, sociology, and social psychology) into various stages of the strategic habitat conservation cycle (i.e., conservation design, conservation delivery, and monitoring) habitat and population objectives can be more readily achieved in a way that is fully integrated into the current dominant conservation paradigm. An effort underway to foster a "culture of fire" in central Texas will serve as a case study for how developing a better understanding of the "human landscape" is supporting the Oaks and Prairies Joint Venture's efforts to "move the needle" for grassland bird populations.

## **2:30: CONSERVATION PLANNING ATLAS: A TOOL FOR LANDSCAPE CONSERVATION DESIGN**

**Blair E. Tirpak**, U. S. Geological Survey, National Wetlands Research Center, Lafayette, LA, 70506,  
USA

**Cynthia Kallio Edwards**, Wildlife Management Institute, Gulf Coast Prairie Landscape Conservation  
Cooperative, Lafayette, LA, 70506, USA

**Abstract:** Landscape Conservation Design is based on the premise that all acres are not created equal—a fundamental tenet of landscape ecology and conservation biology. While technological advances in Geographic Information Systems (GIS) and spatial statistics have fueled our ability to evaluate the broader landscape-scale context of individual acres, the improvement in conservation efficiency potentially gained from these analyses has not been fully realized. This failure does not denigrate the value of biological planning or strategic design, but rather reflects our inability to transfer the technology captured in the geospatial outputs of these planning and design efforts. Too few individuals involved in conservation delivery either have access to or know how to operate a GIS. To address these deficiencies and to improve the integration of conservation design and delivery, the Gulf Coast Prairie Landscape Conservation Cooperative (GCP LCC) developed a Conservation Planning Atlas (CPA) in 2012. The CPA is an online mapping environment built upon the Conservation Biology Institute's Data Basin platform. The core of Data Basin is free and provides familiar mapping tools to easily create custom maps, group workspaces for collaboration, a search engine to discover new datasets, and the ability to upload or download various geo-

spatial datasets. The GCP LCC CPA (<http://gcplcc.databasin.org/>) highlights specific datasets of particular interest to natural resource planners and managers by limiting the universe of available datasets to the limited subset of most value. A case study from the GCP LCC-funded decision support tool for mottled duck (*Anas fulvigula*) will be reviewed.

## **2:45: USING EFFECTIVE MESH SIZE TO CALCULATE TERRESTRIAL FRAGMENTATION IN TEXAS**

**Blair E. Tirpak**, U. S. Geological Survey, National Wetlands Research Center, Lafayette, LA, 70506, USA

**Cynthia Kallio Edwards**, Wildlife Management Institute, Gulf Coast Prairie Landscape Conservation Cooperative, Lafayette, LA, 70506, USA

**Abstract:** Fragmentation of terrestrial natural habitat due to urban, rural, and energy-related development; agriculture; and transportation infrastructure has direct impacts on wildlife that include direct mortality, behavioral changes, reduced dispersal capacity, and decline in genetic flow. Rural areas in Texas are currently being threatened by fragmentation from land subdivision and oil and gas production. From 1992–1997, the total amount of land in mid-sized farms and ranches (500 to 2,000 acres) in Texas declined at a rate of about 250,000 acres per year. While energy production is beneficial for the economy, the impacts of the recent boom in natural gas production on fragmentation of the landscape must be addressed. For example, data from the Texas General Land Office show that new permits issued for “active” or “producing” oil and gas wells have increased over one order of magnitude from 249 during 1990–2000 to over 2,600 during 2000–2010. To better quantify habitat fragmentation in Texas, the Gulf Coast Prairie Landscape Conservation Cooperative has used transportation, urbanization, agriculture, and energy development geospatial datasets to assess landscape fragmentation with a modified effective mesh size method developed by Moser et al., 2007 within various planning units. This poster will review fragmentation results and present potential uses of these data in conservation decision-making.

## **SESSION 2A: ECOLOGY AND MANAGEMENT OF NONGAME BIRDS**

### **3:30: MIGRATORY CONNECTIVITY OF TEXAS AND CONTINENT-WIDE PURPLE MARTIN POPULATIONS**

**James D. Ray**, Consolidated Nuclear Security, L.L.C., U.S. Department of Energy/National Nuclear Security Administration Pantex Plant, P.O. Box 30020, Amarillo, TX, 79120, USA.

**Louise Chambers**, Purple Martin Conservation Association, Tom Ridge Environmental Center, 301 Peninsula Dr., Ste. 6, Erie, PA, 16505, USA

**John Barrow**, 4146 Congressional Dr., Corpus Christi, TX, 78413, USA

**Kevin C. Fraser**, Department of Biological Sciences, University of Manitoba, Winnipeg, MB, Canada, R3T2N2.

**Bridget J.M. Stutchbury**, Department of Biology, York University, 4700 Keele St., Toronto, ON, Canada, M3J 1P3.

**John Tautin**, Purple Martin Conservation Association, Tom Ridge Environmental Center, 301 Peninsula Dr., Ste. 6, Erie, PA, 16505, USA.

**Abstract:** Like many other North American aerial insectivores, the purple martin (*Progne subis*) is experiencing population declines within portions of its breeding range. The eastern subspecies (*P. s. subis*) breeds across most of eastern North America to as far west as Alberta, the Texas Panhandle, and

even a few locations in extreme eastern New Mexico. This race is readily accessible for study due to its dependence on human-supplied nesting cavities. As part of a continent-wide research project, we tracked approximately 30 eastern purple martins from breeding colonies in Texas through the non-breeding portion of their annual life cycle using light-level geolocators. During fall migration, most individuals migrated along the circum-Gulf land route through Mexico and Central America. However, unlike birds from the rest of the range, which tend to use the same paths during both migrations, many of our Texas birds varied from their fall paths and crossed the Gulf during spring migration. In common with approximately 150 marked purple martins from breeding sites throughout the range, including from Florida to Alberta, Texas-breeding birds displayed a similar fall migration strategy: a rapid initial migration, followed by prolonged stopovers and a slower rate of travel before the birds continued on to South America. Many Texas birds took clear detours in late summer to visit the Yucatan, which appears to be a very important fall stop-over location for purple martins from across the breeding range. Continent-wide, longitude of the breeding colony influenced whether the birds used a trans-Gulf or circum-Gulf land-route. However, regardless of breeding location, eastern Purple Martins, including those from Texas, displayed almost completely overlapping non-breeding ranges, with individuals of a colony or region spread across the Amazon Basin in central Brazil. Individual non-breeding sites had an average of 91% forest and only 4% agricultural ground cover within a 50-km radius, and birds originating from declining northern and eastern breeding populations were not more exposed to agricultural landscapes than stable southern breeding populations like those found in Texas. Our results show that differences in wintering location and habitat do not explain recent trends in (regional) breeding population declines in this species.

### **3:45: 11:15: REGIONAL VARIATION IN NEST SITE SELECTION BY GOLDEN-CHEEKED WARBLERS**

**Melanie R. Colón**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77840, USA

**Ashley M. Long**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77840, USA

**Kathryn N. Smith**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77840, USA

**Heather A. Mathewson**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX 77840, USA

**Michael L. Morrison**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77840, USA

**Abstract:** Wildlife-habitat relationships often vary across space and time. However, most efforts to quantify these relationships are limited geographically or temporally. Failing to account for this variation can lead to biased assumptions about resource use and may result in inappropriate management at local scales. The golden-cheeked warbler (*Setophaga chrysoparia*; hereafter warbler) is a federally endangered songbird that breeds exclusively in oak-juniper woodlands in central Texas. Regional differences in landscape- and territory-scale habitat use by warblers have been documented. However, our knowledge of warbler nest site selection is limited to data collected from a small number of prioritized study sites. From 2009–2014, we located 182 golden-cheeked warbler nests in 10 counties to examine the influence of local vegetative characteristics on warbler nest site selection across their breeding range.

### **4:00: GRASSLAND SONGBIRD AND POLLINATOR RESPONSE TO LARGE-SCALE NATIVE-GRASSLAND RESTORATION**

**Anthony K. Henehan**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,

Kingsville, TX 78363, USA

**Danielle E. Belleny**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Fidel Hernandez**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Eric D. Grahmann**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Andrew N. Tri**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Abstract:** Non-native grasses such as buffelgrass (*Pennisetum ciliare*) and Old World bluestems (*Bothriochloa ischaemum* and *Dichanthium annulatum*) have spread across the southwestern United States creating monotypic stands, thereby degrading wildlife habitat. Prior research has shown that these non-native areas maintain lower breeding bird densities than on native grasslands. However, no studies have documented the response of grassland birds to the large-scale (>50 ha) restoration of native plant communities in areas previously dominated by non-native grasses in Texas. Furthermore, no prior research has documented the response of pollinators to native-grassland restoration. The objective of our study was to document the relative densities of breeding grassland birds and butterflies between native rangeland, non-native grassland, and an area being restored to native grassland. Our study is located in LaSalle County, Texas. We monitored avian density and species richness, and relative pollinator abundance and species richness on 3 sites; (1) an untouched native shrub-land (117-ha positive control), (2) non-native grassland (109-ha negative control), and (3) an area currently being restored to native vegetation (118-ha treatment). We conducted avian point count surveys during summer (Jun–Jul 2014) (during treatment), and butterfly line-transect surveys during fall (Oct–Nov 2014) (during treatment). Preliminary analyses indicate bird densities 445% greater on the native area ( $6.37 \pm 1.6 \text{ ha}^{-1}$ ) than the treatment area ( $1.43 \pm 0.7 \text{ ha}^{-1}$ ), and 344% greater on the native area than the non-native area ( $1.85 \pm 0.7 \text{ ha}^{-1}$ ). We documented 19 species of bird on the treatment area, 16 species on the non-native area, and 18 species on the native area. We documented 37 butterflies  $\text{km}^{-2}$  on the treatment area, 12 butterflies  $\text{km}^{-2}$  on the native control area, and 9.6 butterflies  $\text{km}^{-2}$  on the non-native control area. We identified 6 species of butterfly utilizing the non-native area, and 9 species utilizing the native and treatment areas. Understanding the response of breeding grassland birds and migrating pollinators to large-scale restoration efforts can help land managers and biologists to identify how and where to refine management efforts of these important species.

#### **4:15: HABITAT ASSOCIATIONS OF BLACK-SHOULDERED KITES IN AGROECOSYSTEMS OF SWAZILAND**

**Kate Howard**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX, 76401, USA.

**Thomas W. Schwertner**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX, 76401, USA.

**James P. Muir**, Texas A&M AgriLife Research, Stephenville, TX, 76401, USA.

**Ara Monadjem**, Department of Biological Sciences, University of Swaziland, Kwaluseni, Swaziland.

**ABSTRACT:** In Africa there is a decline in many raptor populations that may contribute to the loss of ecosystem services such as pest control. The black-shouldered kite (*Elanus caeruleus*) stands out as an exception, experiencing range expansions due to its proclivity for using agricultural landscapes. We

surveyed roads throughout Swaziland agroecosystems for black-shouldered kites and looked at habitat selection in a used versus available framework. We found that kites selected for savannahs ( $\chi^2 = 6.46$ ,  $df = 2$ ,  $P = 0.039$ ) and tall vegetation ( $\chi^2 = 11.04$ ,  $df = 1$ ,  $P < 0.001$ ), but did not show any other preferences for or against other land cover types. We also found a marginally significant relationship with kite presence and low tree densities in the immediate vicinity of a perch site ( $t = -1.71$ ,  $df = 47$ ,  $P = 0.047$ ). Kites were observed in agriculture, as were pairs of birds and fledglings, suggesting that although they are not selecting for agriculture in proportion to its availability, they are hunting in it. This may be a boon for farmers who implement ecologically based rodent management programs.

#### **4:30: SURVIVAL AND THE EFFECTS OF CAPTURE ON CRESTED GUINEAFOWL AT MBULUZI GAME RESERVE, LUBOMBO, SWAZILAND**

**Chelsea C. Taylor**, Graduate Student, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX, 76401, USA

**T. Wayne Schwertner**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX, 76401, USA

**Jeff B. Breeden**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX 76401, USA

**Roger D. Wittie**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX 76401, USA

**Abstract:** Avian life history characteristics such as survival are best examined by capturing and monitoring live individuals; which can be accomplished using radio telemetry. Crested guineafowl (*Guttera pucherani edouardi*), an understudied reclusive species, may be at risk of extirpation due to habitat fragmentation from agricultural expansion. We compared trapping methodology, commonly used on other galliforms, to determine safe and effective capture procedures. Additionally we used necklace transmitters to estimate annual survival and identify capture related mortality. Individuals were captured using an electromagnetic drop-net and modified walk-in traps. Birds were then radio-collared with mortality sensitive, VHF 24-g-transmitters, released, and tracked daily to determine fate. The drop-net trap was more effective at capturing birds ( $n = 27$ ) and resulted in higher post-capture-survival rates; however it was more expensive and harder to transport than the walk-in trapping method ( $n = 17$ ). Our research estimates annual survival to be 0.26. This rate appears to be biologically unsustainable and yet may be an underestimation of the actual survival rate. We speculate that the low annual survival estimate is a result of increased post-capture-mortality arising from radio handicapping.

#### **4:45: BIRD DIVERSITY, VEGETATION COVERAGE, AND HOUSE PRICES IN LUBBOCK, TEXAS**

**Katherine P. Leuenberger**, Department of Natural Resource Management, Texas Tech University, Lubbock, Texas 79409

**Samantha S. Kahl**, Department of Natural Resource Management, Texas Tech University, Lubbock, Texas 79409

**Michael Farmer**, Department of Natural Resource Management, Department of Agricultural and Applied Economics, Texas Tech University, Lubbock, TX, USA, 79409.

**Robert D. Cox**, Department of Natural Resource Management, Texas Tech University, Lubbock, Texas 79409

**Abstract:** Urban areas are growing both in the United States and around the world. The increase of urbanization means wildlife are forced to use urban areas as the amount of available natural habitat decreases. Determining how homeowners value their urban landscapes could prove useful in helping homeowners increase house prices and improve the quality wildlife habitat. This study has several

objectives. First, we compared bird diversity to vegetation coverage in neighborhoods across Lubbock, Texas. The second objective is to study how bird diversity and vegetation coverage changes throughout the area. Our final objective is to observe how house prices differ when considering bird diversity and vegetation coverage. We performed bird point counts during the summer of 2014, recording every bird seen and heard. We also performed vegetation surveys from May to October 2014 recording number, height, and species of trees and other vegetation variables within the urban area of Lubbock, Texas. Recently-sold house prices were obtained from local real estate agents. Simple linear regressions were used to determine factors that correspond highly to bird diversity, and to develop a best fit model of potential factors contributing to home prices in Lubbock, Texas. Our findings supplement knowledge of how birds use urban neighborhoods in Lubbock, Texas, and identify methods and habitat variables that could be used to predict the diversity of birds in an urban area, not only in Lubbock, Texas, but also in other cities.

## **SESSION 2B: ECOLOGY AND MANAGEMENT OF UNGULATES**

### **3:30: DIETARY ENERGY INFLUENCE IN GROWTH AND DEVELOPMENT OF WHITE-TAILED DEER**

**Ryan L. Reitz**, Kerr Wildlife Management Area, Texas Parks and Wildlife Department Hunt, TX, 78024, USA

**Don B. Frels, Jr.**, Kerr Wildlife Management Area, Texas Parks and Wildlife Department, Hunt, TX, 78024, USA

**Justin A. Foster**, Kerr Wildlife Management Area, Texas Parks and Wildlife Department, Hunt, TX, 78024, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Randy W. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Abstract:** Dietary energy and protein are two nutritional currencies directly related to body growth and antler development in white-tailed deer (*Odocoileus virginianus*). Limitations correlated to environmental supply and individual demand are recognized, although deficiencies in dietary energy often surpass protein in many habitats. We studied the individual effect of dietary energy in body size and antler growth at the Donnie Harmel White-tailed Deer Research Facility located in Kerr County, Texas. Two cohorts of deer (2012–2013) were fed free choice diets of low energy ( $LE \leq 2.2$  kcal/g) and standard energy ( $SE \geq 2.8$  kcal/g) post weaning. Protein content of each diet remained at 16% with similar vitamin and mineral content. We measured weight and skeletal size (total body length, hind-foot length) of males and females 1.5 years of age ( $n = 178$ ) and 2.5 years of age ( $n = 66$ ). At 1.5 years, SE deer body mass was 17% greater (48.17 kg, SE; 40.73 kg, LE). Total body length of SE deer at 1.5 years was comparable to LE deer at 2.5 years (136.76 and 135.5 cm respectively). Hind-foot length remained similar among treatment groups and ranged from 41.6 to 42.6 cm across ages. Gross Boone and Crockett scores of SE males were 70.5 cm (27.75 inches) greater than LE males in 2013; 2014 antler data is currently under analysis. Dietary energy has demonstrated considerable limitations despite greater consumption rates in LE treatments ( $\geq 18\%$ ). Energy status of wild deer habitats affect deer growth rates and herd productivity, which managers should consider.

### **3:45: ALDO LEOPOLD'S COW: CAN CATTLE BE USED AS A HABITAT MANAGEMENT TOOL FOR WHITE-TAILED DEER HABITAT IN SOUTH TEXAS?**

**Stacy L. Hines**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science,

Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**J. Alfonso Ortega-Sanchez**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Thomas W. Boutton**, Department of Ecosystem Science and Management, Texas A&M University-College Station, College Station, TX 77843, USA

**Alfonso Ortega-Sanchez, Jr.**, East Wildlife Foundation, San Antonio, Texas 78216, USA

**Abstract:** Aldo Leopold suggested in his book *Game Management* that cattle (*Bos spp.*) could be used as a habitat management tool. This observation fostered emergence of the paradigm that cattle grazing removes grass, allowing forbs consumed by white-tailed deer (*Odocoileus virginianus*) to increase. Our objective was to determine the relationship between intensity of cattle grazing and the standing crop of forbs preferred by deer. Fifty 1.5 X 1.5-m vegetation enclosures, with a paired outside plot, were randomly allocated at each of six 2,500-ha study sites on East Wildlife Foundation ranches ranging from the coast to western south Texas. We determined standing crop of grasses, forbs deer prefer to eat, and forbs not preferred by deer every autumn during 2012–2014. Cattle grazing intensity was calculated based on standing crop of grass inside and outside vegetation enclosures. Data were analyzed using a case controlled analysis of covariance in Proc Mixed (SAS 9.3). We did not detect a relationship between cattle grazing intensity and standing crop of forbs not preferred by deer ( $P = 0.14$ ) across all years, standing crop of forbs preferred by deer in years 2 and 3 ( $P \geq 0.14$ ), or total standing crop of forbs in years 1 and 3 ( $P \geq 0.25$ ). However, standing crop of forbs preferred by deer declined with increasing cattle grazing intensity in year 1 ( $P = 0.02$ ). This study was completed during drought conditions, on ranches that are recovering from a long history of heavy cattle grazing intensity prior to the formation of East Wildlife Foundation. Under these conditions in the semiarid landscape of south Texas, cattle grazing did not increase the standing crop of forbs that deer prefer to eat.

#### **4:00: WHITE-TAILED DEER EAR TAG RETENTION**

**Emily Belser**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, TX 78363, USA

**David Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, TX 78363, USA

**John Lewis**, Lipscomb University, Nashville, TN 37204, USA

**Mickey Hellickson**, Orion Wildlife Management, Corpus Christi, TX 78469, USA

**Abstract:** Both free range and captive white-tailed deer (*Odocoileus virginianus*) have been marked with visible, plastic ear tags for a wide variety of applications. Research projects use ear tags in free range deer for assessing individual deer behavior, population estimation, and other applications. Captive white-tailed deer are often tagged, such as deer in research pens or deer within breeding facilities. Deer also are marked as part of various management actions. Texas, for example, requires tagging deer that are moved to a new location under the Trap, Transport, and Transplant (TTT) Program. Because of this large scale use of ear tags in white-tailed deer, our goal was to analyze retention of visible, plastic ear tags. We used 2 data sets to analyze ear tag retention—one from deer in a free-range setting and one from a captive setting. The first data set was from 544 marked, free range white-tailed deer on 5 ranches in South Texas. Each deer was captured using a helicopter/net gun, marked with a plastic, 7.6 x 10.2 cm, numbered ear tag, and recaptured in subsequent years. After 1 year of exposure for each tag, 94.9% of ear tags in the right ear remained the second year of capture. The second data set analyzed tag retention from 36 deer held in the

captive deer facility at Texas A&M University-Kingsville. Each deer was marked with a plastic, 5.1 x 4.1 cm, numbered ear tag, and monitored throughout its life. After 177 total years of exposure, there was 98.9% retention. These high retention rates of plastic ear tags suggest that these ear tags are a reliable means of identification.

#### **4:15: EFFECTS OF WHITE-TAILED DEER DENSITIES AND SUPPLEMENTAL FEEDING ON WOODY SHRUB CANOPY COVER AND VOLUME**

**Lindsey M. Phillips**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Charles A. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Lindsay D. Roberts**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Kim N. Echols**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Don A. Draeger**, Comanche Ranch, Carrizo Springs, TX 78834, USA

**Abstract:** The maximum white-tailed deer (*Odocoileus virginianus*) population that southwestern Texas can support without negative vegetation impacts is unknown. Our objective was to determine the impacts of different deer densities on shrub species. In March 2013, 4 80-ha enclosures were established on each of 2 ranches, with target densities of 0, 20, 40, and 60 deer/80 ha. Enclosures received supplemental feed. During summer 2012–2014, we used the line intercept method to estimate canopy cover of shrub species on 20 transects in each enclosure. We compared percent canopy cover of highly palatable, unpalatable, and moderately palatable shrubs. In summer 2013–2014, we measured height and canopy volumes of pairs of guayacan (*Guaiacum agustifolium*), blackbrush acacia (*Acacia rigidula*), and granjeno (*Celtis pallida*) that were unprotected or protected from browsing. Blackbrush acacia and granjeno were split into 2 height classes (<1.50 m tall and >1.50 m tall). Data were analyzed using repeated measures for mixed models. There was no effect ( $P > 0.148$ ) of deer density on percent canopy cover of highly palatable, unpalatable, and moderately palatable shrubs, as well as no effect ( $P > 0.062$ ) on canopy volume of blackbrush acacia and granjeno <1.50 m tall, and guayacan canopy volume. Unprotected blackbrush acacia >1.50 m tall had larger canopies ( $P < 0.041$ ) 2.00 m above the ground and higher. Uncaged granjeno >1.50 m tall showed this trend, but was not statistically significant ( $P > 0.769$ ). Based on our results, it appears that deer browsing may result in compensatory growth of blackbrush acacia and granjeno, increasing canopy area out of the reach of deer.

#### **4:30: ECOLOGY OF ADULT FEMALE ROCKY MOUNTAIN MULE DEER FOLLOWING HABITAT ENHANCEMENTS IN NORTH-CENTRAL NEW MEXICO**

**Grant E. Sorensen**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Mark C. Wallace**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Philip S. Gipson**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Robert D. Cox**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX,

79409, USA

**James W. Cain III**, U.S. Geological Survey New Mexico Cooperative Fish and Wildlife Research Unit, Department of Fish Wildlife and Conservation Ecology, New Mexico State University, Las Cruces, NM, 88033, USA

**Abstract:** Rocky Mountain mule deer (*Odocoileus hemionus hemionus*) population declines in their southernmost region, in particular north-central New Mexico, have been attributed to malnourishment. To test the hypothesis of malnutrition, we monitored 48 adult female mule deer and key browse quality from 2011 to 2013 after habitat enhancements were initiated. There was a strong selection for treated areas across all seasons and years. Adult female mule deer average study period survival was 0.88 ( $SE = 0.027$ ). Survival was only minimally explained by selection for treated brush ( $\beta = 0.00006443$ ). Predation accounted for 81% of known mortalities with mountain lion (*Felis concolor*) predation accounting for 60% of mortalities. Femur marrow fat levels indicated that only 1 individual was in poor condition (<12%) at time of death. Mulching increased the crude protein content of brush over non-mulched brush two years post mulch but this effect was not detected after 2.5 years. In no case, did deer that selected for treated brush have diets with greater fecal nitrogen. Reproductive performance was high with 96% pregnancy rate and 88% twinning rate. Despite persistent drought conditions, adult female mule deer survival was high and similar to other estimates found in the region. Mulching did not improve deer diet quality. There was no evidence in our study to suggest that adult female mule deer populations were limited by malnutrition. High nutrient availability, femur marrow fat levels, and cause-specific mortality results point to a stronger role of predation over nutrition in limiting mule deer populations in north-central New Mexico.

#### **4:45: PREDICTION OF PRONGHORN STRESS DURING TRANSLOCATION**

**Ryan O'Shaughnessy**, Post-doctoral Research Scientist, Borderlands Research Institute, Sul Ross State University Alpine, TX, 79830

**Scott Jaques**, Veterinary Pathologist, Texas A&M Veterinary Medical Diagnostic Laboratory, Texas A&M University, College Station, Texas, 77843

**Louis A. Harveson**, Director, Borderlands Research Institute, Sul Ross State University Alpine, TX, 79830

**Shawn S. Gray**, Mule Deer and Pronghorn Program Leader, Texas Parks and Wildlife Department, Alpine, TX, 79830

**Abstract:** Animal populations in severe decline can be prevented from local extirpation through supplementation of individuals from stable source populations. This process involves the capture and translocation of individuals from viable populations, and their subsequent release and integration into a population at risk. Despite the anticipated benefits to the supplemented population, capture and translocation of wild animals can induce considerable stress to individuals being captured. Prolonged levels of stress, or events causing acute stress in the individual, may cause death resulting from capture myopathy. Physiologically, cortisol may be used to quantify the level of stress experienced by the animal. Glucocorticoids produced approximately 10–12 hours prior to capture can be estimated from fecal glucocorticoid metabolites (FGM). Fecal samples collected from the individual at the time of capture can represent FGM prior to handling and can be assumed to be the baseline stress measure for that individual. Subsequently, serum cortisol can be used to estimate stress of the individual during capture. Therefore, levels of stress in an individual can be quantified by comparing serum cortisol to baselines estimated from fecal samples collected at time of capture. In an effort to bolster pronghorn (*Antilocapra americana*) numbers in the Trans Pecos, the Texas Parks and Wildlife Department in conjunction with the Borderlands Research Institute initiated a pronghorn translocation program in 2011. Our goal was to identify factors that may help to predict individuals most at risk of capture myopathy, so that special focus may be directed to their survival. Our objectives were to: (1) establish cortisol baselines in captured

individuals using fecal cortisol, (2) assess relative stress in individuals at time of capture by comparing serum cortisol to fecal cortisol, (3) using creatine kinase (CK) and aspartate aminotransferase (AST) as indicators of myopathy, quantify the relationship of serum cortisol to capture myopathy, (4) determine if elevated serum cortisol reliably predicts mortality and, (5) test if body temperature was positively correlated with serum cortisol. Stress levels were significantly elevated during capture. Serum cortisol concentration was not significantly different between genders or age classes. Serum cortisol was not a reliable predictor of AST or mortality, but was a reliable predictor of CK. Increasing body temperature reduced the likelihood of mortality. At the time of capture, individuals surviving to 4 weeks post release had an average body temperature of 39.3 °C and individuals who died had an average body temperature of 38.6 °C. The administration of banamine to high temperature individuals at capture stations may have had the result of reducing the effect of CK, AST, and temperature, thereby influencing our model results.

### **SESSION 2C: ECOLOGY AND MANAGEMENT OF MAMMALS**

#### **3:30: ASSESSING BIODIVERSITY OF SMALL MAMMALS, TICKS, AND TICK-BORNE PATHOGENS IN SOUTH TEXAS**

**Aleyda P. Galán**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843

**Hunter A. Folmar**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843

**Sarah A. Hamer**, Department of Veterinary Integrative Biosciences, Texas A&M University, College Station, TX 77843

**Tyler A. Campbell**, East Wildlife Foundation, San Antonio, TX 78216

**Jessica E. Light**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843

**Abstract:** The knowledge of species biodiversity in south Texas is lacking due to large amounts of private land ownership in this area of the state that has been a barrier to conducting standardized biodiversity assessments. Through the East Wildlife Foundation's (EWF) stewardship program on their 215,000 acres of private land, we have the opportunity to document biodiversity of various vertebrate species, which will serve as baseline data from which change can be monitored in the future given changes in climate and land use. Our initial objective is to document the diversity of species of small mammals (primarily rodents), found on EWF properties in southern Texas across various habitat types. Because rodents are competent reservoirs for a variety of tick-borne zoonotic pathogens, we also aim to document the biodiversity of ticks and tick-borne pathogens that are associated with the south Texas rodents. We used several capture techniques including Sherman live traps, mist nets, and opportunistic pitfall traps across 2 field seasons and documented the presence of 15 small mammal species, of which the white-footed mouse (*Peromyscus leucopus*) was most abundant. Using PCR and DNA sequencing, we are screening both rodents and ticks removed from rodents for presence of tick-borne pathogens in the genera *Borrelia* (causative agent for Lyme disease and other diseases) and *Rickettsia* (causative agents for spotted fevers and typhus). Screening native fauna for tick-borne pathogens can create a general baseline of prevalence across the various habitats and rodent assemblages in southern Texas and could aid in determining tick-borne disease risk in the region.

#### **3:45: SMALL MAMMAL RESPONSE TO WILDFIRE ON THE MARFA GRASSLANDS, TEXAS**

**Robert A. Allcorn**, Borderlands Research Institute, Department of Natural Resource Managements, Sul Ross State University, Alpine, TX 79830, USA

**Bonnie J. Warnock**, Borderlands Research Institute, Department of Natural Resource Management, Sul Ross State University, Alpine, TX 79830, USA

**Abstract:** In April 2011, the largest grassland fire in recorded Texas history roared across the landscape between the cities of Marfa and Fort Davis. The fire, now known as the Rockhouse Fire, burned for 34 straight days and covered 314,444 acres. The effects on the landscape were dramatic and were compounded by a severe drought that afflicted the region from October 2010 to May 2012. With this fire came the opportunity to monitor the natural successional process that would be taking place on the Marfa grasslands. As part of the efforts to observe the natural change on the Marfa grasslands, small mammals were monitored using mark recapture techniques. Trapping grids were established at 24 random points and were active for 6 consecutive nights during the cold-dry, warm-dry, and warm-wet seasons of the Marfa plateau. These efforts have led to observations of obvious changes in small mammal populations. Both population size and composition have changed noticeably from the beginning of the study in the summer 2011 to its completion in August 2014. These changes suggest a healthier ecosystem and are indicative of the successional process occurring on the landscape.

#### **4:00: USING CAMERA TRAPS TO INVESTIGATE MAMMAL COMMUNITIES AT INDEPENDENCE CREEK PRESERVE**

**Mark J. Cancellare**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX, 79016, USA

**Richard T. Kazmaier**, Department of Life, Earth and Environmental Sciences, West Texas A&M University, Canyon, TX, 79016, USA

**Corbin Neill**, Independence Creek Preserve, The Nature Conservancy, Dryden, TX, 78851, USA

**Abstract:** An understanding of the influences of habitat on mammalian communities is integral to management. Although many single species habitat studies exist, few studies have tried to simultaneously investigate an entire medium to large sized mammal community because of the logistic difficulties of live trapping such a suite of organisms. Modern camera trapping offers a means to help gather such data. We initiated a camera trap study at Independence Creek Preserve, Terrell County, Texas, to investigate how habitat factors influence mammalian communities. We began installing cameras in different habitats on 21 September 2013. Habitats included lowlands, uplands, midslopes, drainages, and canyons. Currently, we have scored 76,858 images of which 20,099 contained pictures of 26 species of mammals. Only 2 of these species were exotics. White-tailed deer accounted for 44% (8,811) of all mammal images. Preliminary results suggested that across all habitats, midslopes tended to have the highest species richness. Diversity was lower on lowland sites (mean modified Simpson's Index = 0.489) relative to the other habitats (mean modified Simpson's Index = 0.791). Although only preliminary, our results suggest lowland habitats are poorer quality for the mammal community at Independence Creek Preserve.

#### **4:15: MOLECULAR GENDER IDENTIFICATION AND LANDSCAPE EFFECTS ON GENE FLOW OF PORCUPINES IN THE TEXAS PANHANDLE**

**Erica D. Thomas**, Department of Life Earth and Environmental Sciences, West Texas A&M University, Canyon, TX, 79015, USA.

**Rocky Ward**, Department of Life Earth and Environmental Sciences, West Texas A&M University, Canyon, TX, 79015, USA.

**Abstract:** North American porcupines (*Erethizon dorsatum*) in the Great Plains region of North America are relatively unstudied. Information specific to this geographic area will aid in management and to the overall understanding of the porcupine in Texas. Porcupine is a polygynous mammal for which evidence suggests an atypical dispersal pattern that is female biased. This species does not exhibit any external

sexual traits aside from observed pregnancy and breeding behavior, making sex determination by visual inspection difficult. A reliable and time efficient molecular technique has been developed for DNA sex determination in mammals involving the analysis of sex-linked zinc finger protein genes, which are present in both female and male chromosomes. The objective of this study is to investigate the use of molecular markers to determine gender and gender differences in the North American porcupine, as well as explore the overall genetic structure of Porcupine in Texas. We are specifically looking at genetic parameters that either support or refute the female-biased sex ratio and dispersal tendencies, as well as genetic variation within and between populations. For DNA analysis, hair, quills, and toenail clippings are collected from both live-trapped animals and vehicular mortalities. Genomic DNA is extracted from tissue samples using Beckman-Coulter testing and amplified using polymerase chain reaction. Deviations from Hardy-Weinberg equilibrium are used to detect levels of genetic variation. Preliminary results are presently being evaluated.

#### **4:30: LINKING POPULATION ESTIMATES WITH LANDSCAPE FACTORS: ASSESSING DENSITY OF LARGE MAMMALS IN A SPATIAL CONTEXT**

**Andrew N. Tri**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Mary K Annala**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Randy W. DeYoung**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Charles A. DeYoung**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Tyler A. Campbell**, East Wildlife Foundation, San Antonio, TX, 78216, USA

**Abstract:** Wildlife managers and biologists use surveys to assess population size and trends. Wildlife populations are not evenly distributed across the landscape and conducting a population census is costly. Density estimates derived from clustered populations contain underlying spatial data that are often ignored or treated as a nuisance. Biologists and managers can use this underlying spatial variation in animal density and distribution to their advantage. By combining mark-recapture distance sampling with spatial data from the survey, one can develop spatially-explicit estimates of density and better understand relationships between wildlife and landscape factors. We wanted to assess how density varies spatially and with landscape covariates for white-tailed deer (*Odocoileus virginianus*), nilgai (*Boselaphus tragocamelus*), collared peccary (*Peccari tajacu*), and feral swine (*Sus scrofa*) in South Texas. We conducted mark-recapture distance sampling via helicopter on 4 properties of the East Wildlife Foundation (87,000 ha in Kenedy, Jim Hogg, Starr, and Willacy counties) during 2013–2014. We analyzed the distance sampling data in Program R to generate density surface rasters for each species on all 4 properties. We overlaid landscape covariates (e.g., landcover, distance to roads, distance to water) and extracted values for the centroid of each raster cell. We fit generalized additive models to find relationships between density and landscape variables. The resulting output provides a spatially-explicit map of animal density and distribution. Density of large mammals varied among the ranches, but indicated clear patterns of density gradients across the landscape. Wildlife managers can use this technique to compare densities of sympatric species, illustrate niche partitioning, and estimate what factors influence density.

#### **4:45: RIO GRANDE BEAVER SURVEY IN BIG BEND NATIONAL PARK**

**Howland J. Reich**, Wildlife Ecology Program, Texas State University-San Marcos, TX, 78666, USA

**Thomas R. Simpson**, Wildlife Ecology Program, Texas State University-San Marcos, TX, 78666, USA  
**Floyd W. Weckerley**, Wildlife Ecology Program, Texas State University-San Marcos, TX, 78666, USA  
**M. Clay Green**, Wildlife Ecology Program, Texas State University-San Marcos, TX, 78666, USA  
**Raymond Skiles**, National Park Service, Big Bend National Park, TX, 79834, USA

**Abstract:** The Rio Grande River forms the 176 km boundary of Big Bend National Park with Mexico and is home to the southwestern subspecies of North American beaver, (*Castor canadensis mexicanus*). The last survey for the Rio Grande beaver, sometimes known as the Mexican beaver, in Big Bend National Park was conducted in 1981 by P. Strong and J. Bissonette. Our objectives were to document centers of beaver activity and estimate the population of beaver in Big Bend National Park. We surveyed the Rio Grande River on float trips with kayaks and canoes from the mouth of Terlingua Creek to the mouth of Boquillas Canyon. We recorded water depth, type of vegetation, sign of active beaver colonies (presence of dens, beaver tracks, scat, and cuttings), and ranked the amount of beaver activity within each colony as high, medium or low. From these data, we created a map using ArcGIS showing bathymetry of the river, vegetation profiles, and active beaver sign. We delineated a total of 98 active beaver colonies in the study area occupying deeper pools along the Rio Grande. We conducted camera surveys on 11 of the colonies to estimate the number of beaver in each colony. With camera survey data and activity ranking of each colony, we estimated a population of 185 beaver occupying the 98 colonies. This represents a 38% increase in the beaver population along the Rio Grande since 1981.

## **SESSION 2D: ECOLOGY AND MANAGEMENT OF QUAIL**

### **3:30: REDUCING FIRE ANTS TO INCREASE NORTHERN BOBWHITE ABUNDANCE**

**James W. Caldwell**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843

**Nova J. Silvy**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77845

**Roel R. Lopez**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77845

**Michael E. Morrow**, Attwater Prairie Chicken National Wildlife Refuge, Eagle Lake, Texas 77434

**Fred E. Smeins**, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX 77845

**Abstract:** Populations of northern bobwhite (*Colinus virginianus*) have been declining throughout Texas since at least the 1970s. The red imported fire ant (RIFA; *Solenopsis invicta*) was introduced in Mobile, Alabama from South America around the 1920s and reached Texas during the 1950s and has spread steadily across the state. Several have documented the effects of RIFA on northern bobwhite population. It has been noted that arthropods were reduced by 75% once RIFA invaded an area. The importance of invertebrate food to chicks of gallinaceous species has been well documented and RIFA clearly have an adverse impact on invertebrate numbers and biomass. The objectives of our study were to evaluate: (1) the impacts of RIFA on quail nest success, (2) the impacts of RIFA on habitat quality as indicated by invertebrate abundance, and (3) the influence of invertebrate abundance with respect to quail brood survival. To evaluate these objectives, we conducted our research on the Attwater Prairie Chicken National Wildlife Refuge in Colorado County, Texas. We trapped quail in an area treated (Extinguish® Plus) for RIFA and in a non-treated area using funnel traps (about 2,023 ha/area). We aged, sexed, massed, and banded quail and then fitted them with radio transmitters. After release, radio-located females were tracked 3 times per week to determine nest success and brood survival. To assess the impact of treatment on RIFA abundance and foraging activity and subsequent effects on invertebrate abundance, we collected invertebrates at 25 random sites in the treated and non-treated areas monthly

using sweep-nets. RIFA abundance and foraging activity was measured monthly at each of the 25 random treated and non-treated sites using baited (wieners) petri dishes. During the first year, we captured and banded 172 bobwhites. We found treated areas reduced RIFA numbers by 82%, however, there was no significant ( $t = -1.61$ ,  $df = 73$ ,  $P < 0.111$ ) difference in mass or numbers ( $t = -0.22$ ,  $df = 203$ ,  $P = 0.822$ ) of invertebrates obtained from the 2 areas. Also, there was no significant (Chi-square = 0.0247,  $df = 1$ ,  $P = 0.875225$ ) difference in the percentage of female quail with and without chicks on the 2 areas. During this first year of our study, it seems that reduction of RIFA has had little effect on northern bobwhite brood success. This may be due to the abundant rainfall received this year.

### **3:45: EVALUATION OF A GPS BACKPACK TRANSMITTER FOR NORTHERN BOBWHITE QUAIL RESEARCH IN NORTH CENTRAL TEXAS**

**Dean Marquardt**, Texas Parks and Wildlife Department, Granbury, TX 76049

**Luke Scroggs**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77845, USA

**Collin Weise**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX 77845, USA

**Kevin Skow**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX 77845, USA

**Robert Perez**, Texas Parks and Wildlife, La Vernia, TX 78121

**Kevin Mote**, Texas Parks and Wildlife Department, Brownwood, TX 76801

**Brian L. Pierce**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX 77845, USA

**Abstract:** Radiotelemetry has been the standard method for monitoring northern bobwhite (*Colinus virginianus*) movements and habitat use. Spatial data collected using telemetry-based may induce bias due to triangulation error. Technological advances such as Global Positioning Systems (GPS) has increased ecologists' ability to accurately evaluate animal movements and habitat selection. We evaluated the effectiveness of a <3-g Pinpoint GPS unit use on bobwhite quail. The PinPoint GPS incorporated a lightweight rechargeable battery and a very high frequency (VHF) transmitter. We conducted a series of static tests to evaluate performance in varying types of vegetative canopy cover and terrain. The test was conducted using 17 transmitters, in 5 different canopy cover density on 2 different locations. These canopy cover consisted of: bare ground, 25% cover, 50% cover, 75% cover and simulated nest selection. The PinPoint units averaged 49 locations per test across a variety of user defined schedules. Spatial accuracy has high across all experimental habitat types, with >90% of all locations falling within 5 m of actual location (median = 2.3 m). Our results indicate that high resolution GPS packages may have the potential to provide increasingly reliable information on quail movement ecology and habitat selection at a higher resolution than conventional methods.

### **4:00: ROTATIONAL CATTLE GRAZING EFFECTS ON NORTHERN BOBWHITE POPULATION DYNAMICS**

**Shannon Cain**, UNT Quail, University of North Texas, Denton, Texas 76203, USA

**Kelly S. Reyna**, UNT Quail, University of North Texas, Denton, Texas 76203, USA

**Abstract:** Northern bobwhite populations (*Colinus virginianus*) have declined 80% since 1967 and many factors have been determined to be proximate causes including habitat fragmentation and loss, both directly and indirectly from cattle grazing. One emerging notion is that planned rotational grazing benefits cattle, range conditions, and wildlife. Accordingly, we propose to examine indices of bobwhite population dynamics in relation to rotational cattle grazing regimes. Indices of suitable nest structure, nesting success, food availability, and brooding and protective cover will be measured before grazing,

immediately after grazing, and at distinct subsequent intervals. Bobwhite movements in relation to grazing will be recorded, and weather parameters will be analyzed. Results will illuminate the relationship between rotational cattle grazing and local bobwhite populations and should provide land managers with information to make key cattle and wildlife management decisions.

#### **4:15: HABITAT UTILIZATION AND WEATHER EFFECTS ON SCALED QUAIL BEFORE AND DURING THE NESTING SEASON IN THE TRANS-PECOS, TEXAS**

**Ernesto Garcia-Ortega**, Borderlands Research Institute, Department of Natural Resource Management, Sul Ross State University, Alpine, TX, 79832, USA

**Ryan S. Luna**, Borderlands Research Institute, Department of Natural Resource Management, Sul Ross State University, Alpine, TX, 79832, USA

**Louis A. Harveson**, Borderlands Research Institute, Department of Natural Resource Management, Sul Ross State University, Alpine, TX, 79832, USA

**Abstract:** Scaled quail (*Callipepla squamata*) populations have experienced a decline throughout their range since the early 1960's. Anthropogenic factors have been identified as the main cause of their decrease in the Trans-Pecos region. Since its arrival, radiotelemetry has provided the means to gain better information about scaled quail home range movements and their basic ecology. Using radio-tagged females, this research (1) determined the habitat utilization through dispersal of scaled quail before and during the nesting season, (2) analyzed the weather variables that can affect the nesting season and nest-site selection, and (3) estimated a seasonal home range for female scaled quail. In order to accomplish these objectives, Very High Frequency (VHF) portable receivers, Yagi antennas, VHF radio collars, and Global Positioning System (GPS) units were used for the monitoring of female scaled quail from early April to mid-September 2014. The location of each female during the spring and summer seasons was recorded by GPS units and later used in ArcGIS software. A micro-weather station was used to record temperature, precipitation, and relative humidity every 4 hours with 1-minute sampling. By the end of September, 901 locations from 32 female scaled quail were obtained, which averaged a home range of 0.427 km<sup>2</sup>, being 0.138 km<sup>2</sup> the smallest and 0.984 km<sup>2</sup> the biggest. This research will continue recording data through 2015, in order to provide better understanding of scaled quail needs. Habitat improvement and better land management practices will be the final output needed to preserve this species.

#### **4:30: PROBABILITY OF BOBWHITE HABITAT USE IN RESPONSE TO OPERATIVE TEMPERATURE AND SOIL SURFACE TEMPERATURE**

**Monika L. Burchette**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Landen Gulick**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Fidel Hernández**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Eric D. Grahmann**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Abstract:** Northern bobwhites (*Colinus virginianus*) avoid sites with operative temperatures >40°C have, however, the influence of ground surface temperature on habitat use is unknown. Therefore we assessed the probability of northern bobwhite use of their thermal environment by measuring ground surface

temperature and black globe temperature in 5 plant communities at two study sites. Our objectives were to: (1) determine if ground surface temperature has a greater influence on habitat selection than black globe temperature, (2) determine if bird activities (i.e., am feeding, loafing, and pm feeding) is affected by either of these thermal factors, and (3) to determine if there is a difference in soil surface temperature and black globe temperature between birds with broods and birds that do not have broods. Our study area is located on the Hixon ranch in La Salle County, Texas. Sixty-four birds from the 109.3 ha restoration site and a 84.9 ha experimental control, were radio-collared and tracked 3 times per week from May–September 2013 and May–August 2014. Preliminary data analysis from 2013 suggests that probability of use by bobwhite is best determined by both community black globe temperature and soils surface temperature ( $P = 0.0016$ ), with bird activity being significantly related to ground surface temperatures ( $P = 0.0206$ ). Determining how these thermal factors effect probability of habitat selection in bobwhite can assist managers in providing thermally suitable habitat for quail in areas where habitat can be rendered seasonally unusable.

#### **4:45: WEATHER, TEMPERATURE, AND REALIZED NICHE SPACE FOR NORTHERN BOBWHITES AT THE WESTERN PERIPHERY OF THEIR RANGE**

**John M. Tomeček**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas, USA

**Brian L. Pierce**, Institute for Renewable Natural Resources, Texas A&M University, College Station, Texas, USA

**Kelly S. Reyna**, Department of Biological Sciences, University of North Texas, Denton, Texas, USA

**Markus J. Peterson**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas, USA

**Abstract:** Ecologists have long recognized the influence of weather on abundance and range extent of animal species. The northern bobwhite (*Colinus virginianus*) is an excellent model for exploring the ability of specific microclimates to serve as refuge against severe weather conditions. Abundance and range extent of this New World quail species are strongly influenced by weather parameters, but the ability of nesting structures to mitigate these factors in the semi-arid portions of bobwhite range is unknown. We conducted a mensurative field experiment in the Rolling Plains of Texas, a semi-arid ecosystem on the southwestern periphery of bobwhite range, to determine whether native bunch grasses apparently suitable for bobwhite nesting could sufficiently reduce *in situ* temperature below harmful levels for eggs. We compared temperature and relative humidity at 126 paired locations (63 random and 63 nesting), each with 2 sensors (~10 cm and ~60 cm above ground). Based on our results, we conclude that bobwhite nesting cover was significantly cooler than surrounding random points ( $P < 0.001$ ), thus providing adequate thermal refuge in the Rolling Plains by maintaining cooler, moister microclimates. Given that bobwhite eggs would otherwise experience potentially lethal temperatures without these thermal refugia, nesting vegetation is a critical component of bobwhite niche space in semi-arid regions. Many contemporary land uses, however, degrade or destroy bunch grasses and thus decrease realized niche space availability through time for bobwhites. Conservationists working with bobwhites and other species that require bunch grasses in semiarid regions should develop land management strategies that maximize the availability of these thermal refugia across space and time.

### **SESSION 2E: ENDANGERED SPECIES RESEARCH**

#### **3:30: INDIRECT EFFECTS OF RED IMPORTED FIRE ANTS ON ATTWATER'S PRAIRIE-CHICKEN BROOD SURVIVAL**

**Rebecca E. Chester**, Attwater Prairie Chicken National Wildlife Refuge, P.O. Box 519, Eagle Lake, TX

77434, USA

**Michael E. Morrow**, Attwater Prairie Chicken National Wildlife Refuge, P.O. Box 519, Eagle Lake, TX 77434, USA

**Sarah E. Lehnen**, U.S. Fish and Wildlife Service, 500 Gold Avenue SW, Room 4005, Albuquerque, NM 87102, USA

**Bastiaan M. Drees**, Texas A&M University Department of Entomology and AgriLife Extension, 318 Minnie Bell Heep, 2475 TAMU, College Station, TX 77843, USA

**J. E. Toepfer**, Society of Tympanuchus Cupido Pinnatus, Ltd., Ada, MN 56510, USA

**Abstract:** The endangered Attwater's prairie-chicken (APC, *Tympanuchus cupido attwateri*) has experienced a dramatic decline in numbers and distribution during the last century. Despite intensive management intervention, observations over the last two decades revealed total loss of a majority of wild broods <14 days post-hatch. Necropsy of dead chicks found with brood hens at night roosts attributed cause of death to inanition and dehydration. The importance of invertebrates as a food source for young prairie-chickens is well documented in the literature. From 2004–2012, 83% of 547 chicks confined with their brood hen immediately post-hatch and provided locally collected insects *ad libitum* survived the critical 2-week period post-hatch, confirming the importance of invertebrates for APC chicks. Red imported fire ants (RIFA, *Solenopsis invicta*) were introduced to the southern United States circa 1930, and are known to have detrimental impacts on a wide range of fauna, including the invertebrate community that serves as an essential food source for a large number of insectivorous species. RIFA invaded APC habitat circa 1970, and APC populations consistently declined to near extinction in the following 25 years. Our study evaluated invertebrate abundance as a factor limiting APC brood survival, and whether RIFA limit invertebrate numbers and biomass. From 2009–2013, we monitored survival of APC broods ( $n = 63$ ) with radio telemetry during the first 2 weeks post-hatch and collected daily invertebrate samples at brood sites. Broods located in areas with the highest median invertebrate count (338 invertebrates/25 sweeps) had a survival probability of 0.83 at 2 weeks post-hatch compared to 0.07 for broods located in areas with the lowest median invertebrate count (18 invertebrates/25 sweeps). During 2011–2012, we evaluated impacts of RIFA on invertebrates by suppressing RIFA in an impact-reference study design. Treated fields had 27% more individual invertebrates and 26% more invertebrate biomass than controls. Our results clearly document that invertebrate abundance is a limiting factor for Attwater's prairie-chicken chick survival and that RIFA suppress invertebrate abundance. We hypothesize that RIFA are likely contributing to declines of other insectivorous species within RIFA's acquired North American range.

### **3:45: COMPARISON STUDY OF STABLE ISOTOPE VALUES IN MUSEUM AND CONTEMPORARY FEATHERS FROM THE ENDANGERED ATTWATER'S PRAIRIE CHICKEN**

**Zaria Torres**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843, USA

**Miguel A. Mora**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843, USA

**Nova J. Silvy**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843, USA

**Ayumi Hyodo**, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX, 77843, USA

**Michael E. Morrow**, Attwater Prairie Chicken National Wildlife Refuge, United States Fish and Wildlife Service, Eagle Lake, TX 77434, USA

**Rebecca Chester**, Attwater Prairie Chicken National Wildlife Refuge, United States Fish and Wildlife Service, Eagle Lake, TX 77434, USA

**Abstract:** The Attwater's prairie chicken (APC; *Tympanuchus cupido attwateri*) was listed as an

endangered species in 1967 as a result of habitat loss caused by the clearing of prairie for agricultural fields, woody plant invasion, and urban development. Since the mid 1990s, the wild APC population has been supplemented with captive raised birds. Our goal for this study was to determine if museum feather (1894-1965) carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) stable isotope values are different from contemporary (2005-2013) APCs feathers taken from the Attwater Prairie Chicken National Wildlife Refuge (APCNWR). This will help illuminate any diet variation or deficiencies that may have contributed to the APC population decline. We found significant difference for museum feather  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values between their collection sites ( $P < 0.05$ ). No significant difference was found between males and females feathers from the museum samples ( $P > 0.05$ ). When comparing museum and contemporary feather  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values, we found no significant difference between  $\delta^{13}\text{C}$  values ( $P = 0.568$ ), however, our  $\delta^{15}\text{N}$  values showed a significant difference ( $P = 0.022$ ). We see a decrease in  $\delta^{15}\text{N}$  values when compared to historic and contemporary female APC feather samples. This shift is approximately one trophic level less than what the female historic APCs were assimilating in their diet compared to contemporary APC females. Therefore, our results suggest that contemporary females with their insufficient diet today compared to their past, may contribute to the high mortality of APC broods hatched in the wild.

#### **4:00: POST-FLEDGING HABITAT USE OF BLACK-CAPPED VIREOS**

**Marisa T. Martinez**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843, USA

**Abstract:** During the post-fledging period, fledglings must transition from parental care to self-sufficiency and cope with novel demands in their environment. Fledglings face a high risk of fatality and must depend on the availability of suitable post-fledging habitat for their survival. This is particularly the case for migratory songbirds, like the endangered black-capped vireo (*Vireo atricapilla*), as fledglings must forage sufficiently to accumulate fat reserves for migration. To better understand this pivotal life stage in the black-capped vireo I investigated the ecology and behavior of the vireo during the post-fledgling period by documenting habitat use and movement at the Balcones Canyonlands National Wildlife Refuge and surrounding private properties in central Texas during the 2013 and 2014 breeding seasons. My research objectives were to evaluate fledgling habitat use across multiple spatial scales, identify temporal changes in habitat use, and compare features between post-fledging and nesting habitat. I examined how fledglings respond to various landcovers by assessing their habitat use at a landscape scale (>100 ha) and local scale (0.04 ha circular plot) at sites with high, medium and low woodland cover. I used post-fledging season and post-fledging age as temporal scales to identify trends in habitat use at the two spatial scales. My results will uncover potential changes in habitat associations in fledgling vireos over space and time, which can help refine management practices to effectively meet the needs of the species during the critical post-fledging stage.

#### **4:15: LISTING DECISIONS UNDER THE ENDANGERED SPECIES ACT: SCIENCE, SALIENCE, AND SPECIAL INTERESTS**

**Kathryn N. Smith-Hicks**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843, USA

**Abstract:** Some of the most contentious aspects of the Endangered Species Act (ESA) debate surround the role of “best available science” as the sole indicator of whether or not a species should be listed as endangered or threatened. It would be preferable to have comprehensive information regarding population metrics and threats for all candidate species the U.S. Fish and Wildlife Service evaluates under the ESA. Unfortunately, the quantity and quality of science available for each species vary markedly. Listing decisions also attract varying amounts of attention from the public and interest groups, which may

also influence the science used and available. In order to improve our understanding of the implementation of ESA listing decisions, I collected decision rules published by the U.S. Fish and Wildlife Service in the Federal Register from September 2011 to October 2014. Of the 280 species decisions I collected, 151 were designated as endangered, 31 as threatened, 23 were declared warranted but precluded by higher priority species, and 75 were deemed not warranted for protection. Some of the rules included up to 38 individual species but most were single candidate decisions. Population information was unknown for many species and sometimes varied greatly (e.g., 2,500-1 million individuals). My analysis seeks to understand trends in how decisions are made when the “best science available” is exiguous or ambivalent.

#### **4:30: THE INFLUENCE OF TEMPERATURE ON BLACK-CAPPED VIREO HABITAT USE AND NEST SITE SELECTION**

**Ronnisha S. Holden**, Department of Wildlife & Fisheries Sciences, Institute of Renewable Natural Resources, Texas A&M University, College Station TX, 77840, USA

**Abstract:** Microclimate, specifically, temperature variability, is an abiotic factor we should consider when looking at habitat use that can influence some systems and organisms, more than others, and cause the areas they inhabit to be unusable. The black-capped vireo (*Vireo atricapilla*) is a federally endangered neotropical songbird that breeds in a region of the United States that is increasing in annual average temperature. I examined the effects of temperature on habitat use and nest site selection of the black-capped vireo in the southern part of its breeding range in central Texas. I used temperature data loggers to record hourly temperature readings at points across study areas during March–August for the 2013 and 2014 vireo breeding season. At each of these points and at other locations across the site I obtained vegetation measurements including; vegetation height, percent canopy cover and percent shrub cover. I then located and monitored territorial male vireos, on a 3–5 monitoring rotation, by recording GPS points at the location of each male every 2 minutes. I conducted nest searching and monitoring every 2–3 days to identify the contents of the nest and to determine the nest fate (i.e., nest failed or fledged). I will use the information gained from; temperature data loggers, vegetation measurements, male habitat use data and nest monitoring to determine if there is an influence of temperature on the habitat use and nest site selection of the black-capped vireo.

#### **4:45: HABITAT SUITABILITY MODEL FOR EASTERN BELL’S VIREO IN NORTHEAST TEXAS**

**Amanda Turley**, Department of Biological and Environmental Sciences, Texas A&M University-Commerce, Commerce Tx, 75429, USA

**Jeffery Kopachena**, Department of Biological and Environmental Sciences, Texas A&M University-Commerce, Commerce Tx, 75429, USA

**Abstract:** Bell’s vireo (*Vireo bellii*) is a shrubland bird species that has been listed as near endangered by the [International Union for the Conservation of Nature](#). Most research/conservation efforts have focused on the subspecies *Vireo bellii pulsilis* since it was listed as endangered in 1986. However, very little research has been done on the near endangered subspecies *Vireo bellii bellii*, whose habitat range includes parts of northeast Texas. This study focuses on the development of a habitat suitability model for *V. b. bellii*, using Geographic Information Systems and Maxent for spatial analysis of habitat variables. The identification of potential habitat and nesting sites for this species would allow for more focused conservation and habitat preservation efforts.

## **Saturday, 21 February 2015**

### **SESSION 3A: ECOLOGY AND MANAGEMENT OF MAMMALS**

#### **8:00: SEASONAL DIETS OF SABLE ANTELOPE AT MASON MOUNTAIN WILDLIFE MANAGEMENT AREA**

**Amanda C. Hargrave**, Wildlife Ecology Program, Texas State University–San Marcos, San Marcos, TX, 78666, USA

**Thomas R. Simpson**, Wildlife Ecology Program, Texas State University–San Marcos, San Marcos, TX, 78666, USA

**Floyd W. Weckerly**, Wildlife Ecology Program, Texas State University–San Marcos, San Marcos, TX, 78666, USA

**Dittmar Hahn**, Wildlife Ecology Program, Texas State University–San Marcos, San Marcos, TX, 78666, USA

**James Gallagher**, Mason Mountain Wildlife Management Area, Texas Parks and Wildlife Department, Mason, TX, 76856, USA

**Abstract:** Sable antelope (*Hippotragus niger*) are exotic ungulates native to Africa that have been stocked on several Texas ranches for hunting purposes. Basic ecological information from Texas about sable is lacking. Such information is necessary to appropriately manage sable populations and to assess the potential for competition with native wildlife. Our goal was to determine the seasonal food habits of a captive herd of 15 sable antelope at Mason Mountain Wildlife Management Area (MMWMA) using microhistological analysis and an emerging technique of DNA analysis. Forty samples were collected during summer 2013 with 20 samples collected in each of the remaining seasons. Annually, the bulk of the diet was comprised of little bluestem (*Schizachyrium scoparium*) and Texas wintergrass (*Stipa leucotricha*). Vegetational analyses were conducted simultaneously with the fecal collection. Herbaceous plants were sampled using the Daubenmire method. Woody plants were sampled using the line-intercept method. Plant use by sable antelope was compared with the availability of plants at MMWMA to determine if sable antelope were selectively foraging. During spring, summer, and fall little bluestem (*Schizachyrium scoparium*) was selected. During the summer, switchgrass (*Panicum virgatum*) also was selected. Sable antelope selected Texas wintergrass (*Stipa leucotricha*) during the winter. The majority of plants consumed by sable antelope were grasses. While sable antelope may not compete for food resources with browsers such as white-tailed deer (*Odocoileus virginianus*) and greater kudu (*Tragelaphus strepsiceros*), careful consideration should be made when stocking with other grazers such as domestic cattle (*Bos taurus*), gemsbok (*Oryx gazelle*), and scimitar-horned oryx (*Oryx dammah*).

#### **8:15: HOME RANGE ESTIMATES OF ROOSEVELT ELK IN REDWOOD NATIONAL PARK, CALIFORNIA**

**Nicholas R. Kolbe**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Floyd W. Weckerly**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** Few studies have been conducted evaluating seasonal and annual home range estimates of Roosevelt elk (*Cervus elaphus roosevelti*). Previous studies have used bivariate ellipses estimators to evaluate home range for Roosevelt elk. Global positioning system transmitters were placed on 4 female adult Roosevelt elk in the Bald Hills region of the Redwood National Park located in Humboldt County, California. Transmitters were placed on the animals in early 2003 and removed in early 2004. Locations were recorded every 6 hours for each animal for the duration of the year. Three of the 4 animals were located in the same group in the southern region of the Bald Hills and could not be considered independent observations. Thus, these 3 individuals were considered as one animal (animal A) when

calculating home range estimates. The fourth animal was located in the northern region of the Bald Hills and was considered different than the other (Animal B). Yearly and seasonal home range minimum convex polygon estimates (95%) were determined for both animals. Animal A's yearly home range estimate was approximately 3,194 ha and Animal B's yearly home range estimate was approximately 3,144 ha. Animal A's seasonal home range estimates ranged from 1,784 ha in the dry season to 3,342 ha in the start of the wet season. Animal B's seasonal home range estimates ranged from 569 ha in the breeding season to 3,137 ha during the dry season. Compared to previous studies, the largest home range estimate for a single elk within the Bald Hills is 1,410 ha. My findings suggest possible larger home range estimates for individual animals. Possible differences may be attributed to the use of minimum convex polygon estimators rather than the bivariate ellipses method.

### **8:30: BIRTH MASS SCALING IN ELK**

**Gayatri Bhaskar**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA  
**Floyd W. Weckerly**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** Scaling studies in ungulates have proven to be vital in understanding the physiological aspects of life history. The wide range in body mass of elk (*Cervus elaphus*) in North America and Europe allows robust estimation of scaling relationships. Our goal was to estimate the scaling relationship of elk by analyzing the mass of the dam on the day she gave birth and the birth mass of the offspring. Body mass of dams and birth mass of young were extracted from the literature. The data includes elk that were collected from a pen-setting where they were fed a rich in nutrients and readily digestible diet. The mass of the dam at birth and the birth mass of the young were recorded for eleven groups of mothers and offsprings. A simple linear regression was used to estimate an allometric relationship between dam mass and birth mass of offsprings ( $r^2 = 0.9035$ ) with birth mass scaling to 0.75 power. In proportion to body mass, larger dams gave birth to smaller young than did smaller dams. Our finding implies that the intraspecific scaling relationship has a scalar similar to that found for the interspecific relationship between body mass and birth mass.

### **8:45: WHERE THE PRONGHORN PLAY: PRONGHORN HABITAT SUITABILITY AND CONNECTIVITY IN THE TEXAS PANHANDLE**

**Nathan P. Duncan**, Department of Natural Resource Management, Texas Tech University, Lubbock, TX, 79409

**Samantha S. Kahl**, Department of Natural Resource Management, Texas Tech University, Lubbock, TX, 79409

**Shawn S. Gray**, Texas Parks and Wildlife Department, Alpine, TX, 79830.

**Abstract:** Habitat quality and connectivity are important factors that can greatly affect wildlife populations. Pronghorn (*Antilocapra americana*) habitat in the Texas Panhandle is highly fragmented due to the growth of human settlements and agricultural lands. To determine the quality and extent of pronghorn habitat as well as the habitat connectivity in the Texas Panhandle we used the Maxent and Circuitscape modeling environments. We determined the most pertinent environmental variables that may affect pronghorn habitat selection through a search of the peer-reviewed literature, and ranked environmental variables using input from experts familiar with pronghorn in Texas and the southwest US. We built a presence-only habitat suitability model in Maxent using GPS locations of pronghorn, collected via aerial surveys. We then used the habitat suitability model values as the primary input for modeling connectivity between delineated pronghorn herd units in Circuitscape while using road spatial data to predict possible barriers to pronghorn movement. These probabilistic models may serve as useful tools for pronghorn conservation primarily because they provide insight into what factors are most predictive of pronghorn presence, which areas are the most suitable for pronghorn, the routes pronghorn may use in

migration, and the effect roads may play in limiting connectivity. The models can serve as a reference for assessing pronghorn habitat suitability and use on the ground as well as serve as a framework for developing future projects assessing pronghorn movements in the Panhandle.

#### **9:00: MOVEMENTS OF TRANSLOCATED PRONGHORN IN TRANS-PECOS, TEXAS**

**Taylor O. Garrison**, Borderlands Research Institute for Natural Resource Management, Sul Ross State University, Box C-16, Alpine, TX 79832, USA

**Louis A. Harveson**, Borderlands Research Institute for Natural Resource Management, Sul Ross State University, Box C-16, Alpine, TX 79832, USA

**Ryan O'Shaughnessy**, Borderlands Research Institute for Natural Resource Management, Sul Ross State University, Box C-16, Alpine, TX 79832, USA

**Shawn S. Gray**, Texas Parks and Wildlife Department, 109 S. Cockrell, Alpine, TX 79830, USA

**Abstract:** Pronghorn (*Antilocapra americana*) are a unique ungulate only native to North America's grassland ecosystems. Once thought to number > 30 million in the 1880s, today pronghorn populations are approximated to be around 1 million throughout North America. Since the 1980s pronghorn populations in the Trans-Pecos have been steadily declining from an estimated 17,000 individuals to just 3,725 in 2014. To help curtail the decline, in 2011 TPWD and BRI translocated 200 pronghorn from the Texas Panhandle to the Trans-Pecos. Pronghorn were again translocated from the Panhandle in 2013 (130) to the Marathon Basin and in 2014 (102) to the Marfa Plateau to help in restoration of populations in the Trans-Pecos. To help study post-release movements of the translocated pronghorn, adults were collared with Global Positioning System (GPS) collars. The GPS collars were programmed to drop at 300 days post-release. Movements, dispersal, and home range were analyzed using Time Local Convex Hull (T-LoCoH) and ArcGIS. Program T-LoCoH uses a space-time characterization of utilization distributions in home range estimation. Program T-LoCoH has advantages over conventional kernel density (KDE) and minimum convex polygon (MCP) estimators because it connects locations based on time and space rather than computing a home range from the density of locations (Kernel Density Estimator) or drawing a boundary around all locations (Minimal Convex Polygon). Home ranges were averaged for each pronghorn for the entire study period (300 days). From this data we also estimated the home range of collared individuals during the fawning period (April–June) and breeding period (late August–September). In 2013, a total of 130 pronghorn was captured, 59 were equipped with GPS collars. In 2014, a total of 102 pronghorn was captured, 54 were equipped with GPS collars. From previous KDE and MCP estimates we expect the T-LoCoH data to show home range size to be larger in 2014 than in 2013 based on the smaller area of habitat in the Marathon Basin. We expect home range size to average >5,000 ha for 2013 and ≤5,000 ha for 2014. Also dispersion and home range sizes are hypothesized to be larger and more sporadic for both years in spring months (late gestation-pre fawning), when precipitation was low. Differences between males and females will be affected as there was a low sample size for both years (6 and 4, respectively for 2013 and 2014). Therefore, we will not compute much analysis between sexes. We have currently retrieved 29 of the 54 collars placed on pronghorn in the 2014 translocation. All collars will be retrieved and analyzed using T-LoCoH and ArcGIS by the end of December 2014.

#### **9:15: SURVIVAL OF TRANSLOCATED PRONGHORN IN TRANS-PECOS, TEXAS**

**Taylor O. Garrison**, Borderlands Research Institute for Natural Resource Management, Sul Ross State University, Box C-16, Alpine, TX 79832, USA

**Louis A. Harveson**, Borderlands Research Institute for Natural Resource Management, Sul Ross State University, Box C-16, Alpine, TX 79832, USA

**Ryan O'Shaughnessy**, Borderlands Research Institute for Natural Resource Management, Sul Ross State University, Box C-16, Alpine, TX 79832, USA

**Shawn S. Gray**, Texas Parks and Wildlife Department, 109 S. Cockrell, Alpine, TX 79830, USA

**Abstract:** Pronghorn (*Antilocapra americana*) are a native ungulate native to North America's grasslands. Once thought to number > 30 million in the 1880s, today pronghorn populations are approximated to be around 1 million throughout North America. Since the 1980s, populations in Texas have been steadily declining, especially in the Trans-Pecos. Today, the Trans-Pecos contains around 3,000 pronghorn which poses an imminent problem continuing to be resolved. Pronghorn were translocated from the Panhandle to the Trans-Pecos in 2011 to combat the alarmingly low population. Pronghorn were again translocated from the Panhandle in 2013 to the Marathon Basin and 2014 to the Marfa Plateau to help in restoration of these two important areas of historical pronghorn habitat and in studying movements and survival post release. Adult pronghorn were collared with Global Positioning System (GPS) collars and fawns were collared with Expandable VHF collars (VHF) for monitoring fawn survival. The GPS collars were programmed to drop at 300 days post-release. Survival was estimated by using program Mark<sup>®</sup> using the Kaplan-Meier method. In 2013, a total of 130 pronghorn was captured, 59 were equipped with GPS collars. No fawns were collared with VHF in this year. In 2014, a total of 102 pronghorn was captured, 54 were equipped with GPS collars and 13 fawns were equipped with the expandable VHF collars. Survival rates for GPS collared pronghorn were 76.27 % and 66.13 %, respectively for 2013 and 2014. Fawn survival for 2014 was 92.3%. Causes of mortality for 2013 were capture myopathy (38.5%), predation (30.8%), lightning strike (7.7%), and unknown (25.0%). Causes of mortality for 2014 were capture myopathy (14.3%), predation (33.3%), vehicle collision (4.8%), and unknown (47.6%). There was more precipitation recorded in 2013 and a larger amount of predator control in place alleviating pronghorn survival. In 2014, predator control was enacted but not at desired levels. Also, precipitation in 2014 was scarce until late-June, which could have caused lack of nutrition for females that were fawning or still in gestation. Higher amounts of predation in 2014 are likely due to lower nutrition from lack of rainfall and capture myopathy effects causing them more vulnerable to predation.

### **Session 3B: ECOLOGY AND MANAGEMENT OF WILDLIFE**

#### **8:00: MAXIMUM ENTROPY HABITAT SUITABILITY MODEL FOR CONSERVATION MANAGEMENT OF THE TEXAS TORTOISE, DEFINING ITS STATUS IN THE COASTAL PRAIRIES AND EASTERN RANGE**

**Anjana Parandhaman**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**Shawn F. McCracken**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**Michael R. J. Forstner**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** The Texas tortoise (*Gopherus berlandieri*) is a threatened species in Texas and strict conservation action is required to ensure that population loss does not occur. The historical range of the Texas tortoise includes a much larger area than observations from the last 30 years suggest. This is particularly true when examining the eastern portion of the tortoise's historical range. Road surveys were conducted in the poorly known eastern range of the Texas tortoise, from March–October 2014, to obtain observation points for habitat suitability modeling. A maximum entropy algorithm implemented in Maxent software (v 3.3.3k) was used to model suitable habitat based on state-wide environmental data layers known to influence the presence of the Texas tortoise, presence data obtained through our surveys, and location data obtained from natural history museums and online observation databases. The model indicates areas of high suitability in South Texas, with varying degrees of suitability in the counties to the north and east. Furthermore, there are areas of suitability that extend beyond the historic range. Assessing the current habitat suitability of the eastern historical range shows that this region still supports

the species, but the population status remains unknown. This model will aid in conservation and management planning; specifically, in the delineation of areas where active management of the Texas tortoise should be implemented.

### **8:15: DOES MICROCLIMATE EXPLAIN REGIONAL VARIATION IN LESSER PRAIRIE-CHICKEN NEST SURVIVAL?**

**Alixandra J. Godar**, Department of Natural Resources Management, Texas Tech University, Lubbock, Texas 79410

**Blake A. Grisham**, Department of Natural Resources Management, Texas Tech University, Lubbock, Texas 79410

**Clint W. Boal**, U.S. Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, Texas 79410

**David A. Haukos**, U.S. Geological Survey, Kansas Cooperative Fish and Wildlife Research Unit, Kansas State University, Manhattan, Kansas 66506

**Abstract:** The range of the lesser prairie-chicken (*Tympanuchus pallidicinctus*; LEPC) exists along diverse longitudinal precipitation and latitudinal temperature gradients. Ambient temperature and humidity are factors known to influence LEPC nest survival in sand shinnery oak (*Quercus havardii*) prairies. However, this data are lacking across the distribution of the species and may explain regional variation in nest survival. To address this question, we placed data loggers within and adjacent to nests to record temperature and humidity at 10-minute intervals in three ecoregions, 2010–2014. We developed a suite of *a priori* models using the nest survival model in Program MARK to estimate the probability of nest survival during incubation. We hypothesized nest survival will be influenced more by environmental conditions in sand shinnery oak prairie compared to the other ecoregions. We monitored 26 nests in sand shinnery oak prairie, 30 in short-grass/CRP prairie and 49 in mixed-grass prairie ecosystems and our results indicated model selection uncertainty among our *a priori* candidate models. In general, nest survival increased as relative humidity increased and our preliminary results supported our hypothesis that nests in sand shinnery oak prairies were more susceptible to environmental conditions during incubation, and subsequently may explain regional variation in nest survival for the species.

### **8:30: A RANGE-WIDE ASSESSMENT ON THE INFLUENCE OF WEATHER ON LESSER PRAIRIE-CHICKEN DEMOGRAPHIC PARAMETERS**

**Cody P. Griffin**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Alixandra J. Godar**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Blake A. Grisham**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Clint W. Boal**, U.S. Geological Survey Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, TX, 79409, USA

**David A. Haukos**, U.S. Geological Survey Kansas Cooperative Fish and Wildlife Research Unit, Kansas State University, Manhattan, KS, 66506, USA

**Jim C. Pitman**, Kansas Department of Wildlife, Parks, and Tourism, Emporia, KS, 66801, USA

**Christian A. Hagen**, Department of Fisheries and Wildlife, Oregon State University, Bend, OR, 97702, USA

**Abstract:** Lesser prairie-chicken (*Tympanuchus pallidicinctus*) populations in the sand shinnery oak (SSOP) and sand sagebrush prairie (SSBP) ecoregions are found along a climate gradient in the southern Great Plains. Environmental conditions in the SSOP, located on the Southern High Plains of New Mexico

and Texas, are warmer and dryer compared to the SSBP, located along the Arkansas River in Kansas. Precipitation and temperature influence nest and female lesser prairie-chicken survival in the sand shinnery oak prairie (SSOP), but the relative influence of environmental conditions on survival is unknown in the sand sagebrush prairie (SSBP). To assess the role of environmental conditions on nest and female survival, we collected demographic data in 2007–2012 in the SSOP and requested data collected from 1997–2002 in the SSBP. We used known-fate and nest survival models to assess the effect size of biologically relevant environmental variables on adult female and nest survival, respectively, for each ecoregion. Temperature during incubation had the greatest effect on female survival in the SSOP ( $\beta_{SmrTemp} = -0.08$ ) and SSBP ( $\beta_{Cold} = -0.12$ ;  $\beta_{Hot} = -0.03$ ). However, the effect sizes of environmental variables for nest survival in the SSBP were much smaller (10 thousandths and 100 thousandths decimal places) compared to the SSOP (tens and hundredths decimal places). Our results suggest environmental conditions influenced nest survival more than female survival, and environmental variables disproportionately influenced nest survival in the SSOP. These preliminary data corroborate our earlier findings that suggest environmental variables are a contributing factor that influence lesser prairie-chickens population dynamics on the Southern High Plains.

#### **8:45: MICRO-SITING METHOD FOR OIL AND GAS DEVELOPMENT WITHIN NORTHEASTERN TEXAS PANHANDLE POPULATIONS OF LESSER PRAIRIE-CHICKEN**

**Amanda Miller**, Tetra Tech Inc., 4000 N. Big Spring, Suite 401, Midland, TX 79705, USA  
**Kristina Dick**, Tetra Tech Inc., 1750 SW Harbor Way, Suite 300, Portland, OR 97201, USA  
**Karl Kosciuch**, Tetra Tech Inc., 1750 SW Harbor Way, Suite 300, Portland, OR 97201, USA  
**Jimmy Huddleston**, Tetra Tech Inc., 4000 N. Big Spring, Suite 401, Midland, TX 79705, USA

**Abstract:** Due to the federal listing of the lesser prairie-chicken (*Tympanuchus pallidicinctus*) as a threatened species, several petroleum producers entered into range-wide voluntary conservation plans administered by the Western Association of Fish and Wildlife Agencies (WAFWA). In exchange for compliance with avoidance, minimization and mitigation measures during development and production, the producers are provided protection from prosecution on enrolled holdings. The mitigation measure is calculated using total impacted acreage, location within Crucial Habitat Analysis Tool (CHAT) categories, and economic-based multipliers. Although scientifically sound based on the ecology of lesser prairie-chicken, the mitigation fee process has limitations given the dynamic nature of development. We present a micro-siting method, coupling field surveys, remote sensing, and geospatial information system (GIS) analysis, to determine placement of surface developments to reduce overall habitat loss to lesser prairie-chicken. When producers identify a parcel of land having potential surface development, we complete field surveys and remote sensing analysis identifying existing impacts and habitat quality not previously identified. A GIS analysis is then performed to identify where the new surface locations may be moved within the parcel resulting in a reduction of overall new impacts. The micro-siting method has potential for reduction of overall impacts to lesser prairie-chicken habitat, limiting impacts within high quality habitat and focusing development into low quality areas. Because of cooperation between producers and WAFWA within the voluntary conservation plans, all results of micro-siting are submitted to WAFWA and are available for use in future development by other producers, adding to conservation benefits.

#### **9:00: PARASITOLOGICAL SURVEY OF SCALED QUAIL FROM WEST TEXAS**

**Kelsey A. Bedford**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA  
**Alan M. Fedynich**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA  
**Dale Rollins**, Rolling Plains Quail Research Foundation, Roby, TX 79543, USA

**Fidel Hernández**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Abstract:** The scaled quail (*Callipepla squamata*) has experienced a long-term decline throughout its range. Though studies have focused on habitat restoration and predator-prey relationships, little research has been conducted on the role of helminths (internal parasites) on quail populations. Our objectives are to: (1) document the helminth species infecting scaled quail in west Texas, (2) determine helminth prevalence, intensity, and abundance, and (3) relate prevalence and abundance of common helminths (occurring in  $\geq 25\%$  prevalence) to host age, host sex, body mass, year of collection, and precipitation. Twenty-eight and 95 scaled quail were donated by hunters in west Texas during the 2012–2013 and 2013–2014 hunting seasons, respectively. Seven helminth species were found and 3 (all nematodes) occurred in  $\geq 25\%$  prevalence: the cecal worm (*Aulonocephalus pennula*, 98%), the eye worm (*Oxyspirura petrowi*, 48%), and the gizzard worm (*Procyrnea pileata*, 25%). Using a negative binomial distribution regression model, results showed that overall the eye worm abundance was greater in adults than juveniles ( $P = 0.011$ ) and increased in juveniles by year ( $P = 0.044$ ). The eye worm abundance had a direct relationship with precipitation ( $P = 0.038$ ) and weight ( $P = 0.067$ ). During the 2013–2014 hunting season, the eye worm abundance was the highest ( $P < 0.001$ ) and differed among the ages ( $P = 0.017$ ). The cecal worm abundance decreased as precipitation decreased during the 2013–2014 hunting season ( $P < 0.001$ ). Our research provides information about helminth communities in scaled quail which will help biologists better manage quail populations.

#### **9:15: SEASONAL DIETS OF THE COLLARED PECCARY IN THE LLANO UPLIFT ECOLOGICAL REGION, TEXAS**

**Meredith Hominick**, Wildlife Ecology Program, Department of Biology, Texas State University, San Marcos, TX 78666, USA

**Thomas R. Simpson**, Wildlife Ecology Program, Department of Biology, Texas State University, San Marcos, TX 78666, USA

**M. Clay Green**, Wildlife Ecology Program, Department of Biology, Texas State University, San Marcos, TX 78666, USA

**James F. Gallagher**, Mason Mountain Wildlife Management Area, Texas Parks and Wildlife Department, Mason, TX, 76856, USA

**Abstract:** We investigated the seasonal diets of the collared peccary (*Pecari tajacu*) at Mason Mountain Wildlife Management Area from June 2013 to April 2014 using microhistological analysis of fecal material. Eighty fecal samples were collected from summer 2013 to spring 2014. We identified and quantified 36 plant species consumed by the collared peccary. Prickly pear was consumed in all seasons with seasonal use of forbs, grasses and mast. Annually, the bulk of the diet was comprised of cactus 27.35%, browse 9.75%, forbs 32.75%, grasses 7.75% and mast 22.4%. Cactus species included prickly pear (*Opuntia* spp.), browse species included live oak/blackjack/post oak (*Quercus* spp.). Forbs, especially silver bladderpod (*Lesquerella argyrea*) and prickly fanpetals (*Sida spinosa*), were highly utilized as well. Vegetative surveys were conducted using the Daubenmire method to sample herbaceous species and line intercept method to sample woody species. Results of log-likelihood chi-square tests with Bonferroni corrected confidence intervals established that there were statistically significant differences between plant use and availability ( $P < 0.001$ ). Additionally, Manly's alpha preference indices indicated that collared peccaries foraged selectively on silver bladderpod in spring. Prickly pear was a selected food plant in the summer. Peccaries selectively foraged on live oak/blackjack/post oak and prickly pear in the fall and selected prickly fanpetals during winter.

### **Session 3C: ECOLOGY & CONSERVATION OF BIRDS**

#### **8:00: (UN) NATURAL HISTORY: WHAT GENETICS IS NOT TELLING US ABOUT NORTHERN BOBWHITES**

**Jeffrey G. Whitt**, UNT Quail, University of North Texas, Denton, TX, 76203, USA

**Kelly S. Reyna**, UNT Quail, University of North Texas, Denton, TX, 76203, USA

**Abstract:** The northern bobwhite (*Colinus virginianus*) population decline has prompted several studies of bobwhite population genetics. Despite geographically isolated bobwhite populations and a low dispersal distance, these studies have revealed little evidence for a strong geographic component to genetic structure. Within population genetic diversity relative to between population genetic diversity is higher than expected, a finding consistent with significant gene flow between populations. However, strong circumstantial evidence exists that this gene flow is due in part to human activity as millions of wild bobwhites have been transported from one population to another and millions of pen-reared birds have been, and continue to be, released every year across the bobwhite's range. While the survival rate for individual transplanted and pen-reared birds is low, these unnatural movements of bobwhites are in sufficient quantity to potentially alter the natural evolution of bobwhites and to mask genetic effects of habitat fragmentation.

#### **8:15: BREEDING BIRD COMMUNITY AND HABITAT ASSOCIATIONS IN BOTTOMLAND HARDWOOD FORESTS OF EAST TEXAS**

**Meredith P. Wilson**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches TX 75962, USA

**Christopher E. Comer**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches TX 75962, USA

**Warren C. Conway**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX 79409, USA

**Christopher Farrell**, Texas Parks and Wildlife Department, Old Sabine Bottom Wildlife Management Area, Lindale TX 75771, USA

**Scott Bosworth**, Texas Parks and Wildlife Department, Old Sabine Bottom Wildlife Management Area, Lindale TX 75771, USA

**Abstract:** Bottomland hardwood forests in east Texas support a diverse assemblage of breeding songbirds, including many species experiencing population declines. Since songbird abundance and diversity are influenced by vegetation heterogeneity, identifying key habitat variables that drive these patterns is imperative for developing specific management prescriptions for these species. In 2013 and 2014, we used distance sampling point count surveys to estimate bird abundances at the Old Sabine Bottom Wildlife Management Area (Smith County, Texas), one of the few remaining mature bottomland hardwood forest tracts in east Texas. Using Canonical Correspondence Analysis (CCA) ordination, we examined relationships among 24 bird species and 17 structural forest characteristics. Preliminary CCA results indicate the most important forest characteristics affecting bird community composition were overstory basal area (m<sup>2</sup>/ha) and height (m), new seedling density (height < 2.5cm), midstory and vine cover. These features appear important in discriminating breeding bird habitat associations in east Texas bottomland hardwood forests.

#### **8:30: DAILY TEMPORAL VARIATION IN WHITE-TIPPED-DOVE CALLING ACTIVITY**

**Cullom S. Simpson**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State

University, Box T-0050, Stephenville, TX 76401, USA

**Thomas A. Enright**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Box T-0050, Stephenville, TX 76401, USA

**Thomas W. Schwertner**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Box T-0050, Stephenville, TX 76401, USA

**Jeff B. Breeden**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Box T-0050, Stephenville, TX 76401, USA

**Abstract:** White-tipped doves (*Leptotila verreauxi*) are an elusive, ground-dwelling, resident of South Texas. Call counts are commonly used to estimate abundance of birds, however little is understood how effective they are with white-tipped doves. Previous studies examining avian calling behavior employed observer-based methods. Yet, recently, automated recording devices have been demonstrated as an effective means to analyze calling activity. Our objective was to assess the daily temporal variation in white-tipped dove calling behavior using automated recording devices. This information establishes a foundation for abundance estimation and provides a gateway for the development of an effective annual survey for Texas Parks and Wildlife Department. Three automated recording devices (SongMeters) were placed in habitats of known occupancy and programmed to record calling activity between 0400 and 2200 hours. This was replicated in 3 regions across the Lower Rio Grande Valley of Texas. SongMeters were moved between alternate sites every 7 days from 9 May to 17 July 2014. Recordings were downloaded following each 7 day period and SongScope used to identify individual calls and their associated time stamp. Peak calling activity for white-tipped doves occurred between 0630 and 0730 hours. A minor evening peak occurred between the hours of 1830 and 1930 hours. No difference in calling activity was detected over the months of May, June, and July ( $F_{2,56} = 1.003$ ,  $P = 0.373$ ). These results guide survey design, maximizing detection probability, and contribute to the development of a targeted monitoring program for white-tipped doves by Texas Parks and Wildlife Department.

#### **8:45: TRANSMITTER INFLUENCES ON RAPTOR AGILITY AND PREY CAPTURE**

**Rebecca Perkins**, Department of Natural Resources Management, Texas Tech University, Box 42125, Lubbock, TX, 79409, USA.

**Clint Boal**, U. S. Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Lubbock, TX, 79409, USA.

**Abstract:** Remote sensing technology (i.e., VHF radios, GPS transponders, etc.) has become an important tool in wildlife research. These tools, however useful, require that an animal carry a foreign structure on its body for a period of time. In the case of predatory volant species, the weight, shape, and attachment method of the transmitters must be managed so as to not interfere with hunting activities. We conducted flight trials to measure the influence of transmitter weight loading on flight parameters of a trained red-tailed hawk (*Buteo jamaicensis*) fitted with transmitter loadings of 0.3, 2.5, and 5% body weight. Our sample size was limited and we observed no significant difference in the red-tailed hawk's flight speed, wing beat frequency, or flight height. We did, however, note that the red-tailed hawk's mean speed was fastest, wingbeat frequency lowest, and flight height highest when not fitted with the transmitter or transmitter harness. We are currently collecting additional data with other raptors and also assessing in-flight turning performance. To further investigate the impacts of transmitters on raptor predatory behavior we used nest cameras to record prey deliveries at Swainson's hawk (*Buteo swainsoni*) nests in Potter and Carson counties near Amarillo, Texas. We monitored 3 nests in which 1 adult was fitted with a PTT transmitter, and 3 nests in which neither adult was fitted with a transmitter. Following analysis of video footage, we will present our findings regarding parental provisioning rates and diversity of prey species in respect to radioed and non-radioed parents.

## **9:00: PREDICTING SONGBIRD ABUNDANCE AND HABITAT USE USING A FIRE SEVERITY INDEX**

**Kristin P. Davis**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843, USA

**Abstract:** Fire dynamics across Texas have changed drastically due to decades of fire suppression and an increasingly growing urban/wild-land interface. In 2011 alone, over 16 million hectares of land burned in wildfires in Texas. Despite the loss of wildlife habitat due to these fires, few standardized predictive models exist in Texas associating wildlife responses to burn severity. Understanding effects of fire on wildlife is critical in predicting and mitigating wildfire impact and optimizing the efficacy of species'-targeted land management. This response, however, varies and often requires intensive monitoring efforts. Using a model to make accurate predictions about species' response post-fire may save land managers money and time spent on costly monitoring efforts. I will investigate whether a fire severity index used extensively in western states to quantify burn severity, the delta Normalized Burn Ratio (dNBR), can accurately predict songbird abundance and habitat use post-fire in east Texas. The dNBR will classify fire severity in unburned (control) and burned areas and, based on those severity predictions, infer songbird abundance and habitat use. The model also will be ground-truthed to determine the accuracy of fire severity classifications. The results of this project may provide a unique picture of multi-species' response to burn severity.

## **9:15: EFFECTS OF LANDSCAPE CHARACTERISTICS ON NESTING ECOLOGY OF CAVITY-NESTING BIRDS**

**Sara E. Harrod**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA  
**M. Clay Green**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA  
**Floyd. B. Weckerly**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA  
**Thomas R. Simpson**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** We studied the effects of landscape characteristics on nesting success and nest site selection of native cavity-nesting birds at the Freeman Center, San Marcos, Texas from 2013 to 2014. 40 nest boxes were installed in 2013 and an additional 20 boxes were installed in 2014. Nest checks were conducted twice weekly from February to July of each year. Landscape analyses were conducted using ArcGIS and FRAGSTATS and habitat measurements were collected on site to examine the landscape characteristics surrounding each box. We used the Mayfield Method to estimate nest success of each nesting pair. For each year, Principal Components Analyses (PCA) were conducted to assess characteristics of each nest box, and Canonical Correspondence Analyses (CCA) were conducted to assess relationships between habitat features surrounding nest sites and species nesting success. Four species used the nest boxes in 2013, followed by six in 2014. In 2013, eastern bluebirds (*Sialia sialis*) (15% occupancy) and ash-throated flycatchers (*Myiarchus cinerascens*) (5% occupancy) were most successful in grassland and shrubland habitats, respectively. Bewick's wrens (*Thryomanes bewickii*) (77.5% occupancy) were generalists; their nesting success showed no association for any habitat variable. Sites of black-crested titmice (*Baeolophus atricristatus*) (12.5% occupancy) nests were associated with areas of little herbaceous or woody horizontal vegetative cover while no difference in landscape characteristics were found between successful and failed nests. In 2014, bluebird (20% occupancy) success and failure were associated with large grassland patches. Flycatcher (11.7% occupancy) success was not associated with any measured habitat variables, while failure occurred in sites with large shrubland patches. Titmouse (38.3% occupancy) success and failure were not correlated with any measured habitat variables, while wren (71.7% occupancy) success was most likely to occur in sites with large woodland patches. To maximize nesting success, wildlife managers utilizing nest boxes to manage for a given species should consider not only habitat types but patch characteristics such as density and area when considering where

to erect nest boxes.

### **SESSION 3D: VEGETATION RESEARCH AND MANAGEMENT**

#### **8:00: EFFECTS OF NON-NATIVE INVASIVE GRASSES ON THE NATIVE SEED BANK IN SOUTH TEXAS**

**Matthew N. Wojda**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Fidel Hernández**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Eric D. Grahmann**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Mike Hehman**, Hixon Ranch, Cotulla, TX 78014, USA

**Forrest Smith**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Abstract:** Many previous attempts at restoring northern bobwhite (*Colinus virginianus*) habitat in landscapes dominated by buffelgrass (*Pennisetum ciliare*) and old world bluestems (*Dicanthium annulatum*, *Bothriochloa ischaemum* var. *songarica*) have been unsuccessful. Presence of native seeds in the soil seed bank should aid in restoration efforts; however, long-term dominance of non-native invasive grasses is predicted to result in a soil seed bank dominated by non-native invasive grasses. Currently, we are attempting a large scale habitat restoration in South Texas that is dominated by these non-native, invasive species. Our objective is to determine the plant species composition of the soil seed bank. Soil was sampled beginning in February 2014 using a novel method for separating two different layers of soil for the detection of seeds. These seeds were identified using the seedling emergence method. We used multidimensional scaling to ordinate above and below ground communities. Above ground species composition was 84% non-native, invasive species whereas the below ground seed bank composition was 14% non-native, invasive species. The seed bank was dominated by native forbs including annual lazy daisy (*Aphanostephus ramosissimus*) and Jamaican nama (*Nama jamaicense*). The soil seed bank contained 13 different plant species that are considered important as bobwhite quail food. Taking into account presence of native plant seeds in the seed bank may aid in restoring native vegetation.

#### **8:15: WILDLIFE CENTER, TEXAS, USA**

**Drew A. White**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX 76401, USA

**Jeffrey B. Breeden**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX 76401, USA

**Roger D. Wittie**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX 76401, USA

**James P. Muir**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX 76401, USA

**Abstract:** Fossil Rim Wildlife Center, a non-profit captive breeding facility for threatened and

endangered species, is committed to sustainable habitat management, research, and conservation. By understanding monthly herbaceous standing biomass, species composition, and forage nutritional value Fossil Rim Wildlife Center can make optimal management decisions for both ungulates and native pasture lands. Our objectives were to determine herbaceous forage availability and nutrient value so that optimal timing and quantity of supplemental feed can be predicted. Random points and enclosure plots were established, sampling 8 soil types across 168 ha. Soil types varied in available water holding capacity (2 low, 4 medium, and 2 high) capturing the range found within the pasture. Two soil types of equal available water holding capacity were selected to determine difference between native vegetation and established improved pasture of coastal Bermuda grass (*Cynodon dactylon*). Daubenmire frames were used monthly to estimate percent cover, species composition, evidence of grazing, and clip vegetation. Vegetation samples were dried, weighed, grouped by season and analyzed to quantify phosphorous, crude protein, acid detergent fiber, acid detergent lignin, and neutral detergent fiber concentrations. Collected data were analyzed for variability between vegetation types, soil types, and seasonal variation. Our research will facilitate an enhanced understanding of biomass production and nutritional value for both native and improved pasture. With this knowledge managers can make informed decisions on the quantity and timing of supplemental nutrition to promote reproductive success, maintain healthy body condition, and decrease pressure on the landscape.

### **8:30: IMPROVING ESTABLISHMENT OF MAST-PRODUCING SPECIES IN THE TEXAS BLACKLAND PRAIRIE**

**Luke Oliver**, Arthur Temple College of Forestry & Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Jeremy Stovall**, Arthur Temple College of Forestry & Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Chris Comer**, Arthur Temple College of Forestry & Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Hans Williams**, Arthur Temple College of Forestry & Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Matt Symmank**, Texas Parks and Wildlife Department, Streetman, TX 75859, USA

**Abstract:** High-grading in the early 20<sup>th</sup> century removed oaks and hickories from the bottomland hardwood forests in the Texas Blackland Prairie ecoregion. This ecoregion lies at the ecotone of temperate deciduous forests and xeric woodlands. These species were replaced by shade tolerant species, mainly cedar elm (*Ulmus crassifolia*), green ash (*Fraxinus pennsylvanica*), and sugarberry (*Celtis laevigata*). Typical survival of hardwood seedlings planted beneath existing canopies is low (<20%) based on preliminary studies at Richland Creek Wildlife Management Area (RCWMA) in Freestone County. The combination of winter flooding, summer drought, and vertic soils creates challenging edaphic conditions. To improve our understanding of establishment silvicultural practices, a split plot experimental design was installed on three sites at RCWMA. The whole plot treatment was a two-by-two factorial of mulching and herbicide application. Mulching reduced overstory basal area by 50% in February 2014. Herbicide was a spot release application of glyphosate applied in June 2014 to control herbaceous weeds. Tree species was the subplot, with bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), and pecan (*Carya illinoensis*) seedlings planted in March 2014. Extensive uprooting by hogs shortly after planting resulted >80% mortality of pecan on two sites. Predation was less problematic for the oaks. One year survival and growth data will be presented describing the efficacy of different levels of overstory retention and understory competition control on the restoration of hard-mast producing species in this region. A second experimental design planted in winter 2014-15 spanning four sites in the region will also be described.

### **8:45: SLENDER RUSH-PEA MORPHOLOGY AND COMMUNITY RESPONSES TO**

## COMPETITION REMOVAL

**Ashley C. McCloughan**, Caesar Kleberg Wildlife Research Institute and Department of Animal, Rangeland and Wildlife Sciences, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Sandra Rideout-Hanzak**, Caesar Kleberg Wildlife Research Institute and Department of Animal, Rangeland and Wildlife Sciences, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute and Department of Animal, Rangeland and Wildlife Sciences, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Abstract:** Over the past century the south Texas coastal plains have undergone extensive modification through agriculture and invasion of non-native grasses, leading to degradation of native plant communities. Slender rush-pea (*Hoffmannseggia tenella*), an endemic, herbaceous legume, was classified as endangered in 1985. To better understand effects of non-native grasses on slender rush-pea, we studied morphological and microsite community responses of slender rush-pea to various forms of neighboring plant removal (i.e., mechanical, chemical, fire, and control); in the burning treatment target slender rush-pea plants were also burned. All active treatment plants had more main stems than control treatment plants ( $P < 0.03$ ). Burn plants had longer stems than all other treatments ( $P < 0.01$ ). However, control plants had longer stems than either chemical or mechanical treatments ( $P < 0.06$ ). When flower production is high, herbicide plants had more flowers than other plants ( $P < 0.01$ ). Mortality, number of leaves, and number of fruit pods were not affected. For the microsite community assessment we identified all plants within a 1 m diameter circle around either a target slender rush-pea burn plant, a control plant, or a non-burned random point, and we measured their distances from the plant or point. One year post-burning, we found 42 plant species present, with 33 occurring in control plant microsites, 24 in burned plant microsites, and 28 in non-burned random point microsites. Richness around burned plants may rise in the future as fire effects become apparent. Further analyses were conducted to assess diversity and similarity among these sites.

## 9:00: INFLUENCES OF VEGETATION TYPE ON GRASSLAND NEST PREDATORS

**Helen T. Davis**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843, USA

**Abstract:** Predation is the primary cause of nesting failure in birds. Alterations to predator assemblages and predation rates can have significant influences on bird populations. Anthropogenic influences on landscapes can also alter predator communities and indirectly effect nesting birds. Therefore, understanding predation is paramount to conserving birds and mitigating population declines. Even though numerous studies have examined the direct effects of landscape change on nesting success, few have studied the influences of this change on the relationships between predators, vegetation type, and nesting birds. I will present results for several datasets examining vegetation changes and the effects on predator assemblages and grassland bird nesting success. Additionally, I will offer suggestions for future study of the influences of changing vegetation on predator assemblages and predation rates of grassland nesting birds.

## 9:15: INVERTEBRATE AND SEED BANK POTENTIAL OF MOIST SOIL MANAGEMENT UNITS IN WEST TEXAS AND THE LOWER RIO GRANDE VALLEY

**Ryan S. Anthony**, Borderlands Research Institute, Sul Ross State University- Alpine, Alpine, TX, 79830, USA

**Ryan O'Shaughnessy**, Borderlands Research Institute, Sul Ross State University- Alpine, Alpine, TX, 79830, USA

**Louis A. Harveson**, Borderlands Research Institute, Sul Ross State University- Alpine, Alpine, TX,

79830, USA

**Dan P. Collins**, Borderlands Research Institute, Sul Ross State University- Alpine, Alpine, TX, 79830, USA

**Ryan S. Luna**, Borderlands Research Institute, Sul Ross State University- Alpine, Alpine, TX, 79830, USA

**Abstract:** Moist soil impoundments in the Southwestern US provide food resources to waterfowl, shorebirds and other wildlife. Waterfowl and shorebirds consume seeds and invertebrates to meet the nutritional needs of migration and molting in the Southwest. We created moist and wet conditions in soil core samples collected from wetland units to determine the plant species germinating under those treatments. We conducted water column and benthic core samples to monitor invertebrate biomass and diversity. Our research will assist wetland biologists to make informed decisions in managing wetlands in Texas and New Mexico.

### **Session 3E: MANAGEMENT OF WATER RESOURCES**

#### **8:00: VEGETATION CLASSIFICATION WITH UNMANNED AERIAL SYSTEM TO SUPPORT MANAGEMENT AND CONSERVATION EFFORTS OF A CONSTRUCTED WETLAND**

**Kristina M. Tolman**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Kristy A. Kollaus**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Thomas C. Heard**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**John H. Fletcher**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Matthew Symmank**, Texas Parks and Wildlife Department, 1670 FM 488, Streetman, Texas 75859, USA

**Michael C. Frisbie**, Texas Parks and Wildlife Department, San Marcos, Texas, 78666, USA

**Thomas B. Hardy**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Abstract:** Wetlands are invaluable natural resources that provide vital ecological processes such as improving water quality and providing habitat for various species. With the rapid decline of natural wetlands, constructed wetlands have become an increasingly popular means for enhancing water quality while supporting wildlife habitat. Located near Palestine, Texas, the 14,238 acre Richland Creek Wildlife Management Area includes a large constructed wetland that covers approximately 9 km<sup>2</sup> (2,221 acres) and contains an interconnected system of 5 sediment basins and 20 inundated cells. The wetland system receives nutrient-rich water from the Trinity River. As the water flows through the wetland cells, the clay substrate and vegetation within the cells absorb nutrients, such as phosphorous, and improve the water quality before it is discharged back into the Trinity River. Vegetation assemblages can vary widely by amount and species from cell to cell. Annual vegetation areal coverage estimates are necessary to assess the health, productivity, and biodiversity of this dynamic system. Unmanned aerial systems offer a cost-effective method for obtaining high-resolution, georeferenced aerial imagery. During autumn 2014, Meadows Center for Water and the Environment used an unmanned aerial vehicle (UAV) to obtain high resolution imagery of all the wetland cells with a spatial resolution of 18 cm. Four hundred point, lines, and polygon attribute data denoting the vegetation type were collected with Trimble Geo XH units. Post-processing was performed with various software packages including: Agisoft's Photoscan, ERDAS, and ArcGIS. The 1,699 images collected by the UAV were mosaicked, classified into respective vegetation

assemblages through a supervised vegetation classification. Ground control data were used to verify and validate the classified data. Areal coverage estimates were calculated for the classified vegetation groups within ArcGIS. Results from this analysis will help ascertain annual growth rates for different vegetation assemblages and assess habitat characteristics for populations of indigenous and migratory bird species.

#### **8:15: HUMAN DIMENSIONS OF URBAN WATER BODY USAGE IN LUBBOCK, TEXAS**

**K. J. Young**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**S. S. Kahl**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**M. Farmer**, Department of Natural Resources Management, Department of Agricultural and Applied Economics, Texas Tech University, Lubbock, TX, 79409, USA

**K. Griffis-Kyle**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Abstract:** As urban areas expand to accommodate a growing population, urban planners are tasked with building Urban Green Spaces (UGS) that support both ecological services and public recreation. In Lubbock, Texas Urban Water Bodies (UWB) have been used for storm water catchment and some have been incorporated into public UGS. The purpose of this study was to evaluate recreation in UGS that include UWB by: (1) observing recreational activities at UGS/UWB, and (2) learning stakeholders' value and perceptions of UWB/UGS. To identify UWB with an associated UGS GIS data was used from multiple sources. Visual observations of recreational activities were conducted at 24 study sites over a 24 month period. Interviews and written surveys were conducted for stakeholder perspectives. Documenting current UWB types provided useful information for planning future UWB/UGS in a semi-arid environment. Visual observations of study sites aided in discerning human and basic wildlife usage of UWB/UGS. Feedback received from UWB/UGS stakeholders provided a user's perspective of the fauna and flora found in UWB/UGS. The results of this study can aid direction of future studies on wildlife impact due to human activity presence in UGS. In addition, knowledge of public user UGS preferences can help urban planners while preserving ecological services for wildlife in an area designated for human recreation.

#### **8:30: EVALUATION OF A LOW-COST UNMANNED AERIAL SYSTEM TO SUPPORT MANAGEMENT AND CONSERVATION EFFORTS OF TEXAS COSTAL RESOURCES**

**Kristy A. Kollaus**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Thomas C. Heard**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Kristina M. Tolman**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Timothy Birdsong**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744, USA

**Thomas B. Hardy**, The Meadows Center for Water and the Environment, Texas State University, San Marcos, Texas 78666, USA

**Abstract:** Use of unmanned aerial systems (UAS) in ecological management and conservation efforts has gained increasing attention due to their relatively low cost, versatility, and instantaneous acquisition of multispectral digital aerial imagery. The value of UAS in support of ecological research is becoming better understood; however, the full range of potential applications remains unclear. For this project, Texas State University's UAS crew partnered with Texas Parks and Wildlife to evaluate the utility of UAS

on 3 management and conservation efforts on the Texas coast. The 3 objectives using UAS were to (1) estimate vegetation coverage of the Harborwalk wetland mitigation site, (2) conduct colonial waterbird counts on North Deer Island, and (3) document seagrass species (*Halodule wrightii* and *Ruppia maritima*) expansion in West Galveston Bay. Appropriate imagery resolution and pre-determined flight plans were determined for each project and uploaded to the unmanned aerial vehicle (UAV) onboard computer independently for each objective. After each flight, captured imagery and spatial data were exported and processed through EnsoMosaic for further analysis. UAV flights were completed between January–September 2014 with 1,954 images captured over the project areas. Completed mosaic resolution ranged from 8cm (Harborwalk) to 18cm (Seagrass beds). Approximate wetland area coverage in the Harborwalk mitigation site was greater (~500 m<sup>2</sup>) using UAV acquired imagery compared to NAIP satellite imagery. Brown pelican (*Pelecanus occidentalis*) nesting counts on North Deer Island averaged 220 more (i.e., potentially 440 more individuals) when using UAV imagery compared to traditional boat/ground methods. High wind conditions during 2 seagrass flights resulted in increased water turbidity and poor image quality; however, in our final seagrass flight, we were able to detect seagrass areas and observe propeller scar locations. Overall, the 3 projects were successful in highlighting and expanding current knowledge on the value of UAS in ecological research. Within appropriate conditions and objectives, low cost UAS can be a complementary tool to support coastal and other management and conservation efforts.

#### **8:45: UTILIZING HUNTER HARVEST FOR DISEASE SURVEILLANCE**

**John T. Stone**, Biology Department, Sul Ross State University, Alpine, TX, 79830, USA

**Christopher M. Ritzi**, Biology Department, Sul Ross State University, Alpine, TX, 79830, USA

**Abstract:** Surveillance of wildlife diseases is an important problem that faces wildlife managers. Emerging diseases are frequently zoonotics emerging from wildlife reservoirs. These diseases can have impacts on human populations, livestock, agricultural interests, ecological processes and biodiversity. To be better prepared for these diseases when they emerge, proper surveillance protocols must be created and implemented. One concept of importance is the use of sentinel species in disease surveillance. Sentinel species are species that can be monitored for potential problems, and one group that has been studied as a possible sentinel species for disease surveillance are canines. Coyotes (*Canis latrans*) are ubiquitous in the United States, and their role as a mesocarnivore provides many opportunities for exposure to pathogens. In addition, coyotes are commonly hunted for depredation efforts and sport. This harvest is a largely unexploited resource for wildlife research. WeI have been successful in obtaining samples for a serologic survey of the Marfa Plateau by working with coyote hunting groups and believe that this type of resource could prove invaluable in studying diseases across the country. The information gained from harvest data can be used to better make management decisions and better manage our natural resources.

#### **9:00: JGTCLI EARLY CAREER PROFESSIONAL DEVELOPMENT CASE STUDY: ASSESSMENT OF THE CARRIZO WILCOX AQUIFER AND RECOMMENDATIONS FOR SUSTAINABLE GROUND WATER MANAGEMENT**

**Jamie L. Killian**, Richland Creek Wildlife Management Area, Texas Parks and Wildlife Department, Streetman, TX, 75859, USA

**Chase Currie**, San Pedro Ranch, Carrizo Springs, TX, 78834, USA

**Derek Broman**, Texas Parks and Wildlife Department, Dallas, TX, 75106, USA

**Tara Korzekwa** ARCADIS-US, Austin, TX, 78703, USA

**Tim Siegmund**, Texas Parks and Wildlife Department, College Station, TX, 77843, USA

**Abstract:** The James G. Teer Conservation Leadership Institute (JGTCLI) selected 21 natural resource professionals to collaborate over the past year to gain a comprehensive overview on a specific unresolved natural resource issue in Texas. Due to the increase in human population, coupled with recent record

droughts, ground water (GW) management has been made a high priority for many Texans. The goal of the JGTCLI cohort was to produce a guideline for developing recommendations for future sustainable GW use in the Carrizo Wilcox Aquifer (CWA). The cohort researched current GW regulations, demand, availability, and technology to identify points of intervention for sustainable GW management. The issue is quite complex as each aquifer varies in specific aquifer function, demand, and regulation. Gaps in knowledge were discovered in many areas including aquifer function, the relationship between GW and surface water, and efficient conservation techniques for GW management. Understanding how the CWA functions, current and future GW demand, and GW conservation efforts are critical when making management decisions for sustainable management. These guidelines can then be used to develop recommendations for any aquifer. The cohort used these guidelines to produce a white paper and corresponding resolution and position statement on sustainable GW management in the CWA which we present here.

#### **9:15: GROUNDWATER CONSERVATION EDUCATION IN THE CARRIZO-WILCOX: PUBLIC BENEFITS OF RURAL WORKING LANDS**

**Mike Marshall**, Texas A&M Institute of Renewable Natural Resources, Gatesville, TX, 76528, USA

**Whitney J. Gann**, Department of Biology, University of The Incarnate Word, San Antonio, TX 78209, USA.

**Samantha S. Kahl**, Dept. of Natural Resources Management, College of Agricultural Sciences and Natural Resources, Texas Tech University, Lubbock, TX 79409.

**Sarah Kahlich**, Plateau Land and Wildlife Management, San Antonio, TX 78213, USA

**John Kinsey**, Texas Parks and Wildlife Department, Hunt, TX 78024, USA

**Abstract:** Satisfying the demand for water in Texas is the predominant natural resource issue of the state, and increasingly scarce groundwater resources are often used to help solve water allocation problems. Because 83% of the land in Texas is privately owned working lands, we should consider the public benefit these lands provide, particularly in regards to water quality and quantity. Although Texas leads the nation in land area devoted to privately owned working lands, it also continues to lead the nation in the loss of those working lands (i.e., loss of 1.1 million acres from 1997–2012) mainly driven by drastically increasing market values of these lands (i.e., 214% increase in per acre market value in Texas). Further exacerbating this situation is the growing urban-rural disconnect where 95% of all land is privately owned but 90% of Texans live in cities, resulting in policies that come from an almost singular urban perspective. Here, we explore a public-private framework for education and outreach in the Carrizo-Wilcox aquifer that can be applied to the state of Texas in general. The focus of this effort is to address the urban-rural disconnect by highlighting the public benefit (e.g. recharge capacity) that working lands provide to 4 specific audiences: policy makers, teachers, youth, and urban communities. We believe such a campaign not only promotes urban water conservation throughout the Carrizo-Wilcox, but also has the potential to open up funding streams to support land conservation as seen in parts of the Edward's Aquifer near San Antonio.

### **Session 4A: ECOLOGY AND MANAGEMENT OF MAMMALS**

#### **10:00: PRELIMINARY SURVEY RESULTS AND DISTANCE ANALYSIS FROM PRONGHORN ANTELOPE AERIAL SURVEYS IN TEXAS**

**Caroline L. Ward**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX 78363, USA.

**Randy W. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,

Kingsville, TX 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville,  
Kingsville, TX 78363, USA

**Shawn S. Gray**, Texas Parks and Wildlife Department, Alpine, TX 79830, USA

**Andrew N. Tri**, Caesar Kleberg Wildlife Research Institute, Texas A&M University –Kingsville,  
Kingsville, TX 78363, USA

**Abstract:** Although large mammal aerial surveys allow biologists to cover large expanses of range and evaluate populations efficiently, they are inaccurate counts due to external factors that diminish the ability to spot animals. However, surveys can be improved through models that include covariates that are known to diminish sighting probability. We evaluated the effects of distance on pronghorn antelope (*Antilocapra americana*) sighting in the Texas Panhandle. We captured and fitted 50 pronghorn with GPS collars during March 2014, 25 at each of 2 sites near Pampa and Dalhart, Texas. We surveyed the collared populations in June and recorded *a priori* covariates that we had identified as potential factors of pronghorn sighting probability, including but not limited to activity, group size, habitat type, background cover, terrain, and distance from the survey line. The preliminary results of our distance analysis for Pampa shows an effective strip width of 124.5 yards ( $P = 0.56572$ ) and a density of 95.2 acres/pronghorn (95% CI of 77.6–116.9). In the Dalhart Grassland region, we had an effective strip width of 131.3 yards ( $P = 0.59689$ ) and density of 64.8 acres/pronghorn (95% CI of 44.7–94.1). In the main Dalhart herd unit, the effective strip width was 119.7 yards ( $P = 0.54421$ ) with a density of 86.4 acres/pronghorn (95% CI of 66.1–113.1). Additional analyses will be conducted to improve the fit of the detection curves to the data at each site by including the covariate data collected during each survey.

### **10:15: ENVIRONMENTAL CONTAMINATION OF *BAYLISASCARIS PROCYONIS* EGGS BY INFECTED RACCOONS**

**Jacob L. Ogdee**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Scott E. Henke**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-  
Kingsville, Kingsville, TX 78363, USA

**Abstract:** *Baylisascaris procyonis* (here after, raccoon roundworm) is a large zoonotic nematode that occurs in the small intestine of raccoons (*Procyon lotor*), of which the larvae can cause visceral, ocular, and neural larva migrans within intermediate hosts. We investigated the likelihood of infected raccoons contaminating their environment with raccoon roundworm eggs. Infected raccoon scats were placed in various climatic conditions and allowed to decay. Scats decayed in direct relation to rainfall. Complete decay required an equivalent of about 20 cm of rainfall for fresh scats and more for older, dryer scats. Upon decay, raccoon roundworm eggs contaminated the soil up to 49 cm from the scat. In addition, the quantity and viability of raccoon roundworm eggs were determined in 4 soil textures, 2 soil moistures, 2 soil canopies, and 4 soil depths up to 10 cm within 48 containerized plots during a 2 year period. Raccoon roundworm eggs were collected from infected raccoons, and placed in 100 eggs/mL aliquots, and 1 aliquot was placed in the center of each 10 x 10 grid (100 grids) of each plot. Three randomly selected grids were sampled each month with a 2 x 10cm circumference soil tube; each soil

sample was separated into 4 depths, and raccoon roundworm eggs were quantified under 100X magnification for each soil depth. Sandy soil texture and soil moisture increased permeability of raccoon roundworm eggs into the soil column. However, raccoon roundworm eggs did not exceed past 10 cm for any soil texture or moisture regime during the 2 year study. Eggs remained close to the soil surface in soil textures >60% clay. Egg viability was >93% for all soil textures, canopies, moistures, and depths. Infected raccoons can infect the environment with raccoon roundworm eggs, which remain near the soil surface and remain viable in the environment for at least 2 years.

### **10:30: ECOLOGICAL PREFERENCES OF DAMA GAZELLE BUCKS IN WEST TEXAS**

**Elizabeth Cary Mungall**, Second Ark Foundation, 105 Henderson Branch Rd. W., Ingram, TX 78025, USA

**Susan M. Cooper**, Texas A&M AgriLife Research, 1619 Garner Field Rd., Uvalde, TX 78801, USA

**Abstract:** Spatial data was collected for 1 year from GPS collars on five male dama gazelles (*Nanger dama ruficollis*) in an exotic population on a west Texas ranch. Within the 8,996 ha semi-arid pasture, habitat use was assessed as the proportion of GPS locations within each ecological type. Selection of habitats relative to their availability was investigated at two different scales: within the entire pasture and within individual 95% Kernel Home Ranges (KHR) where each buck localized his activity (KHR sizes: 1,414–2,142 ha [3 adults] and 2,041–4,258 ha [2 subadults]). Habitat composition of the home ranges differed from that of the pasture ( $\chi^2 = 63.87$ ,  $df = 8$ ,  $P < 0.001$ ). Gazelles selected Ector (Ec) hill and plateau ecological type and associated Upton-Reagan-Lozier (Uz) valleys. Use was 80% yet these habitats constituted only 35.2% (29.8% and 5.4%, respectively) of the pasture. Conversely, gazelles tended to avoid the steeper, more rugged, and less productive hills of the Ector-Rock Outcrop Complex (Er) (46.1% of the pasture), and associated gravel Sanderson-Upton (Su) valleys (13.8%). Selection for Ec habitats and against Er also was evident within individual home ranges ( $\chi^2 = 85.43$ ,  $df = 7$ ,  $P < 0.001$ ). One gazelle had a much greater proportion of Er habitat in his home range than the others (40.9% vs 10.9%), yet his home range size was intermediate compared to the other adults. This indicates that terrain ruggedness, rather than lesser food availability, may be driving selection against Er areas. These insights can assist reintroduction planning for these critically endangered North African gazelles.

### **10:45: MESOCARNIVORE DENSITY, OCCURRENCE, AND DETECTABILITY IN A SMALL, SOUTHEASTERN URBAN AREA**

**Jason V. Lombardi**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas, 75962, USA

**Christopher E. Comer**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas, 75962, USA

**Daniel G. Scognamillo**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas, 75962, USA

**Abstract:** The coyote (*Canis latrans*), red fox (*Vulpes vulpes*), grey fox (*Urocyon cinereoargenteus*) and bobcat (*Lynx rufus*) are medium-sized carnivores that have become more common around urban areas. In eastern Texas, the city of Nacogdoches and immediate surrounding area quickly shifts (< 1 km) from high-density housing to forested woodlands, which raises the potential for human-wildlife interactions. In an attempt to identify potential hotspots of human-mesocarnivore interaction, we conducted camera surveys to estimate mesocarnivore densities and how certain urban landscape features affect occurrence and detectability. During summer and fall 2013, we surveyed 120 sites randomly distributed across a grid covering 119.2 km<sup>2</sup>. Each season, we deployed two trail cameras at each site for two weeks resulting in 3360 trap nights. We identified 83 coyotes, 39 red foxes, 19 grey foxes and 23 bobcats. We used spatially explicit capture-recapture and occupancy models to determine if mesocarnivore density, occurrence, and detectability differed in predictable ways in relation to urban landscape features. We developed density surface maps showing variations in density across the area, and used city-zoning maps to identify areas with potential for high risk of human-mesocarnivore interaction. Bobcats (fall: 0.57 individuals/km<sup>2</sup>) and coyotes (fall: 2.27 individuals/km<sup>2</sup>) were most likely to occur around larger forested patches and gray foxes (fall: 0.36 individuals/km<sup>2</sup>) were most likely to occur in areas with low building density. In contrast, red foxes (summer and fall: 1.19 individuals/km<sup>2</sup>) were most abundant in areas closer to urban edge.

#### **11:00: ARE ANTLER RESTRICTION REGULATIONS INFLUENCING AGE AND ANTLER CHARACTERISTICS IN THE PINEYWOODS?**

**Daniel Price**, Texas Parks and Wildlife Department, Rusk, TX, 75785, USA

**Micah Poteet**, Texas Parks and Wildlife Department, Lufkin, TX, 75901, USA

**Gary Calkins**, Texas Parks and Wildlife Department, Jasper, TX, 75951, USA

**Abstract:** State mandated antler restrictions designed to improve the age structure of bucks in the population and provide additional harvest opportunity have been implemented in many (117) counties in Texas. The objective of this study is to evaluate the success of the antler restriction regulations on white-tailed deer (*Odocoileus virginianus*) in the Pineywoods ecological region (27 counties) post-implementation of the antler restriction regulations enacted in 2006.

Age/Weight/Antler (AWA) data has been collected in the Pineywoods since the 1970's and was a basic data type considered during implementation of the regulation. In order to evaluate the impacts of the regulation on the population, continuation of this data collection has remained consistent with pre-implementation protocols. The AWA data is collected at locker plants and processors across the area and is meant to be a random sample representing the general harvest. Data/samples collected from harvested animals include date of kill, age of animal, and field dressed body weight from both sexes. Additionally, antler base, antler spread, and antler main beam length are collected from the males. Analysis of age structure and antler spread both pre and post regulation change can be used to determine impacts of the harvest on the population. Data collected on these two parameters indicate that the antler restriction regulation is having the desired effect of increasing age structure of males in the population. A related side benefit to the increase in age structure is the increase in antler size, which is also being documented by the data. This preliminary data suggests that antler restriction regulations may be positively influencing the age structure of the buck herd in the Pineywoods. However, it is difficult to

ascertain if the antler restrictions were solely responsible for the differences.

**11:15: HOME RANGE ESTIMATES OF ROOSEVELT ELK IN REDWOOD NATIONAL PARK, CALIFORNIA** Home range estimates of Roosevelt elk in Redwood National Park, California

**Nicholas R. Kolbe**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Floyd W. Weckerly**, Department of Biology, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** Few studies have been conducted evaluating seasonal and annual home range estimates of Roosevelt elk (*Cervus elaphus roosevelti*). Previous studies have used bivariate ellipses estimators to evaluate home range for Roosevelt elk. Global positioning system transmitters were placed on 4 female adult Roosevelt elk in the Bald Hills region of the Redwood National Park located in Humboldt County, California. Transmitters were placed on the animals in early 2003 and removed in early 2004. Locations were recorded every 6 hours for each animal for the duration of the year. Three of the 4 animals were located in the same group in the southern region of the Bald Hills and could not be considered independent observations. Thus, these 3 individuals were considered as one animal (animal A) when calculating home range estimates. The fourth animal was located in the northern region of the Bald Hills and was considered different than the other (Animal B). Yearly and seasonal home range minimum convex polygon estimates (95%) were determined for both animals. Animal A's yearly home range estimate was approximately 3,194 ha and Animal B's yearly home range estimate was approximately 3,144 ha. Animal A's seasonal home range estimates ranged from 1,784 ha in the dry season to 3,342 ha in the start of the wet season. Animal B's seasonal home range estimates ranged from 569 ha in the breeding season to 3,137 ha during the dry season. Compared to previous studies, the largest home range estimate for a single elk within the Bald Hills is 1,410 ha. My findings suggest possible larger home range estimates for individual animals. Possible differences may be attributed to the use of minimum convex polygon estimators rather than the bivariate ellipses method.

**SESSION 4B: ECOLOGY AND CONSERVATION OF BIRDS**

**10:00: SNOWY PLOVER EXPOSURE TO METALS IN SEDIMENT AND WATER FROM SALINE LAKES OF THE SOUTHERN GREAT PLAINS**

**Hannah M. Ashbaugh**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Warren C. Conway**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Daniel P. Collins**, Migratory Bird Office – Region II, U.S. Fish and Wildlife Service, Albuquerque, NM, 87103, USA

**David A. Haukos**, U.S. Geological Survey, Kansas Cooperative Fish and Wildlife Research Unit, Kansas State University, Manhattan, KS 66506, USA

**David Klein**, The Institute of Environmental and Human Health, Texas Tech University, Lubbock, TX, 79416, USA

**Abstract:** Snowy plover (*Charadrius nivosus*) exposure to potential environmental contaminants may be

partially linked to declining populations that depend on saline lakes of the Southern Great Plains as breeding or migration habitat. Beyond threats from habitat degradation in these saline lakes, no data exist on metal concentrations in these habitats. We collected sediment (from 0-20 cm deep) and water samples during the 2013 breeding season, and measured As, Cd, Pb, Se, and V from saline lakes that included snowy plover breeding habitats in Texas, Oklahoma, and New Mexico. Inductively coupled plasma optical emission spectrometry (ICP-OES) was used to quantify metal concentrations from sediment and water samples collected in close proximity to flowing and non-flowing springs. Overall, sediment and water from flowing/non-flowing sample concentrations were below background levels and similar to observed concentrations from previous regional playa wetland studies. Thus, none of these potential contaminants are thought to be at sublethal or toxic levels in these environments. Further analyses of contaminant concentrations within snowy plovers and associated prey may provide further insight as to the interplay between environmental contaminants and observed population declines.

#### **10:15: NESTING BEHAVIOR OF THE REDDISH EGRET ON GREEN ISLAND, TEXAS**

**R. D. Bracken**, Department of Biology, Texas State University, San Marcos, Texas 78666

**M. C. Green**, Department of Biology, Texas State University, San Marcos, Texas 78666

**Abstract:** Although foraging behavior has previously been studied in the reddish egret (*Egretta rufescens*), little is known about nesting behaviors and time budgets during nesting. Activity engaging in specific behaviors may vary temporally in response to fluctuations in daily temperature changes and nest predation by other avian species. We tested this hypothesis by developing an ethogram of nesting reddish egret behavior on Green Island, Texas based on video recordings of active nests. Behaviors observed include: incubating, alert, off nest and in view of the camera, and off nest and out of view of the camera. We compared the amount of time individuals engaged in each behavior between daytime and nighttime. Preliminary results suggest that there is no significant difference in the average amount of time spent in the behaviors between day and night. However, we note evidence that nesting reddish egrets do leave the nest unguarded for longer periods of time during the night. This could be in response to the lower temperatures at night, when heat is no longer a potential factor that could result in a failed nest. Similarly, grackles, a key nest predator, are generally less active at night, possibly explaining the increased amount of time the reddish egrets spend nest guarding during the day. We are currently increasing the sample size of our observations to more fully explore the relationship between daily changes in temperature and predation, and changes in nesting behaviors.

#### **10:30: FORECASTING RECOVERY OPPORTUNITIES FOR THE RED-COCKADED WOODPECKER USING A SPATIAL MODEL OF TREE AGE**

**Amanda Dube**, Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77843, USA

**Roel Lopez**, Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, 77843, USA

**Rusty Feagin**, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX, 77843, USA

**Sorin Popescu**, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX, 77843, USA

**R. Neal Wilkins**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843, USA

**Abstract:** Recovery efforts for the federally endangered red-cockaded woodpecker (RCW; *Picoides borealis*) primarily occur on public lands throughout the southeastern United States, where management practices ensure availability of mature, open pine savannahs able to support populations. As many of

these populations approach carrying capacity, RCW management on private lands will become increasingly important in providing habitat and achieving recovery goals. This will involve developing RCW habitat of sufficient age and spatial aggregation (i.e., recruitment clusters) to support nesting and foraging. Given the RCW's habitat preferences, geospatial technologies are useful in assessing current and future recovery opportunities. In this analysis, relationships between tree age, canopy height, and site index were applied to land cover, LiDAR-derived canopy height, and expected site index spatial data to produce a tree age model for longleaf (*Pinus palustris*) and loblolly (*Pinus taeda*) pines on private lands in Eastern North Carolina. Modelling provided a means to spatially and temporally identify recovery opportunities within the next 40 years, locate potential recruitment cluster sites within the next 10 years, and assess connectivity between these sites. Results indicated almost 80% of existing pines are too young to support RCW cavity trees within the next 10 years. However, over 3,000 potential recruitment sites identified could contribute to increased carrying capacity, habitat availability, and improved landscape connectivity between existing populations throughout Eastern North Carolina and surrounding areas. The prevalence of young pines suggests opportunities to create RCW recruitment clusters will increase over time with proper habitat and population management. Tree age modelling serves as a valuable conservation planning tool to guide development of potential recovery efforts over space and time.

#### **10:45: APPLYING THE INTEGRATED WATERBIRD MANAGEMENT AND MONITORING INITIATIVE TO NATIONAL WILDLIFE REFUGES IN TEXAS, NEW MEXICO, AND OKLAHOMA**

**Kristen Linner**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Blake Grisham**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Warren Conway**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX 79409, USA

**William P. Johnson**, U.S. Fish and Wildlife Service, National Wildlife Refuge System, Division of Biological Services, West Texas A&M Box 60906, Canyon, TX, 79016, USA

**Abstract:** Ground-based waterbird surveys are used by U.S. Fish and Wildlife Service (USFWS) National Wildlife Refuges (refuges) in order to capture chronology and abundance of waterfowl, wading birds, and shorebirds utilizing managed wetlands. A new standardized USFWS protocol for ground-based waterbird surveys was recently developed as part of the Integrated Waterbird Management and Monitoring (IWMM) Initiative for refuges in the Midwest (Region 3), Northeast (Region 5), and the Southeast (Region 4). However, the new protocol has not been applied to individual refuges within Region 2, leading to variation in survey methodologies within refuges and inhibiting long term data collection and inferences made from these data. We visited nine refuges (Muleshoe, Hagerman, Bitter Lake, Maxwell, Las Vegas, Washita, Salt Plains, Tishomingo, and Sequoyah) in Region 2 to document and standardized waterbird survey methods as part of the IWMM effort. We then applied the national protocol framework to each refuge's existing methods to standardize surveys for each refuge. This project will facilitate the continuation of survey procedures for each refuge, standardize methodology on individual refuges through time and across staff changes, and thus facilitate long-term comparability of data for the USFWS.

#### **11:00: IDENTIFICATION OF MIGRATORY PATHS AND NEW BREEDING GROUNDS OF GREATER SANDHILL CRANES IN THE LOWER COLORADO RIVER VALLEY**

**Courtenay M. Conring**, Texas Tech University, Department of Natural Resources Management, Lubbock, TX 79409

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

79409

**Daniel P. Collins**, United States Fish and Wildlife Service, Region 2 Migratory Bird Office, P.O. Box 1306 Albuquerque, NM 87103

**Abstract:** The Lower Colorado River Valley population (LCRVP) of sandhill cranes (*Grus canadensis*) is the smallest of the migratory sandhill crane populations in North America. Recent surveys found <30% of the estimated LCRVP of sandhill cranes are on their known breeding grounds in northeast Nevada and southwest Idaho during the summer, suggesting more information is needed regarding migratory routes and breeding ground distribution. In January 2014, we equipped 16 greater sandhill cranes on two study sites in southwest Arizona and southeast California with solar powered ARGOS satellite platform transmitter terminals. We used location class (LC) GPS (G) quality locations to identify migratory stopover, staging and breeding areas. We identified seven distinct stopover locations, including Wayne E. Kirch Wildlife Management Area and surrounding areas in Nevada. Pahrnagat National Wildlife Refuge in Nevada was used exclusively by cranes captured in Arizona, whereas Mojave National Preserve in California was used exclusively by cranes captured in California. The Ruby Valley in Nevada was used heavily as a staging area, but only during spring migration. Thirteen of 16 cranes were located on the known breeding grounds in northeast Nevada and southwest Idaho. One crane summered in Valley County, Idaho, an area that has not been documented as a breeding location for this population. The ultimate goal of this research program is to provide the framework for future habitat selection studies and reliable information to the Pacific Flyway Council for revision of the LCRVP management plan.

#### **11:15: MODELING WIND TURBINE COLLISION RISK FOR MIGRATING SWAINSON'S HAWKS AT AN INTERNATIONAL SCALE**

**Laurie Groen**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX 79409

**Clint Boal** U.S. Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, TX 79409

**James D. Ray**, Consolidated Nuclear Security, LLC, Pantex Plant, Amarillo, TX 79120

**Jimmy Walker**, West Texas A&M University, Canyon, TX 79016

**Abstract:** The Swainson's hawk (*Buteo swainsoni*) breeds across the prairie grasslands of North America and is a species of conservation concern in many states. Each autumn the population migrates en masse from North America to their wintering grounds in Argentina, and returns in the spring for a round trip distance that may exceed 22,000 km. Previous studies used satellite telemetry to investigate migratory pathways of Swainson's hawks. A contemporary concern is the potential risks Swainson's hawks may experience due to the rapid development of wind energy facilities along the migration route. We attached GPS Platform Transmitter Terminals to 24 male and female Swainson's hawks nesting in the panhandle of Texas and tracked their migratory movements. These units provide 6 - 8 daily fixes with a location accuracy of 18 m, speed, heading, and altitude data. Using this information, we are constructing Brownian Bridge movement models to determine the potential for Swainson's hawks to encounter, and potentially be at risk of, wind energy centers along their international migration route. This will allow us to identify international areas of conservation concern and monitoring importance for Swainson's hawks and other migrating avian species.

### **SESSION 4C: ECOLOGY AND MANAGEMENT OF GAME BIRDS**

#### **10:00: HABITAT, CLIMATE, AND RAPTORS AS FACTORS IN THE NORTHERN BOBWHITE DECLINE**

**John T. Edwards**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, 700 University Boulevard, Kingsville, TX 78363, USA

**Fidel Hernández**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, 700 University Boulevard, Kingsville, TX 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, 700 University Boulevard, Kingsville, TX 78363, USA

**Leonard A. Brennan**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, 700 University Boulevard, Kingsville, TX 78363, USA

**Chad J. Parent**, Department of Fisheries and Wildlife, Michigan State University, 480 Wilson Road, East Lansing, MI 48824, USA

**Robert M. Perez**, Texas Parks and Wildlife Department, La Vernia, TX 78121, USA

**Abstract:** Northern bobwhite (*Colinus virginianus*) populations have experienced continental declines since at least 1966 according to the North American Breeding Bird Survey; however, there exists considerable spatial variability in the rate of this decline. The ultimate causes of declining bobwhite populations are considered to be habitat loss and fragmentation, which reduce the amount of usable space for bobwhites, potentially making populations more vulnerable to predation and climate. Our objective was to evaluate the influence of habitat area, climate variation, and raptor abundance in the bobwhite decline. We used a stepwise multiple linear regression analysis to estimate the relative importance of these factors on bobwhite population trends in the Rolling Plains and Rio Grande Plains ecoregions of Texas. The analysis for each ecoregion was based on spatially independent data from 3 time periods: 1992, 2001, and 2011, which corresponded to available data from the National Land Cover Database. For each ecoregion, a best-fit model was chosen by selecting for parsimony and highest  $R^2$  values, where only significant ( $P < 0.10$ ) variables were retained. In the Rolling Plains, we found that breeding season precipitation, a temperature index, and the interaction between these 2 variables explained the most variation ( $R^2 = 0.62$ ) in bobwhite numbers. In the Rio Grande Plains, bobwhites were influenced by the mean maximum temperature, amount of cropland, and average cattle stocking rate for each county ( $R^2 = 0.32$ ). Climatic factors explained the most variation in our models, potentially supporting the “boom-bust” theory for bobwhite populations as well as the impression that these ecoregions still support abundant habitat for bobwhites.

#### **10:15: USING GIS TO DEVELOP PRIORITY AREAS FOR THE RESTORATION OF EASTERN WILD TURKEYS IN TEXAS**

**Jason A. Estrella**, Texas Parks and Wildlife Department, Tyler, TX, 75707, USA

**Jason Hardin**, Texas Parks and Wildlife Department, Buffalo, TX, 75831, USA

**David O'Donnell**, DOI, Bureau of Indian Affairs, OTSGS, Lakewood, CO, 80401, USA

**Abstract:** Despite restoration efforts dating back to the late 1970's, populations of eastern wild turkey (*Meleagris gallopavo silvestris*) in Texas have consistently remained low and fragmented. In 2007, Texas Parks and Wildlife Department (TPWD) funded research through Stephen F. Austin State University to test a super stocking model for restoring turkey populations, which showed promising results. Recently, TPWD reopened the eastern wild turkey restoration program with a goal to restore wild turkeys to large tracks of suitable habitat utilizing this super stocking approach. TPWD staff constructed a landscape scale Habitat Suitability Index (HSI) as a tool to assist in restoration efforts. The HSI was developed to evaluate spatial data representing the environmental conditions that are favorable to Eastern wild turkey. The HSI evaluates eastern wild turkey habitat based on 4 criteria: (1) Edge habitat, (2) Human Disturbance, (3) Land Use/Land Cover, and (4) Riparian Corridors. The habitat criteria input values were reclassified and normalized into raster layers with 10-m resolution. Composite HSI scores were then calculated from those input rasters to show spatial ranking of suitable habitat. Further analysis was conducted to statistically identify focal areas of relatively high concentration of potentially suitable

habitat for future restoration efforts and management.

### **10:30: HABITAT SELECTION, INCUBATION, AND INCUBATION RECESS RANGES OF NESTING FEMALE RIO GRANDE WILD TURKEYS IN TEXAS**

**Mason D. Conley**, Texas Parks and Wildlife Department, Winters, TX 79567, USA

**Jesse G. Oetgen**, Texas Parks and Wildlife Department, Weatherford, TX 76088, USA

**Jennifer Barrow**, Texas Parks and Wildlife Department, Decatur, TX 76234, USA

**Michael J. Chamberlain**, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602, USA

**Kevin L. Skow**, Institute of Renewable Natural Resources, Texas A&M University, College Station, Texas 77843, USA

**Bret A. Collier**, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA 70803, USA

**Abstract:** Identifying demographic patterns is central to the understanding of wild turkey population dynamics and developing sound management strategies. Rio Grande wild turkey (*Meleagris gallopavo intermedia*) populations in Texas have exhibited considerable variability in population size annually, typically driven by pre-breeding season environmental events which create habitat conditions that drive nest success. To better identify Rio Grande wild turkey nest habitat selection and incubation-related movements and ranges, we conducted research on private and public lands in Stephens, Palo Pinto, and Wise counties within the Cross Timbers and Prairies region of Texas. We monitored 56 GPS-tagged females in the spring and summer of 2012 and 2013 and had 33 hens attempt 46 nests, and we recovered GPS data for 25 of these attempts. Overall, 24 females initiated a nest once, 8 renested, and 2 nested 3 times. Seventy eight percent of nesting hens selected woody cover as nesting substrate, effectively avoiding warm season bunchgrasses common to our study areas. Mean incubation area range estimates (75 and 95% kernel) for incubating females were 1.64 ( $SE = 0.64$ ) and 5.53 ( $SE = 4.32$ ) ha. Recess movements accounted for 72% (3.87 [ $SE = 3.94$ ] ha) of the 95% incubation range estimates. Our results suggest that female Rio Grande wild turkeys consistently select a heterogeneous spatial vegetative structure with little evidence of quantifiable differences that could be used to infer quality. Our findings suggest that perhaps managers and scientists should reconsider how to define the scale at which nesting females select nesting habitat, and how, or if, habitat-based measurements at the nest site provide specific information useful for management.

### **10:45: PRE-NESTING MOVEMENTS OF RIO GRANDE WILD TURKEY HENS IN THE CROSS TIMBERS AND PRAIRIES OF TEXAS**

**Mason D. Conley**, Texas Parks and Wildlife Department, Winters, TX 79567, USA

**Jesse G. Oetgen**, Texas Parks and Wildlife Department, Weatherford, TX 76088 USA

**Jennifer Barrow**, Texas Parks and Wildlife Department, Decatur, TX 76234 USA

**Bret A. Collier**, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA 70803, USA

**Abstract:** Wild turkeys (*Meleagris gallopavo* spp.) are highly nomadic species and use a wide variety of habitat conditions during seasonal movements. Movements during the breeding season vary temporally and spatially and can be defined as distinct periods (pre-nesting, laying, incubating, and brooding). Several studies have focused primarily on large scale, pre-nesting movements and have associated these movements with habitat or nest site selection. Under this assumption, wild turkey females select a nest site by narrowing down habitat using pre-determined criteria or memory of a previously visited site. To better understand pre-nesting movements of Rio Grande wild turkey (*M. g. intermedia*) females, we conducted research on private lands in Stephens, Palo Pinto, and Wise counties within the Cross Timbers

and Prairies region of Texas. We monitored 56 GPS-tagged females in the spring and summer of 2012 and 2013 and had 33 hens attempt 46 nests, and we recovered GPS data for 25 of these attempts. For the 19 initial nesting attempts, the average distance a female was located relative to her nest site during the pre-nesting period was 1,554.3 m ( $SE = 1536.14$ ). The average minimum distance each day that females approached each respective nest site was 86.4 m ( $SE = 121.26$ ) thus indicated that hens rarely were within several hectares of their nest site prior to laying. Our results suggest that female Rio Grande wild turkeys do not conduct a rigorous process of habitat selection during the pre-nesting period and if selection does occur it is at a fine-scale, short term (<12 hour) basis.

#### **11:00: SURVIVAL AND REPRODUCTION OF TRANSLOCATED WILD BOBWHITES INTO THE ROLLING PLAINS OF TEXAS**

**Michelle C. Downey**, Caesar Kleberg Wildlife Research Institute, Texas A&M University– Kingsville, Kingsville, TX, 78363, USA

**Dale Rollins**, Rolling Plains Quail Research Foundation, San Angelo, TX, 76901, USA

**Fidel Hernández**, Caesar Kleberg Wildlife Research Institute, Texas A&M University –Kingsville, Kingsville, TX, 78363, USA

**Eric D. Grahmann**, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, TX, 78363, USA

**Bradley W. Kubečka**, Rolling Plains Quail Research Foundation, San Angelo, TX, 79546, USA

**Lloyd M. LaCoste**, Rolling Plains Quail Research Foundation, San Angelo, TX, 79546, USA

**Abstract:** Northern bobwhite (*Colinus virginianus*) populations have declined throughout Texas over the last several decades. Translocation of wild bobwhites has been utilized in an effort to restore bobwhite populations. However, these attempts have yielded mixed results. Our goal is to examine efficacy of translocating wild-trapped bobwhites into recently depopulated habitat in the eastern Rolling Plains of Texas to augment population size. We translocated 202 and 207 bobwhites during 2013 and 2014, respectively, from several locations within the Rolling Plains to 2 release sites (~400 ha each) in Stephens and Shackelford counties. We estimated seasonal survival, site fidelity, and reproduction of radio-marked translocated bobwhites. We also compared bobwhite relative abundance between release sites and a control site. Ninety-five and 91 radio-marked females were released in March 2013 and March 2014, respectively. Known-fate modeling in program MARK estimated summer 6-month survival (March-September) to be 35.9% in 2013 and 23.22% in 2014. Nest success was 42% ( $n = 72$  nests) in 2013 and 51% ( $n = 53$ ) in 2014. Nesting rate, percent of hens that initiated a nest, and average clutch size will be reported for 2013 and 2014. One final translocation ( $n = 200$  bobwhites) is planned for March 2015. This research will provide valuable insight on bobwhite population restoration techniques in the Rolling Plains of Texas.

#### **SESSION 4D: RESEARCH AND MANAGEMENT**

##### **10:00: THERMAL ENVIRONMENT AND EXOTIC GRASSES INFLUENCE HABITAT SELECTION BY SCALED QUAIL IN SOUTH TEXAS**

**Holley Kline**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Richie Sinclair**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,

Kingsville, TX 78363, USA

**Timothy Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Fidel Hernández**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Eric D. Grahmann**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**David B. Wester**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Leonard Brennan**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville,  
Kingsville, TX 78363, USA

**Abstract:** Relative importance of thermal and vegetation variables in habitat selection by the chestnut-bellied scaled quail (*Callipepla squamata var. castanogastris*) is unknown. Our objectives were to: (1) describe the thermal niche of scaled quail, (2) determine what vegetation characteristics produce thermally usable space for scaled quail, and (3) to determine if screening cover, woody vegetation height, and canopy cover of woody vegetation, native and non-native grasses are important in habitat selection. We conducted field studies on 5 ranches in LaSalle, County near Cotulla, Texas in 2013 and 2014. We radio-marked and relocated 80 birds 2–3 times per week and recorded thermal and vegetation measurements at each bird location and at paired randomly generated locations. We used *a priori* logistic regression models with our thermal variables and interactions with activity period as predictor variables. Based on AICc values, the best model for predicting thermal habitat selection included soil temperature and activity period. Used locations were 6°C cooler than random locations during early afternoon; these were the largest temperature differences observed. Usable soil temperatures were created by >150% woody canopy cover and <30% bare ground. The best model for predicting vegetation characteristics of scaled quail habitat included cover of non-native grasses and screening cover. Probability of use was negatively correlated with increasing non-native grass cover and increasing screening cover. We recommend that habitat with patches of dense (>150%) woody cover with an open understory free of non-native grasses be maintained to maximize usable space for the chestnut-bellied scaled quail in South Texas.

#### **10:00: DIETARY ANALYSIS OF OVERWINTERING POPULATIONS OF BRAZILIAN FREE-TAILED BATS IN CENTRAL TEXAS, UNITED STATES**

**Lynsey M. Ramirez**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**Thomas R. Simpson**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**M. Clay Green**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**Chris Nice**, Population and Conservation Program, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** Brazilian free-tailed bats (*Tadarida brasiliensis*) overwinter in south and central Mexico and migrate northward each spring to form large breeding colonies in northern Mexico and the southwestern United States. However, there are recent observations of increasing numbers and size of overwintering populations of free-tailed bats in central Texas. A critical component for overwintering bats is a reliable food source. It is possible that climate change has led to changes in precipitation patterns, length of seasons, and warmer winters in northern sections of their range resulting in increased insect productivity and forming a sustainable food resource for the bats. Traditional methodology of dissecting guano pellets to identify insect fragments through the use of various keys, guides and experienced entomologists, was used to gather information on the dietary habits of overwintering free-tailed bats. Pellets were collected from roosting sites at three different locations across central Texas and then dissected in the lab. Insect fragments contained in guano pellets were identified to order, and when possible to family, to determine free-tailed bat diets during winter months in central Texas. Unidentified Diptera (30.03%), Hemerobiidae

(21.03%), and Lepidoptera (26.99%) composed the greatest combined mean percent composition of diet. Significant differences in diets existed between sites relative to a particular insect taxon. Differences could be due to diverse vegetation and habitats at each sampling site. Knowledge of winter diets will provide a greater understanding of those factors controlling migratory dynamics.

#### **10:15: BAT OCCUPANCY IN BOTTOMLAND HARDWOOD FORESTS MANAGED FOR WILDLIFE IN THE MISSISSIPPI ALLUVIAL VALLEY**

**Lorraine P. Ketzler**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Christopher E. Comer**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Daniel J. Twedt**, US Geological Survey, University of Memphis, Memphis, TN 38152, USA

**Roger J. Masse**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Brian P. Oswald**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA

**Abstract:** Microchiropterans affect trophic linkages by feeding extensively on nocturnal insect prey. Importantly, population declines of forest-dwelling bats are often attributed to disturbances that affect shelter and food availability. Wildlife-forestry has been advocated for management of bottomland hardwood forests on public conservation lands within the Mississippi Alluvial Valley (MAV) and involves managing forests to achieve forest structure described as desired forest conditions (DFCs) for wildlife. Although songbirds may respond positively to management actions (e.g., timber harvests), little research has been directed at the effects on other species, including bats. To examine bat community response, we surveyed public lands (i.e., National Wildlife Refuges and Wildlife Management Areas) in the MAV from 1 May–13 August 2014. We surveyed forest stands treated to achieve DFCs for wildlife and reference forest stands, conducting vegetation surveys to measure characteristics within stands and sampling bats acoustically using Pettersen D500X acoustic recording devices. At each study site, we used 2 paired devices in each of 3 treatment and 3 control units for 6 consecutive nights. We identified echolocation calls to species using a combination of SonoBat™ version 3.2 Kentucky-Tennessee software and manual verification of call sonographs. We used the generalized linear mixed model to identify treatment effects on bat species occurrence at each survey site. We found three species that called more abundantly in forest stands treated for DFCs: evening bats 63%, eastern red bats 71%, and tricolored bats 24%, ( $p < 0.05$ ); and one species that called less abundantly: hoary bats 120%, ( $P < 0.05$ ).

#### **10:30: MODELING BAT OCCUPANCY AND ABUNDANCE IN A BOTTOMLAND HARDWOOD FOREST OF EAST TEXAS**

**Carla J. Weinkauff**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, 75962, USA

**Christopher E. Comer**, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, 75962, USA

**Warren C. Conway**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Chris Farrell**, Texas Parks and Wildlife Department, Old Sabine Bottom Wildlife Management Area, Lindale, TX, 75771, USA

**Scott Bosworth**, Texas Parks and Wildlife Department, Old Sabine Bottom Wildlife Management Area, Lindale, TX, 75771, USA

**Abstract:** In east Texas, 8 bat species are partially or entirely dependent on bottomland hardwood forests

for roosting and foraging habitat; however, the precise relationships between forest characteristics and bat occupancy are poorly understood. We characterized the bat community and related it to key stand structural characteristics at the Old Sabine Bottom Wildlife Management Area (OSBWMA) in Smith County, Texas. We conducted acoustic surveys using Pettersson D500X monitors from 9 April 2013 to 26 August 2013, for a total of 129 sampling nights and 871 trap nights. At each location we measured canopy closure, stem density, and basal area to characterize stand structure. We recorded 23,863 bat calls and identified 15,436 (65%) to species using a combination of Sonobat™ software and manual examination of call sonographs. Calls of 10 bat species were identified. The most common species included evening bats (*Nycticeius humeralis*), Seminole and eastern red bats (*Lasiurus* sp.), tricolored bats (*Perimyotis subflavus*), hoary bats (*Lasiurus cinereus*), silver-haired bats (*Lasionycteris noctivagans*), and southeastern myotis (*Myotis austroriparius*). Using multi-state models in PRESENCE, we determined detection probability and occupancy as well as relative abundance by species and identified stand characteristics that influenced these variables. We found detection probability to be lower in areas of higher stem density and higher basal area. Occupancy and abundance of evening bats, Seminole, and eastern red bats were lower in areas of high stem density. Tri-colored bat, silver-haired bat and hoary bat abundances peaked early in the season but were not affected by measured stand characteristics.

#### **11:15: ASSOCIATION OF SMALL MAMMAL COMMUNITIES AND URBAN LAND COVER IN SAN MARCOS, TEXAS**

**Lauren C. Cody**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA  
**Thomas R. Simpson**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA  
**M. Clay Green**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA  
**Ivan Castro-Arellano**, Wildlife Ecology Program, Texas State University, San Marcos, TX, 78666, USA

**Abstract:** The importance of understanding small mammal diversity in urban areas is multifaceted. Small mammals affect predator population dynamics, habitat structure, and the spread of zoonotic diseases. Small mammal populations can help evaluate habitat fragmentation and quality and can potentially impact urban habitat management strategies. Our objectives were to determine the composition and diversity of small mammal communities within the city of San Marcos, Texas, and to evaluate these relationships by meteorological season and land cover type. Twenty sites were surveyed within urban San Marcos for a total of 11,590 trap nights from August 2013 to May 2014. A total of 262 small mammals representing 12 species was captured; hispid cotton rats (*Sigmodon hispidus*) had the highest relative abundance (45.4%). The highest diversity index (1.39) and species richness ( $n = 5$ ) were found in Speck Parking Lot, an urban developed site. Bicentennial Park, classified as forest/woodland, yielded no captures over the entire survey period. Lower Purgatory Greenspace, a grassland site, had the highest relative abundance ( $n = 75$ ) and trap success (13.7%). Preliminary analyses suggest no differences in species richness among land cover types but lower species richness during the spring season. No differences in relative abundance were found among seasons. Higher abundance was found in grassland areas and lower abundance in woodland areas. Lower species richness in spring might be due to the extremely cold winter season experienced in the San Marcos area. Two of the forest/woodland sites had large stands of nonnative privet trees (*Ligustrum* spp.), which might account for lower relative abundance in those areas.

### **SESSION 4E: ECOLOGY AND MANAGEMENT**

#### **10:00: ANALYSIS OF MOTION-CAPTURED PICTURES LOCATED ON MAN-MADE WATER SOURCES IN THE SOUTHERN HIGH PLAINS OF WEST TEXAS**

**Trevor Gicklhorn**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Nicholas Pirius**, Department of Natural Resources Management, Texas Tech University, Lubbock, TX, 79409, USA

**Clint Boal**, U.S. Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, TX, 79409, USA

**Abstract:** Given the loss of natural springs and the projected decline in yearly average precipitation due to climate change, the benefits or detriments of man-made water sources for wildlife is a contemporarily relevant conservation issue. Little research has addressed wildlife use of man-made water sources in the arid Southern Great Plains. We deployed motion-activated camera traps at 12 locations in Cochran, Hockley, Yoakum, and Terry counties, Texas from March 2009 through February 2013. Natural springs in this study area have been dry for almost a century and the only surface water available are provided by stock tanks and their overflows used for cattle production. Our objectives were to assess species-specific temporal and seasonal patterns of use at man-made water sources, as well as to assess differences in use between above ground metal stock tanks and ground level overflows. We focused our assessment efforts on lesser prairie-chicken (*Tympanuchus pallidicinctus*), mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), coyote (*Canis latrans*), and all raptors (Accipitridiformes, Falconiformes, Strigiformes). We collected 1,887,902 digital images, with 2,428 detections of prairie chicken, 8,899 detections of mule deer, 367 detections of pronghorn, 1,449 detections of coyote, and 1,004 detections of raptor. The average number of animals per visit was 2.0 for prairie chickens, 1.9 for mule deer, 1.4 for pronghorn, 1.2 for coyotes, and 1.1 for raptors. We are currently using analysis of variance to assess species-specific temporal and seasonal patterns of use, and assessing use in relation to environmental conditions of relative humidity, temperature, and precipitation.

#### **10:15: SMART-PHONES LEAD TO SMART ZOO PATRONS**

**April A. T. Conkey**, Caesar Kleberg Wildlife Research Institute and Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Marybeth Green**, Department of Educational Leadership and Counseling, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Abstract:** Camera enabled smart-phones and tablets have the potential to enhance learning; however, most studies have focused on showy visual effects rather than on education. Augmented reality (AR), which adds a computer-generated artificial environment over a real world image, can supplement educational signage in zoos, museums, and other park exhibits. Our objective is to examine whether 3-D inquiry-type apps in a zoo-park environment contribute to better learning and are more rewarding to the user than 3-D factual apps. We tested two versions of AR apps (factual- and inquiry-based) for the Nile hippopotamus (*Hippopotamus amphibius*) and Komodo dragon (*Varanus komodoensis*) in front of live exhibits over four days at the San Antonio Zoo. Factual-based apps presented three basic facts about the species when the user clicked on key parts of the AR animal's body. Inquiry-based apps posed questions or required interactions by the user with the AR animal before presenting the same three facts. The four apps were each tested by two hundred adult zoo visitors, who also took a post-survey that checked retention of educational facts and personal satisfaction with the app experience. A Kruskal-Wallis analysis of variance was used to determine that there was a significant difference between factual- and inquiry-based apps on knowledge retention ( $P < 0.001$ ). Those who tested the inquiry-based apps performed better on post-survey quiz questions than those who tested the fact-based apps. Zoo patrons liked the app experience, but there was no significant difference between factual- and inquiry-based app types in likability or differences in user age, gender, or frequency of zoo visits. Thus, we suggest inquiry-based educational materials be considered in technical designs of apps for exhibits to increase user knowledge and retention of facts.

### **10:30: AGRICULTURAL CONSERVATION EASEMENTS: A TOOL FOR PREVENTING LOSS OF OPEN SPACE AND ASSOCIATED WILDLIFE HABITAT ON PRIVATE LANDS**

**Kenneth A. Cearley**, Texas Agricultural Land Trust, San Antonio, TX, 78209, USA

**Blair Calvert Fitzsimons**, Texas Agricultural Land Trust, San Antonio, TX, 78209, USA

**Allison Elder**, Texas Agricultural Land Trust, San Antonio, TX, 78209, USA

**Todd Snelgrove**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, USA

**Roel Lopez**, Institute of Renewable Natural Resources, Texas A&M University, College Station, TX, USA

**Abstract:** Texas is comprised of 171 million acres. Ninety-six percent of these lands are privately held. Of that portion of the Texas land base, approximately 14% is developed and 86% rural. These 142 million acres of rural working lands play a critical role in providing wildlife habitat. From 1997 to 2012 the human population of Texas increased 36%, growing from 19 to 26 million. Concurrently open space land was reduced from 143 million ac. to 142 million ac., a loss of approximately 1 million acres to land use changes broadly characterized as conversion and fragmentation. Upward trends in human population, land conversion, and fragmentation are expected to continue. Agricultural conservation easements offer a means of conserving open space lands in perpetuity. The purpose of an agricultural conservation easement is to protect the viability and productivity of agricultural lands while also protecting other conservation values such as wildlife habitat, water quality, and/or scenic landscapes. A conservation easement is a voluntary, legal agreement between a landowner and a qualified holder that permanently limits a property's uses in order to protect the property's conservation values. It selectively removes rights from the title of the land, with a relatively small requirement, and is individually tailored to the landowner's wishes. An agricultural conservation easement limits non-agricultural use of the land while encouraging the business of farming and ranching. Conservation easements can take the form of donated easements, purchased easements, or bargain sale easements. Disadvantages to the implementation of a conservation easement include: expense of the project; cash match from other entities is not always available; takes a long time to complete; does not ensure that the land will continue to be farmed, ranched or managed for wildlife—only that the land will be available for agriculture and hunting; sale of a conservation easement is subject to capital gains tax; tax benefits are generally only available to the first generation of easement donors; use of the property is limited for the future; and the value of the property is reduced by the conservation easement. Benefits of a conservation easement include: providing a voluntary mechanism to protect property from fragmentation or development as it fits the owner's long-term stewardship goals for the farm or ranch; income tax deduction; estate tax benefits as it facilitates inter-generational transfer; and conversion of property equity to cash or tax savings.

### **10:45: AFLATOXIN: A NEEDLE IN A HAYSTACK**

**Brent C. Newman**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Scott E. Henke**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Greta Schuster**, Department of Agriculture, Agribusiness, and Environmental Sciences, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Alan M. Fedynich**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**James C. Cathey**, Texas A&M AgriLife Extension Service, College Station, TX 77843, USA

**Abstract:** Aflatoxin, a harmful fungal metabolite produced by strains of *Aspergillus flavus* and

*Aspergillus parasiticus* growing on grain, can negatively affect the health of wildlife. Aflatoxin can cause reduced weight gain, impaired kidney and liver function, reduced immune functions, hepatitis, a halt in egg production, and death. Any cereal grain is susceptible to the production of aflatoxin, and even though the ranching community is concerned about feeding aflatoxin-tainted grain to wildlife, wildlife managers still provide wildlife with supplemental feed. We monitored commonly used methods to store and feed corn to determine weekly aflatoxin levels. In addition, we quantified aflatoxin levels of corn using several commercially available testing methods to determine the efficacy of such methods for rancher use. Corn was purchased and stored in either an outdoor pavilion with open sides, non-environmental controlled barn, environmental controlled building, metal grain containers, plastic grain containers, bags on pallets maintained outdoors, and in animal feeders. Weekly samples were tested for temperature, humidity, grain moisture and aflatoxin concentration. Grain moisture and aflatoxin concentrations fluctuated weekly within each type of storage and ranged from 10.4% - 97.5% and 0–1,200 ppb, respectively. Each storage type contained corn samples that exceeded recommended aflatoxin levels deemed safe for wildlife within 2 weeks. Black light tests, qualitative tests, and quantitative tests that use small grain samples (<10 g samples) potentially mask the aflatoxin concentration of grain. Therefore, aflatoxin is much like looking for a needle in a haystack. Obtaining a low aflatoxin concentration does not necessarily mean low concentrations will occur thereafter, and vice versa. A high concentration of aflatoxin could be followed by a low concentration of another sample within the same bag of grain because aflatoxin is rarely, if ever, evenly distributed throughout grain.

#### **11:00: THE TEXAS CHAPTER OF THE WILDLIFE SOCIETY'S WILDLIFE CONSERVATION CAMP, A LOOK AT LONG-TERM EFFECTS**

**Kelsey Griffin**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX, 76402, USA

**T. Wayne Schwertner**, Department of Wildlife, Sustainability, and Ecosystem Sciences, Tarleton State University, Stephenville, TX, 76402, USA

**Wayne Atchley**, Department of Agricultural and Consumer Sciences, Tarleton State University, Stephenville, TX, 76402, USA

**Selma Glasscock**, Welder Wildlife Foundation, Sinton, TX, 78387, USA

**Abstract:** Environmental education programs have been evaluated to assess short-term effects on participants; however, few studies have examined long-term impacts. This study aims to investigate some of the challenges and dilemmas we face in fostering environmental stewardship in young people as they transition into adulthood. We explore how the Texas Chapter of The Wildlife Society's Wildlife Conservation Camp (WCC) has impacted high school students' attitudes and behavior regarding wildlife conservation and natural resources. Research objectives are to better understand the long-term attitudes of the camp experience on participants, current attitudes and behaviors towards wildlife and natural resources, determine if program goals have been met, and investigate methods to improve the WCC. A web-based survey questionnaire was created in Qualtrics and made accessible to all successfully contacted former camp participants on-line. The questionnaire was created following the Tailored Design Method. Questions included a combination of open- and close-ended response types with attitude scales (Likert). A subset of questions was taken from the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation to evaluate participation in wildlife-related activities and provide a control group for comparison. Analysis includes descriptive statistics on demographic data of participants. We will report on attitude and behavior frequency data from close-ended response questions. The results of this project will provide valuable feedback not only for the Texas Chapter of The Wildlife Society, but also for camps of a similar nature. We hope to gain a better understanding of the role environmental education programs have on former participants who are now adults, as well as long-term impacts on attitudes regarding wildlife conservation and natural resources.

## 11:15: THE CONSULTANT'S ROLE IN WILDLIFE PROTECTION

**Vanessa Pina**, Environmental Permitting, URS Corporation, Houston, TX, 77094.

**Abstract:** Consultants have a broad role that impacts wildlife across the globe. Whether the work product is threatened and endangered species surveys, habitat assessments, biological assessments, or simplistic site recommendations, consultants must be well versed with suitable habitat, species occurrences, potential impacts, and wildlife regulations. This presentation is meant to discuss the current and future inadequacies of the regulatory system as well as the average consultant, and how these deficiencies impact stakeholders, agencies, and most of all wildlife.

## Poster Abstracts

(Number at beginning of title is number on poster board)

(At end of title: \*To be judged undergraduate poster; \*\*To be judged graduate poster)

### 1. ARE MINT-SCENTED TRASH BAGS A 'WASTE'?\*

**Justin Plata**, Department of Animal, Rangeland and Wildlife Sciences, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Scott E. Henke**, Department of Animal, Rangeland and Wildlife Sciences, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Abstract:** Raccoons (*Procyon lotor*) are often considered a nuisance species that vandalize dumpsters, trash cans, and tear into trash bags. To counter such behavior, trash bags were developed to contain an odor (i.e., mint-scented) to repel raccoons. We tested the advertiser's claim that mint-scented trash bags will repel raccoons. We placed an equal quantity of food items (i.e., sardines and cans, 10 mL of cooking oil, and corn) into eight mint-scented and eight non-scented, white trash bags and hung the bags approximately 30 cm above the ground. A Reconyx HC500 remote camera was placed 5 m from the trash bags to monitor raccoon activity and behavior. Number of raccoons per visit, raccoon interaction time with trash bags, and the time ratio of when bags were torn open to total interaction time were compared between mint-scented and non-scented trash bags. The efficacy of repellency was determined by Chi-square analysis. No differences were observed in the number of raccoons that visited trash bags ( $3.9 \pm 0.4$  and  $3.8 \pm 0.6$  raccoons/visit for mint-scented and non-scented bags, respectively;  $F_{1,7} = 0.01$ ;  $P > 0.94$ ) or in the amount of time spent interacting with trash bags ( $62.2 \pm 16.8$  min and  $80.9 \pm 17.9$  min for mint-scented and non-scented bags, respectively;  $F_{1,7} = 0.41$ ,  $P > 0.53$ ). However, mint-scented trash bags were torn open by raccoons more so ( $\chi^2 = 5.34$ ,  $P < 0.025$ ) than non-scented trash bags. In addition, raccoons tore into mint-scented trash bags twice as quickly ( $0.35 \pm 0.08$  and  $0.89 \pm 0.06$  for mint-scented and non-scented bags, respectively;  $F_{1,7} = 32.3$ ,  $P < 0.0001$ ) as non-scented trash bags. Mint-scented trash bags did not repel raccoons as advertised. It would be prudent to invest in trash cans with locking lids rather than scented trash bags to keep raccoons from scattering your trash.

### 2. A PRELIMINARY EVALUATION OF AGING CRITERIA FOR MONTEZUMA QUAIL FROM HUNTER BAGS IN ARIZONA\*

**C. Zachary Johnson**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas, USA

**John M. Tomeček**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas, USA

**Charles J. Randel**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas, USA

**Roel R. Lopez**, Institute for Renewable Natural Resources, Texas A&M University, College Station, Texas, USA

**Pedro M. Chavarria**, College of Arts and Sciences, Northern New Mexico College, Espanola, New Mexico, USA

**Brian L. Pierce**, Institute for Renewable Natural Resources, Texas A&M University, College Station, Texas, USA

**Nova J. Silvy**, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas, USA

**Abstract:** Montezuma quail (*Cyrtonyx montezumae*) have experienced marked declines in both abundance and range in recent years. Once hunted in Texas, New Mexico, and Arizona, now only New Mexico and Arizona allows hunting of Montezuma quail. Each year, Arizona Game and Fish biologists assess age and sex ratios of Montezuma quail hunter bags using the pattern and color of the outermost greater primary coverts to determine age. The pattern of these coverts, however, gradually shifts from brown-edged-with-buff to buff or white-barred as the birds mature. Thus, at some developmental stages age determination may be difficult using only this method. Our objective was to determine if inclusion of primary molt with primary covert pattern produced more reliable estimates of age than primary covert pattern alone. We examined 1,327 hunter-harvested Montezuma quail wings from the 2008–2009 hunting season in Arizona. Of those, 58% were male, 42% female. Adult primary covert pattern was strongly associated ( $\geq 90\%$ ) with birds molting IX, X, and a completed molt. Juvenile primary covert pattern was strongly associated with birds molting up to VI ( $\geq 87\%$ ). Birds molting VII and VIII were not strongly associated with either adult or juvenile status based on primary covert pattern. 45% of wings molting VII, and 49% of wings molting VIII were identified as adults based on primary coverts alone. We therefore recommend that those attempting to determine age of Montezuma quail from hunter bags use both primary covert pattern and post-juvenal primary molt to determine age.

### **3. SPRING AND SUMMER DIET OF RIO GRANDE WILD TURKEY IN THE NORTHERN ROLLING PLAINS\***

**Bradley W. Kubečka**, Rolling Plains Quail Research Foundation, San Angelo, TX, 79546, USA

**Becky Ruzicka**, Texas A&M AgriLife Extension Service, Wildlife and Fisheries Sciences, Dallas, TX 75252, USA

**Dale Rollins**, Rolling Plains Quail Research Foundation, San Angelo, TX, 76901, USA

**Abstract:** The Rio Grande wild turkey (*Meleagris gallopavo intermedia*) is known for its opportunistic and nomadic feeding habits. Wild turkeys have been documented destroying simulated quail nests and, anecdotally, having a fondness for quail eggs. Combined with the increase of wild turkeys in recent decades, this led to a colloquial belief popular in the Midwest that wild turkey are predators of quail and could, therefore, be contributing to the quail decline. Our objectives were to determine if eggs or chicks of northern bobwhite (*Colinus virginianus*) were consumed by wild turkey, describe wild turkey diets during the nesting season of bobwhites, and compare diets between sexes. We collected 93 crops (60 females, 33 males) from a 27,530-ha ranch in Roberts County, Texas. We categorized crop contents by food groups: plant matter, anthropogenic supplement, arthropods, and other. No evidence of quail was found in the crops. Arthropods occurred in 93.6% of crops, followed by plant matter at 74.2%, anthropogenic supplement at 73.2%, and other at 5.4%. Arthropods found frequently in crops were Orthoptera (54.5%), Hemiptera (39.8%), Coleoptera (33%), and Lepidoptera (30.7%) followed by 5 other Orders at much lower frequencies. Consumption of supplements was the only difference noted between sexes ( $P = 0.0585$ ). Other food noted in female crops were all relatively high in calcium (snails and bones).

#### **4. PELAGE GROWTH RATES IN WHITE-TAILED DEER IN SOUTHERN TEXAS\***

**Ramon Saenz**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Stacy L. Hines**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Alfonso Ortega-Sanchez**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Thomas W. Boutton**, Department of Ecosystem Science and Management, Texas A&M University-College Station, College Station, TX 77843, USA

**Alfonso Ortega-Sanchez, Jr.**, East Wildlife Foundation, San Antonio, Texas 78216, USA

**Abstract:** Stable isotope signatures of animal tissues have been used to infer diets, dietary overlap among species, and migration patterns of wildlife species. Hair is metabolically inactive tissue that, once keratinized, retains the stable isotope signature of the diet. Thus, isotopic variation along the length of a hair can potentially yield a chronological record of variation in animal diet. White-tailed deer (*Odocoileus virginianus*) pelage changes biannually and growth rates of white-tailed deer hair are unknown. Our objective was to determine growth pattern to establish the chronological time period represented along a strand of deer winter-pelage hair. We shaved and dyed a section of hair on the rump of 5 mature bucks and 5 mature does during the onset of deer winter-pelage growth. Measurements were taken weekly for the first 4 weeks post treatment. We measured new hair growth on 10 randomly chosen hairs in the shaved and dyed areas. Preliminary results suggest there was no effect of shaving on new hair growth rate ( $P = 0.204$ ). During October, there appears to be continuous growth ( $P = 0.588$ ) and no difference in hair growth rate between males and females ( $P = 0.107$ ). The study will continue throughout spring 2015, until completion of the winter-pelage molt, with measurements taken monthly.

#### **5. FEED SITE VISITATION OF FEMALE DEER DURING AND POST PREGNANCY\***

**Ty E. Higginbotham**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Charles A. DeYoung**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Kim N. Echols**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**Don A. Draeger**, Comanche Ranch, Carrizo Springs, TX, 78834, USA

**Abstract:** Supplemental feeding can help to provide extra nutrition during pregnancy for white-tail deer (*Odocoileus virginianus*) does when the nutritional needs increase during the later stages of pregnancy. In March of 2014, we attached GPS radio collars on 36 does and checked whether or not each doe was pregnant. We hypothesized that the collared known pregnant does would visit the feed sites more frequently before the parturition date along with their visitation rates dropping off after the estimated parturition week due to their decreased home range size. We took information from 26 of the GPS collared does in the 60 deer to one and 20 deer to one feed site in the 81-ha enclosures, and set up game

cameras starting in May 2014–August 2014 looking at the 2-week period before the estimated parturition week and 3 weeks prior. Out of the 26 collared does 35% visited the feeder more frequently while 27% visited more after the estimated parturition week. The 35% that visited more the 2 weeks before had a mean lower capture weight and rump fat measurement compared to the 27% although the mean age was higher. Based off this information we have concluded that white-tailed deer will visit the feed sites more frequently closer to parturition perhaps due to space constraints in the body cavity as the fawn size increases; while does with a higher weight or rump fat measurement perhaps use that fat storage to help with the increasing stresses closer to parturition.

## **6. OBTAINING WHITE-TAILED DEER FORAGE DIET USING VIDEO COLLARS\***

**Landen R. Gulick**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363-8202, USA

**David G. Hewitt**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363-8202, USA

**Michael J. Lavelle**, National Wildlife Research Center, 4101 Laporte Avenue, Fort Collins, CO, 8052, USA

**Kurt C. VerCauteren**, Wildlife Services, National Wildlife Research Center, 4101 LaPorte, Avenue, Fort Collins, CO 8052, USA

**Abstract:** Despite the importance of foraging and nutrition to white-tailed deer (*Odocoileus virginianus*) population dynamics and management, most techniques used to measure diet composition of deer are biased. Digital video technology has progressed sufficiently to enable mounting of a camera on a collar and deployed on free-ranging white-tailed deer. The videos were used to assess deer foraging choices. The objective of this study was to assess the use of video collected from cameras mounted on collars to determine white-tailed deer diets in South Texas. Collars were deployed for 14 days on captured male white-tailed deer in a 405 ha area in Zapata County, Texas, during November 2010. We reviewed 1,239 video clips showing foraging habits and recorded the primary forage category consumed. Consumption outcomes were: 9% forbs, 16% grass, 30% browse, and 43% succulents. Video cameras give the wildlife biologist a first person view of how white-tailed deer browse on certain plants, what parts of the plants, and the time of day deer forage. The use of video camera technology will give biologist a better understanding of white-tailed deer feeding behavior.

## **7. GERMINATION AND DECAY RATES OF FIGS SEEDS SELECTED BY WAHLBURG'S EPAULETTED FRUIT BATS\***

**Cody J. Vavra**, Tarleton State University, Department of Wildlife, Sustainability, and Ecosystem Sciences, Stephenville, TX, 76401, USA

**Sean R. Clawson**, Tarleton State University, Department of Wildlife, Sustainability, and Ecosystem Sciences, Stephenville, TX, 76401, USA

**Thomas W. Schwertner**, Tarleton State University, Department of Wildlife, Sustainability, and Ecosystem Sciences, Stephenville, TX, 76401, USA

**Ara Monadjem**, University of Swaziland, Department of Biological Sciences, Mbabane, Swaziland

**Phillip D. Sudman**, Tarleton State University, Department of Biological Sciences, Stephenville, TX, 76401, USA

**Abstract:** Wahlberg's epauletted fruit bat (*Epomophorus wahlbergi*) may play an important role in distributing seeds in forest systems, with some bats consuming large amounts of ripe fruit and often moving >30km per night. Bats seek out ripe fruit that is carried to feeding roosts and consumed, with large portions being discarded or dropped ("spats"). Consumed seeds are later passed out in fecal contents. The extent to which this process contributes to successful seed distribution depends partly on

the germination and decay rates of consumed and spat seed. Our objective was to compare germination and decay rates among seeds from ripe figs, spats, and fecal pellets. We conducted our study site in the lowveld of northeastern Swaziland, near Simunye. Bat habitat consisted of riparian forests dominated by sycamore figs (*Ficus sycomorus*) in a matrix of sugarcane fields. We collected uneaten ripe figs from trees where bats were observed feeding, and spats from beneath feeding roosts. Fecal specimens were collected using fecal traps placed beneath a day roost, as well as from captured bats. Seeds were cleaned, placed in a damp paper towel, and monitored daily. Seeds collected from fecal samples germinated at a higher rate than uneaten figs ( $P = 0.0094$ ), but seeds from spats did not ( $P = 0.1233$ ). Uneaten seeds also decayed (evidenced by signs of molding) at a greater rate than either fecal samples ( $P = 0.0001$ ) or spats ( $P = 0.0002$ ). This suggests that seeds from figs selected and consumed by bats may have a higher germination than unselected figs.

## **8. USING MOBILE AND WIRELESS TECHNOLOGY TO REMOTELY MONITOR MALE WHITE-TAILED DEER FEED SITE VISITATION\***

**Darrion Crowley**, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**David Hewitt**, Ceaser Kleber Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX, 78363, USA

**F. Scott Mitchell**, O'Connor Brothers River Ranch LLC. P.O. Box 400 Victoria, TX. 77902, USA

**Abstract:** Obtaining reliable estimates of white-tailed deer (*Odocoileus virginianus*) populations is a critical aspect of deer management. Wireless remote cameras combined with mobile technologies allow us new ways to monitor locations via mobile devices. We compared 2 types of mobile devices to a desktop PC by monitoring and recording unique occurrences of white-tail males at 9 randomly baited sites for 63 days. The purpose of this study was to: (1) examine feed site visitation of white-tailed males by recording the timing of new adult males visiting baited sites and (2) evaluate the differences in detection rates for adult males using 2 different mobile devices and a desktop PC. Three “Buckeye” ORION XIL wireless cameras were placed in randomly selected 263-ha grids in a 4,000 ha study site. This study was conducted from 15 September–15 November 2014. We reviewed 2,322 photos using 2 separate mobile devices and a base computer via the internet. We compared detection rates between the devices and to the base PC unit. We used a paired *t*-test to compare rates and found no detection differences between the base pc and device 2 ( $P = 0.10$ ) and no difference between devices ( $P = 0.17$ ). However, we did find a difference between the base PC and device one ( $P = 0.01$ ). The average date of new occurrence was 12.2 days ( $SE=5.3$ ). Fifty one percent were detected within 14 days with 2 sites recording new occurrence within the final 2 days. New technologies continue to provide opportunities to combine proven methods of existing deer population management the freedom of newly advancing mobile technologies.

## **9. WINTERING GRASSLAND SONGBIRD RESPONSE TO ONGOING NATIVE GRASSLAND RESTORATION \***

**Danielle E. Belleny**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Anthony K. Henehan**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Fidel Hernandez**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Eric D. Grahmann**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

**Timothy E. Fulbright**, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX 78363, USA

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**Abstract:** Invasive, non-native grasses have become more prominent in areas once dominated by native plant communities. Non-native grasses such as buffelgrass (*Pennisetum ciliare*) and Old World bluestems (*Bothriochloa ischaemum* and *Dichanthium annulatum*) suppress native herbaceous plants, produce monotypic stands, and degrade wildlife habitat. Although information exists regarding non-native grass dominance on grassland birds during the breeding season, little is understood regarding how non-native grass dominance influences these birds on wintering grounds. Furthermore, no studies have documented the response of grassland birds to restoration on a large-scale (>50 ha) in areas previously dominated by non-native grasses. The objectives of our study were to document the relative density of wintering grassland birds on: (1) an area dominated by non-native grass, and (2) an area currently being restored back to native vegetation. Our study is located in LaSalle County, Texas. We monitored relative bird abundance and species richness on 3 sites. These included an area: (1) of untouched native shrub-land (117-ha positive control), (2) of non-native grassland (109-ha negative control), and (3) currently being restored to native vegetation (118-ha treatment). We conducted avian point count surveys during winter (Dec–Jan 2013–2014) (pretreatment). Preliminary analyses indicate bird densities were 304% greater on the treatment area ( $8.95 \pm 1.9 \text{ ha}^{-1}$ ) than the native area ( $2.94 \pm 0.9 \text{ ha}^{-1}$ ), and 170% greater on the treatment area than the area dominated by non-native grasses ( $5.24 \pm 1.2 \text{ ha}^{-1}$ ). Understanding how wintering grassland birds react to restoration efforts will help land managers make informed decisions for one of the fastest declining taxon in the United States.

## 10. LAYING THE FOUNDATION FOR STABLE ISOTOPE RESEARCH: CATTLE SWITCH TAIL HAIR GROWTH PATTERN\*

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**Abstract:** Stable isotope signatures of animal tissues can be used to ascertain diet and diet overlap among species. Hair is metabolically inactive tissue. Hence, hair retains the isotope signature of the diet when it was growing and does not change once keratinized. Once the growth rate and pattern for hair has been established, analysis of the stable isotope signatures along the hair strand could be used to infer temporal variation in diet over the time span recorded by that hair. Our objective was to determine the growth pattern to establish the chronological time period represented along a strand of cattle switch-tail hair. We shaved and dyed sections of switch tail hair on 10 adult females, 3 juvenile females, and 1 adult male. For four weeks post treatment, we obtained weekly measurements of new hair growth for 10

randomly selected hairs in both the shaved and dyed areas. Preliminary results suggest there was no effect of shaving on the growth rate of cattle switch tail hair ( $P = 0.614$ ) and hair growth was indeterminate ( $P = 0.444$ ). Upon completion of statistical analyses, our results will establish the time period during which diets will be represented by varying lengths of cattle switch tail hair. One hair sample collection could reveal dietary information for multiple seasons, saving both time and money.

## **11. PRONGHORN FAWN SURVIVAL IN THE TRANS-PECOS REGION OF TEXAS\***

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**Abstract:** Pronghorn (*Antilocapra americana*) are an important ungulate vital to North America's grasslands. Pronghorn populations were once thought to number >30 million in the late 1800s and now reside around 1 million. In the Trans-Pecos region of Texas, healthy populations existed upon the first arrival of settlers to the area. After years of habitat fragmentation and overhunting, the population dropped from a high of 17,000 individuals in the 1980's to 3,725 currently. Translocation efforts were initiated in 2011 to restore and supplement pronghorn to region, as well as study movements and survival post-release. Following these translocations, fawn survival studies were initiated each spring-summer to help in studying cause of mortality, translocated pronghorn ability to recruit, and fawn production. Fawns were captured using the hoop-net method. Pronghorn were blindfolded upon capture. Measurements included new-hoof growth (age), neck circumference, and from head to start of tail. Fawns were equipped with Very High Frequency (VHF) collars and uniquely ear tagged to note capture area and number. All precautions were taken to ensure fawn health and prevent mother abandonment of fawns. This required all equipment to be scented with creosote (*Larrea tridentata*) before and during captures. Using this brush species seems to be effective based on previous captures. Time handling fawns was minimized to reduce stress. They were monitored daily for 30 days post-capture and then weekly to bi-weekly until collars expanded and broke off. Fawns were captured and monitored from 2011–2014 between late-April to early July. Mortality percentage was estimated using the Kaplan-Meier method using program Mark<sup>®</sup>. Mortality was estimated at 92%, 85%, 50%, and 85% for each consecutive year. Sample size for 2014 didn't meet the minimum requirement ( $n \geq 20$ ) to be used in analysis; however, body measurements were used. Pronghorn fawn surveys are an invaluable tool in measuring population numbers and restoring the species to a healthy level so they can relive historical population numbers.

## **12. ENERGY REQUIREMENTS AND DIET ITEMS FOR AMERICAN ALLIGATORS IN TEXAS\***

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**Abstract:** The American alligator (*Alligator mississippiensis*) is an endemic species iconic to the Gulf Coast and Lower Atlantic Coastal Plains of North America that inhabits rivers, swamps, marshes, lakes, bayous, as well as ephemeral bodies of water. The American alligator was declared an endangered species in 1967; however, federal protection has allowed the American alligator to repopulate and expand its traditional range throughout the Gulf coast. However, such population increases and expansion creates added pressure on ecosystems via energy requirements and prey availability. We determined diet items for alligators from stomachs collected during the open hunting season during 2013-2014 and calculated basal metabolic rates for various sizes of alligators. Alligator diet contained more terrestrial (i.e., mammal) species than avian and aquatic species (i.e., wetland birds, fish, turtles, invertebrates). Basal metabolic rates for small (<1.5 m), medium (~2 m), and large (~3 m) alligators was calculated to be 141 kcal/day, 174 kcal/day, and 237 kcal/day, respectively. We modeled alligator energetic needs based on the equation of Powell (1979) and calculated daily energy requirements to be 1,586 kcal, 1,794 kcal, and 2,552 kcal, respectively, for small, medium, and large alligators. Accounting for prey item digestibility, alligators receive the greatest benefit by selecting for a mammalian diet, which was observed in alligators from south-central Texas.

### **13. COMPARISON OF A BOTTOMLAND FOREST ALONG THE TEXAS COLORADO RIVER TO CROSS TIMBERS AND EDWARDS PLATEAU BOTTOMLAND FORESTS\***

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**Abstract:** An area of bottomland forest was characterized in terms of its woody vegetation. The information gained is useful both to increase understanding of the local ecosystem and as a potential guide for restoration. If landowners or land managers have reliable data on what types and densities of trees are natural to an area, they can more effectively plan an efficient management scheme. So far, only about 11 bottomland forests have been characterized in Texas. For this project at the Timberlake Ranch in Mills County, Texas, several quadrats were established, then the trees inside the quadrats were identified and their diameters measured. At the ranch site, upstream of the confluence of the San Saba and the Texas Colorado rivers, the forest was a form of the Sugarberry-Cedar Elm-Pecan Community that is typical in the region. Preliminary data indicates that this community is comprised of mostly cedar elm (*Ulmus crassifolia*), green ash (*Fraxinus pennsylvanica*), and western soapberry (*Sapindus saponaria* var. *drummondii*). Also present were pecan (*Carya illinoensis*) and sugarberry (*Celtis laevigata* var. *laevigata*), although both were rare. cedar elm was the most dominant tree type, followed by green ash. Other associates include cottonwood (*Populus deltoides* var. *deltoides*), and Texas persimmon (*Diospyros texana*). There is little regeneration of young trees due to herbivory of seedlings and small trees. The dominant trees were compared to other studies of bottomlands in the Cross Timbers and Edwards Plateau ecoregions.

### **14. PHYSIOLOGICALLY RELEVANT ASSAYS OF DIETARY ENERGY ON WHITE-TAILED DEER\***

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**Abstract:** Digestible energy content of diets can influence many physiological parameters of white-tailed deer (*Odocoileus virginianus*) and therefore morphological parameters such as body size and antler size. Annually since 2012, 80 white-tailed deer fawns at the Kerr Wildlife Management Area's Donnie E. Harmel White-tailed Deer Research Facility have been weaned onto a standard energy pellet (>2.8 kcal/g digestible energy) or a low energy pellet (<2.2 kcal/g digestible energy), each with similar concentrations of vitamins and minerals. Deer on the low energy diet were smaller but little is known about their physiological responses. We collected a blood sample from male and female deer 1 year of age ( $n = 101$ ) and 2 years of age ( $n = 66$ ) in October 2014 and submitted the samples to the Texas Veterinary Medical Diagnostic Laboratory for a whole blood profile analysis. The results, which are being compiled, will provide insight into how deer in Texas cope with low energy diets common during dry periods.

## 15. MODELING PROBABILITY OF OCCURANCE FOR FERAL SWINE\*

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**Abstract:** Feral swine (*Sus scrofa*) have been a growing problem for both wildlife and agriculture professionals. Swine cause millions of dollars in damage in Texas each year. Many programs focus on control methods, with trapping being the most prevalent. To optimize swine control efforts, researchers and managers need a tool to predict where swine are most likely to occur. The objective of our project was to develop a tool to predict the probability of feral swine occurrence to facilitate trapping effectiveness. We conducted aerial surveys via helicopter on the East Wildlife Foundation lands in South Texas to collect locations of swine sounders. We located 97 groups of feral swine on 4 on the ranches (San Antonio Viejo, Buena Vista, East El Sauz, and Santa Rosa). We also collected data on landscape covariates (habitat type, distance to water, distance to roads, distance to fence line). We used Maxent 3.3 to model the probability of occurrence for feral swine presence on each ranch in relation to landscape factors. These probability maps will give managers and researchers an empirically-derived tool that can make their trapping efforts more efficient.

## 16. IMPACTS OF EAGLE FORD SHALE EXPLORATION ON QUAIL HABITAT USE AND ABUNDANCE\*\*

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**Abstract:** The northern bobwhite (*Colinus virginianus*) and scaled quail (*Callipepla squamata*) have been declining across their ranges for decades due to habitat loss. South Texas is considered to be one of the last remaining strongholds for quail populations in the US. However, the recent and rapid development of the Eagle Ford Shale in this region has the potential to negatively impact quail and their habitat. The objective of this study is to determine how bobwhite and scaled quail respond to localized oil-and-gas disturbance. Our study will take place on 2 private ranches located in Dimmit and Maverick counties. We will compare space use, survival, nest success, site fidelity, and abundance of bobwhites and scaled quail between 2 areas along an oil-and-gas exploration corridor (treatment) and 2 corridors where no exploration activities have occurred (control). Metrics of quail habitat use and population ecology will be collected using radio-telemetry. Plant community and habitat structure also will be measured and compared between treatments. This research is important as exploration activities from the Eagle Ford Shale are expected to impact more than 5 million hectares within some of the last unfragmented quail habitat in the US.

## **17. HABITAT STRATIFICATION OF BARN SWALLOWS, CAVE SWALLOWS, AND CLIFF SWALLOWS NESTING ON HIGHWAY STRUCTURES IN NORTHEAST TEXAS\*\***

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**Abstract:** The use of artificial nesting substrate (e.g., bridges, buildings, culverts) has facilitated the range expansion of barn swallows (*Hirundo rustica*), cliff swallows (*Petrochelidon pyrrhonota*), and, more recently, cave swallows (*Petrochelidon fulva*) into northeast Texas. This study determined the extent to which the three species of swallow are stratifying the use of highway structures and the extent to which cave swallows might be affecting barn swallow and cliff swallow populations in northeast Texas. Data indicate barn swallows and cave swallows seem to prefer nesting in culverts whereas cliff swallows were more often found nesting under I-beam bridges. Between 2005 and 2013, barn swallow populations exhibited a significant decrease whereas cave swallow populations increased. This effect was most pronounced in culverts. These data are consistent with the suggestion that cave swallows outcompete barn swallows for culvert nesting sites.

## **18. TESTING ONTOGENETIC VARIATION IN THE RELATIONSHIP BETWEEN CRANIAL MORPHOLOGY AND TOTAL BODY LENGTH IN THE AMERICAN ALLIGATOR\*\***

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**Abstract:** It has long been hypothesized that cranial morphology of American alligators (*Alligator mississippiensis*) is strongly related to the total length of individuals. This relationship is the basis of size estimation of individuals sighted during population surveys. Previous research has not verified the consistency of this relationship across size classes or between sexes. We performed a regression analysis comparing the equality of models of the relationship of total head length and total length as well as the relationship of eye to nare length and total length of alligators across all size classes and between both sexes. We found that within each alligator size class, the relationship of cranial morphology, and total length was constant between both sexes and one model could be used to explain these relationships for both males and females. A large amount of the variation in total length could be explained by variation in cranial measurements; therefore, we recommend this as a useful field technique for estimating relative size of American alligators. In the cases that cranial measurements can be directly assessed, such as museum specimens, we suggest the use of equations produced by this study in order to obtain the most accurate estimate of total length.

## 19. TEMPORAL INFLUENCES ON AMERICAN ALLIGATOR NIGHTTIME SURVEYS\*\*

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**Abstract:** Nighttime surveys are a common method for monitoring crocodylian populations because they have established methodology, are cost effective, and provide useful information about abundance, distribution, and size. It has been assumed that “timing of surveys” probably contributes to variation among population estimates; however, this assumption has yet to be verified and has not been tested on all age classes of alligators (*Alligator mississippiensis*). We conducted nighttime surveys along designated transects at Brazos Bend State Park, Texas. Surveys were conducted during four successive nights per month during a twelve month period, which began at either 1 hour after sunset or 3+ hours after sunset. Lake order was randomly selected each night to determine differences in alligator behavior by time of night. Observed alligators were enumerated and placed into appropriate size classes. Number of hatchlings observed was unaffected ( $F_{1, 127} = 0.48$ ,  $P = 0.4877$ ) by survey time; however, subadult and adult alligators were observed more readily ( $F_{1, 127} = 17.71$ ,  $P = 0.0001$ ) during later survey times (3+ hours after sunset) than during early survey times (i.e., one hour after sunset). Monthly differences were found ( $F_{11, 124} = 6.85$ ,  $P = 0.0001$ ) in the number of alligators observed within all age classes of alligators. Alligators were more readily observed in August, January, May, July, and November, followed by February and March, April, September, and October, then June, and finally December. Currently, in

Texas, the majority of alligator surveys conducted for management purposes are conducted according to state protocol in July and August beginning an hour after sunset. We suggest that managers and researchers conduct alligator surveys at least 3 hours after sunset to optimize subadult and adult alligator counts and continue conducting surveys during July and August.

## **20. ENVIRONMENTAL CONTAMINATION OF *BAYLISASCARIS PROCYONIS* EGGS BY INFECTED RACCOONS\*\***

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**Abstract:** *Baylisascaris procyonis* (here after, raccoon roundworm) is a large zoonotic nematode that occurs in the small intestine of raccoons (*Procyon lotor*), of which the larvae can cause visceral, ocular, and neural larva migrans within intermediate hosts. We investigated the likelihood of infected raccoons contaminating their environment with raccoon roundworm eggs. Infected raccoon scats were placed in various climatic conditions and allowed to decay. Scats decayed in direct relation to rainfall. Complete decay required an equivalent of about 20 cm of rainfall for fresh scats and more for older, dryer scats. Upon decay, raccoon roundworm eggs contaminated the soil up to 49 cm from the scat. In addition, the quantity and viability of raccoon roundworm eggs were determined in 4 soil textures, 2 soil moistures, 2 soil canopies, and 4 soil depths up to 10 cm within 48 containerized plots during a 2 year period. Raccoon roundworm eggs were collected from infected raccoons, and placed in 100 eggs/mL aliquots, and 1 aliquot was placed in the center of each 10 x 10 grid (100 grids) of each plot. Three randomly selected grids were sampled each month with a 2 x 10cm circumference soil tube; each soil sample was separated into 4 depths, and raccoon roundworm eggs were quantified under 100X magnification for each soil depth. Sandy soil texture and soil moisture increased permeability of raccoon roundworm eggs into the soil column. However, raccoon roundworm eggs did not exceed past 10 cm for any soil texture or moisture regime during the 2 year study. Eggs remained close to the soil surface in soil textures >60% clay. Egg viability was >93% for all soil textures, canopies, moistures, and depths. Infected raccoons can infect the environment with raccoon roundworm eggs, which remain near the soil surface and remain viable in the environment for at least 2 years.

## **21. DEVELOPMENT AND EVALUATION OF PROTOTYPE FERAL PIG TOXICANTS\*\***

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**Abstract:** Feral pigs (*Sus scrofa*) are the most prolific large mammals in North America. The current U.S. population of feral pigs is estimated at 3–5 million, with 2.6 million pigs in Texas alone. This exotic, invasive species has increased its range across the state of Texas at alarming rates, causing \$500 million in damages annually. Methods implemented to curb the population include: hunting, trapping, snaring, use of dogs, even aerial gunning. However, the use of these methods is currently not enough to control the population. Therefore, other methods of population control might be necessary. Toxicants have shown

potential to be an applicable, multi-regional feral pig management tool. Although there is not a registered toxicant within the U.S., Sodium nitrite (SN) is being evaluated as an active ingredient for feral pig toxicants. In previous trials at Texas Parks and Wildlife Department's Feral Swine Research Facility, uptake of raw SN in pigs was not sufficient to produce the targeted mortality rates of 90%. Coating SN through microencapsulation (MESN, e.g. plasticizers, etc.) might mitigate taste aversion, thereby increasing uptake. Additionally, microencapsulation can influence the location and rate of release within the gastrointestinal tract as well as degradation time in the environment. An enteric deployment of MESN might lead to higher mortality rates while reducing risk to secondary consumers. We plan to test differences in mortality and bait uptake between MESN and enteric MESN formulations: 3 bait formulations will be assessed, with 6 total replicates. Results from this project will be instrumental in determining the efficacy of toxicants for feral swine control in the future

## **22. MODELING SEA LEVEL RISE USING A SLAMM MODEL AND ITS EFFECTS ON COLONIAL WATERBIRD ISLANDS\*\***

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**Abstract:** Many of the colonial waterbird islands along the Lower Texas Coast are  $\leq 1$  m above sea level, so the threat of rising sea levels could have large impacts on the distribution of available nesting sites for waterbird in this region. There are 25 colonial waterbird species that regularly breed on these islands, some of which, like the reddish egret and black skimmer, are species of concern. There are currently 49 waterbird colonies within the Laguna Madre, and the size of these breeding colonies varies greatly, with some supporting thousands of individuals which can comprise the majority of the state's population for certain species. We developed a sea level rise model using different sea level rise scenarios to investigate the loss of current colonial islands due to inundation, the distribution and abundance of currently available islands, and the potential natural development of new colonial islands along the Lower Texas Coast relative to different sea level rise scenarios. With only a 1 meter rise in sea levels only 18 (37%) of all colonial waterbird islands will still be available. This information can guide dredge spoil placement plans to increase the elevation of existing islands to prevent inundation due to sea level rise, or mitigate loss of colonial islands by producing new islands in optimal areas.

## **23. IMPACTS OF WIND ENERGY ON WINTERING REDHEADS ALONG THE LOWER TEXAS COAST\*\***

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**Abstract:** Freshwater ponds adjacent to the Laguna Madre provide an important and heavily used source of fresh water for redheads (*Aythya americana*) throughout winter. Little is known about the impacts of wind energy on organisms and their habitats. A wind farm of 267 turbines was developed on a private ranch along the western coast of the Laguna Madre, south of Baffin Bay. We conducted weekly aerial surveys to monitor coastal pond use by wintering redheads from mid-October through mid-March during 2000-2003 and 2012-2014. Pond availability and Palmer Drought Severity Index within the wind farm was significantly correlated pre-construction ( $n = 16$ ,  $R^2 = 0.53$ ,  $P = 0.035$ ) and post-construction ( $n = 11$ ,  $R^2 = 0.64$ ,  $P = 0.003$ ). However, there was a significant decrease in the number of ponds available at each PDSI level within the wind farm post-construction (paired  $t = 3.2$ ,  $n = 5$ ,  $P = 0.033$ ). During dry years (PDSI  $\leq -3$ ) following construction, < 1% of ponds were available within the wind farm that were available under the same conditions during pre-construction. Similarly, during years of average wetness (PDSI = 0), 30% of ponds available during pre-construction were available during post-construction. The average number of redheads detected per survey on coastal ponds within the wind farm decreased by 77.5% from pre-construction ( $\bar{x} = 2,164.79$ ,  $SE = 488$ ) to post-construction. Redheads abundance on ponds across the entire study area increased by an average of 225.7% between pre and post-construction ( $P = 0.019$ ). It appears that wind energy has impacted use of coastal ponds by redheads during winter. Future wind farm placement should consider coastal pond distribution and the dynamics of redhead use between coastal ponds and foraging areas in the Laguna Madre.

#### **24. SURVIVAL AND NESTING SUCCESS IN PEN-REARED AND TRANSLOCATED NORTHERN BOBWHITES\*\***

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**Abstract:** The population decline of the northern bobwhites (*Colinus virginianus*) has likely been caused by numerous factors including reduced habitat quantity and connectivity which may have led to extirpated local populations. Accordingly, in areas with potential habitat and no nearby populations, effective restoration techniques are needed. Here, we evaluate three restoration techniques: (1) release of pen-reared bobwhites, (2) translocation of bobwhites from high densities to low densities, and (3) release of pen-reared and translocated bobwhites acclimated on site prior to release. In 2013, pen-reared (2 sites) and translocated wild bobwhites (1 site) were released in large coveys with no acclimation period. Pen-reared survival times of 2.42 weeks (site 1,  $n = 49$ ) and 4.27 weeks (site 2,  $n = 46$ ) were not different ( $P = 0.195$ ). Mean survival on the translocation release site was 8.50 weeks ( $n = 7$ ). In 2014, pen-reared and translocated birds were released on the same study sites as 2013, after an acclimation period of 0, 7, or 14 days. Survival between acclimation groups was not different *within* each study site. Pen-reared survival means were 1.91 weeks (site 1,  $n = 62$ ) and 1.40 weeks (site 2,  $n = 67$ ) and translocated survival was 11.54 weeks ( $n = 9$ ). Pen-reared females had fewer nests than translocated birds in both years. These results show that pen-reared birds have reduced survival and fewer nesting attempts when compared to translocated birds and that acclimation time was not a factor.

#### **25. OVERWINTER SPACE USE OF GREATER SANDHILL CRANES IN THE LOWER COLORADO RIVER VALLEY\*\***

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**Abstract:** The Lower Colorado River Valley population (LCRVP) of greater sandhill cranes (hereafter cranes) is the smallest of the migratory crane populations in the United States with approximately 3,026 individuals. Ecological information is lacking for this population, despite an existing proposal to open a harvest season in Arizona. To address the lack of baseline ecological data, we equipped 16 cranes on two study areas in southwest Arizona (Cibola National Wildlife Refuge) and southeast California (Imperial Valley) with solar powered ARGOS satellite platform transmitter terminals (PTTs) in January 2014. We used Brownian Bridge Movement Models to delineate overwinter home ranges from mid-January- early March 2014 and October- early February 2014–2015, respectively. Our results indicated cranes had home ranges that overlapped with grain agriculture and wetlands, which resulted in small, bimodal home ranges. Cranes in Arizona had overlapping home ranges and were confined completely within the boundary of Cibola National Wildlife Refuge or Colorado River Indian Tribe (CRIT) land north of Blythe, California. Likewise, cranes in the Imperial Valley had overlapping home ranges but were mostly found on privately owned land. Overall, cranes demonstrated high site fidelity (80%) between wintering seasons, but 2 cranes moved from Cibola NWR to CRIT land between winters. One crane captured in the Imperial Valley in 2014 wintered at Cibola NWR in 2015, suggesting these areas should not be considered discrete management units for the LCRVP.

## **26. THE EFFECTS OF HABITAT AND LURE ON BOBCAT DETECTION\*\***

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**Abstract:** Felid populations are challenging to survey due to their large home range size and secretive behavior. Low detection rates, which are characteristic of felid surveys, make it difficult to obtain reliable population estimates. Motion-triggered cameras are commonly used to survey for felids and are typically placed along roads or trails to increase encounter rates. In February 2012, we initiated camera surveys of the carnivore communities on three ranches of the East Wildlife Foundation: Buena Vista, San Antonio Viejo, and Santa Rosa. Each sampling grid was composed of 24-30 camera stations. We examined habitat immediately surrounding camera stations and its influence on bobcat (*Lynx rufus*) detection rates. We also applied lure to camera stations to examine its influence on bobcat detection rates.

## **27. ABUNDANCE AND LAND COVER ASSOCIATIONS OF MIGRANT AND WINTERING BIRDS OF PREY IN THE SOUTHERN GREAT PLAINS\*\***

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**Abstract:** Wind energy development is a rapidly advancing source of renewable, non-carbon emitting energy in the Southern Great Plains. However, it is not without environmental cost in terms of potential

mortality and disturbance to wildlife. Birds of prey in particular appear to be susceptible to direct mortality from wind turbines. Each winter, the southern Great Plains experiences an influx of birds of prey that migrate through the area or settle in for the winter. However, little contemporary or quantitative information is available regarding the composition, abundance, or distribution patterns of these birds across the landscape. We initiated bird of prey surveys along 51.5 km road-survey transects in the Southern Great Plains of eastern New Mexico, the panhandle of Texas, and western Oklahoma. Our goal is to determine species richness, abundance, and species-specific land cover associations in the region to assess potential risk of energy development to migrating and wintering birds of prey. We will use a distance sampling approach to estimate species-specific detection rates and resulting density estimates across the region. We have completed October surveys, with mid-December and early January surveys pending. Final analysis of the survey data will be presented.

## **28. THE EFFECTS OF VEGETATION AND ELEVATION ON MOUNTAIN LION HUNTING BEHAVIORS IN WESTERN COLORADO\*\***

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**Abstract:** The mountain lion (*Puma concolor*), occupies the largest geographical range of any terrestrial mammal in the western hemisphere. Mountain lions live in a variety of habitats including mixed forests, high elevation plateaus, shrub communities, open steppe, valley bottoms with steep slopes, and riparian habitats. Our goal is to investigate the relationship between mountain lion hunting behaviors and vegetation using the national land cover database (NLCD). Additionally, the use of a digital elevation model (DEM) will be incorporated so that the effects of elevation on predation will be determined. The study site was located near De Beque, Colorado and includes approximately 1,100 km<sup>2</sup>. We collected 436 different predation events from 4 March 2011 to 11 December 2012 on 11 different mountain lions fitted with Global Positioning System (GPS) collars. ArcGIS 10.2 along with Geospatial Modelling Environment (GME) was used to map the study area with the NLCD layer and to randomly generate coordinates for comparison. We used logistic regression between predation coordinates and the random coordinates using R version 3.0.1 to assess whether the data points collected have a specific pattern or are due to random chance. Since mountain lions use habitat and terrain in their pursuit of prey, we expect that there will be differences between random coordinates and predation coordinates. Understanding these hunting behaviors will aid in the management of mountain lions as well as their prey populations, and will provide the knowledge and tools to mitigate conflicts so humans may successfully cohabitate with this iconic species.

## **29. ESTIMATING ENERGETIC CARRYING CAPACITY FOR NONBREEDING WATERFOWL ON RANCHING STOCK PONDS IN THE ROLLING PLAINS OF TEXAS**

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**Abstract:** Approximately 53% of North American wetlands have been lost as a result of numerous anthropogenic activities. Thus, from a waterfowl management perspective, quantifying the value of remaining habitat for waterfowl is of particular significance since wetland quality likely influences waterfowl body condition and over-winter survival. Currently, we are examining the availability of foraging resources for waterfowl on man-made stock ponds in the Rolling Plains of Texas. Field methodologies include conducting visual observations, recording water quality parameters, taking benthic and water-column invertebrate samples, and collecting vegetation samples with a 25cm quadrat. During the fall and winter of 2014–2015, seeds and aquatic invertebrates known to be consumed by waterfowl will be analyzed to estimate energetic carrying capacity across 32 stock ponds. Calculating Duck Energy Days (DEDs) will allow managers to maintain and enhance stock ponds to support regional migrating and overwintering waterfowl populations. Additionally, we placed 16 game cameras at 16 of the 32 stock ponds to assess waterfowl occupancy in the Rolling Plains. As drought and water availability are projected to become more prevalent in the Rolling Plains of Texas, stock ponds are likely to become more important to migrating and overwintering waterfowl, especially if natural wetlands dry or become less accessible. Information from this study provides preliminary data on waterfowl use, and also indicates the availability and potential forage value of stock ponds as habitat for waterfowl.

### **30. IDENTIFYING HABITAT FEATURES SUPPORTING EASTERN WILD TURKEY POPULATIONS IN TEXAS\*\***

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**Christopher E. Comer**, College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962

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**Abstract:** From 1 January to 20 February, Texas Parks and Wildlife Department (TPWD) released 247 eastern wild turkeys (*Meleagris gallopavo silvestris*) on to 3 study sites. Gus Engeling Wildlife Management Area (GEWMA, Anderson County), a privately owned ranch (Henderson County), and Luminant's Oak Hill Mine (Rusk County) were chosen as release sites via TPWD's current habitat suitability index (HSI). Up to 40 hens per site were fitted with Lotek Large Minitrack Backpack GPS units with remote download capability. Hens from a site previously superstocked in 2007 (Anderson County) were trapped and fitted GPS transmitters. Radio-marked individuals were tracked from the time of release until most poults should be fledged (1 September). Data regarding mortality, nesting, production, and daily movements were collected from radio-marked individuals. Mortality rates for GEWMA, Lochridge, Oak Hill Mine were 0.55, 0.48, 0.08, respectively, compared to 0.17 at the site stocked in 2007. Production for all sites was low with only two radio-marked hens successfully raising poults until they were able to fly. Vegetation and invertebrate sampling occurred on GEWMA, the privately owned ranch, and Oak Hill Mine to quantify prey availability and vegetation structure of opening potentially used as poult-rearing habitat. Trapping efforts for the 2016 field season are currently underway to further refine the habitat use during critical nesting and brood-rearing periods.

### **31. PRIMARY FEATHER MOLT IN INCUBATING SNOWY PLOVERS IN THE SOUTHERN HIGH PLAINS\*\***

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**Abstract:** Interior western snowy plovers (*Charadrius nivosus nivosus*) are exhibiting chronic declines in survival and abundance in Oklahoma and Southern High Plains of Texas and New Mexico. Beyond habitat related issues negatively impacting population trends regionally, other factors may reduce overall adult fitness, including onset of primary molt in both genders during the breeding season. A total of 135 adult snowy plovers was captured while incubating from April to August 2014, of which 35 (26%) were actively molting early primaries (P1–P5) and associated primary coverts. The first observation of primary molt was recorded on 1 July, but was observed in most adults by mid-July with advanced primary molt occurring into August. P5 was recorded molting in 4 snowy plovers in late July and early August. These observations are inconsistent with previously described snowy plover wing molt chronology, where primary molt is purportedly absent during the breeding season. In some congeners, primary molt may occur during the breeding season in extremely high quality habitats. However, such prerequisites did not seem to be met during 2014. The physiological stress incurred while concurrently molting and incubating in extreme saline lake breeding environments remains unknown, as does the potential impact on brood survival during the latter part of the breeding season.

### **32. VAGINAL IMPLANT TRANSMITTERS AS A TOOL TO CAPTURE PRONGHORN FAWNS\*\***

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**Abstract:** Pronghorn (*Antilocapra americana*) recruitment is important to maintain stable populations. Extremely low fawn to doe ratios of 6:100 were observed in Fort Stanton, New Mexico in 2013, site of a translocation study. Therefore, in 2014, vaginal implant transmitters (VITs) were used estimate fawn production in translocated pronghorn females. During capture in January 2014, females ( $n = 26$ ) were radiocollared, ultrasounded to determine pregnancy, and implanted with a VIT (Model M3930L, 21g; ATS, Inc., Isanti, Minnesota, USA) prior to translocation to Fort Stanton, NM. VITs were equipped with both temperature and photo sensors, which activated precise event transmitter (PET) codes to indicate duration of VIT expulsion. Of the 19 VITs that were associated with live and known location females, 16 VITs were confirmed to have expelled and/or females were observed with fawns. Expelled VITs assisted in fawn capture from 10 different females; a total of 29 fawns were captured, from both females with VITs and opportunistically. Issues with VITs in pronghorn included protrusion, but not expulsion from females, in early April. Such scenarios exposed photo sensors to light and indicated false expulsion. For pronghorn in this study, visual locations were achievable and necessary to verify partial expulsion of VITs. In habitats in which pronghorn location and parturition information rely solely upon receipt of PET codes, not visual locations of does, current VIT style and technology may provide unreliable information. Future use of VITs in pronghorn will require modifications to current VIT design(s).

### **33. ACTIVITY PATTERNS OF BLACK BEARS AND OTHER MAMMALS IN THE CHISOS MOUNTAINS OF BIG BEND NATIONAL PARK, TEXAS\*\***

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**Abstract:** Once nearly extirpated from Texas, the black bear (*Ursus americanus*) naturally recolonized the Chisos Mountains of Big Bend National Park. Common throughout the mountain range, bears share the habitat with many species of small mammals, including skunks (*Mephitis* and *Spilogale* spp.), jackrabbits (*Lepus californicus*), desert cottontail rabbits (*Sylvilagus audobonii*), ring-tailed cats (*Bassariscus astutus*), grey foxes (*Urocyon cinereoargenteus*), coyotes (*Canis latrans*), mountain lion (*Puma concolor*), collared peccary (*Pecari tajacu*), Carmen mountain whitetail (*Odocoileus virginianus carmensis*), and mule deer (*Odocoileus hemionus*). There is little understanding, however, of how these species interact with bears in the national park and partition temporal use of habitat. Identifying daily activity patterns leads to a better understanding of predation risk by prey species, predation opportunities of predators, and how the presence of a large omnivore affects species interactions. Remote cameras provide the ideal way to monitor a large number of species continuously over a long stretch of time. In this study I placed a single Bushnell Trophy Cam remote camera at 13 sites within the Chisos Mountains, in a system of 2.25-km<sup>2</sup> grids. Each site was chosen specifically for likelihood of animal movement, in areas such as draws and canyons, mountain passes, or saddles in a ridgeline. We collected pictures from the cameras for a 30-day period over the summer months, when bears were likely to be most active. Pictures were sorted, organized, and analyzed using the programs ReNamer, DataOrganize, and DataAnalyze to identify the daily pattern of each species across the Chisos Mountains.

### **34. THINGS ARE LOOKING UP FOR RANGELAND BIRDS IN SOUTH TEXAS\*\***

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**Abstract:** We analyzed a 7-year land bird dataset from 3 East Wildlife Foundation ranches. We found increasing trends in the overall number of land birds on all 3 ranches: El Sauz (ES), Santa Rosa (SR) and San Antonio Viejo (SAV). We present here trends from 8 of the most common species. We observed increasing trends for northern bobwhite (*Colinus virginianus*) on SAV and SR ranches and a stable trend on ES ranch. Mourning doves (*Zenaida macroura*) showed increasing trends on all 3 ranches. Northern mockingbirds (*Mimus polyglottos*) displayed strongly increasing trends on SAV and SR ranches and a weak increasing trend on ES ranch. Pooled observations of northern cardinals (*Cardinalis cardinalis*) and pyrrhuloxia (*Cardinalis sinuatus*) displayed stable to weakly increasing trends on all 3 ranches. Trends in cowbird species (*Molothrus* sp.) and the endemic olive sparrow (*Arremonops rufivirgatus*) were more ambiguous. Cowbirds species showed a strongly increasing trend on SAV ranch, a stable trend on SR ranch and a slightly decreasing trend on ES ranch. Olive sparrow showed slightly decreasing trends on SAV and SR ranches, and a stable trend on ES ranch. There are several factors potentially influencing this increase in land bird numbers that are acting individually or in tandem. Increased rainfall in 2013 and 2014 after several years of drought, and reduced cattle stocking rates on East Foundation properties are likely contributing to these upward trends.

### **35. MOVEMENTS OF SATELLITE GPS COLLARED PRONGHORN IN THE TEXAS PANHANDLE IN RELATION TO BARRIERS AND AGRICULTURE\*\***

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**Abstract:** Pronghorn antelope (*Antilocapra americana*) have large home ranges and are capable of making long-distance movements. Fences and highways are known to influence pronghorn movements. However, little is known about seasonal movements or habitat use in the southern Great Plains in relation to agriculture. We studied pronghorn habitat use and movements in a mosaic of irrigated agriculture and livestock production in the Texas panhandle. We captured and fitted 50 pronghorn with GPS collars during March 2014, 25 at each of 2 sites near Pampa and Dalhart, Texas. Ten pronghorn at each site received satellite GPS collars, and 15 received store onboard GPS collars. Preliminary data from satellite collars revealed that U.S. Routes 87 and 54 in Dalhart are barriers; only one male pronghorn crossed Route 87. One female pronghorn attempted crossing, but suffered vehicle mortality. State highway 70 near Pampa appears to be a barrier, as 6 of the 10 collared pronghorn approached the highway, but never crossed. All pronghorn crossed smaller county and farm to market roads readily. All 10 collared pronghorn in the Dalhart area used agricultural fields. The average home range of pronghorn in Dalhart was 4,558 ha, with daily point to point movements up to 8 km. The average home range of the collared pronghorn in Pampa was 3,238 ha, with daily point to point movements up to 5 km. Additional analyses to be conducted using the data from recovered store onboard collars will provide finer scale data on resource selection, seasonal movement, and home range size.

### **36. EVALUATION OF AN AVIAN RADAR SYSTEM TO DIFFERENTIATE BIRD TARGETS\*\***

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**Abstract:** Ornithologists utilize radar technology to research passage rates, spatial and temporal patterns, and other characteristics of migrating birds. Although radars collect enormous amounts of information, their accuracy in differentiating bird targets is unknown unless combined with ground-truthing procedures. Tracking released birds with avian radar allows for validation by correlating known and radar-estimated size metrics. We released representatives of five species of birds ( $n = 204$ ) through the radar coverage while the radar recorded 60 parameters for each target. Prior to release, we measured a series of body dimensions to calculate body volume and a surface area index of each individual. Released species ranged in size from house sparrows (*Passer domesticus*) to rock doves (*Columbia livia*). Correlation of known-size measurements and radar size estimates can be a reliable method for radar differentiation of bird targets. Because radar size metrics can vary with target orientation, bearing, and its

distance from the radar, we need to devise and substantiate a calibration procedure for calculating the reflectivity range for the five given bird species. Though radar technology remains an efficient technique for conducting bird migration research, the combination of double-observer and bird-release validation surveys allow for a better understanding of the factors influencing target signatures and more resolution in avian radar information.

### **37. NEW CAPTURE TECHNIQUE FOR NORTHERN BOBWHITE AND SCALED QUAIL\*\***

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**Abstract:** Northern bobwhite (*Colinus virginianus*) and scaled quail (*Callipepla squamata*) have long been captured using the Stoddard walk-in-funnel trap method developed in the mid-1930s. However, the Stoddard trap a passive method and has a reliance on quail's attractant to food. When food is plentiful (i.e., insect, native seeds, or vegetative matter), Stoddard traps effectiveness decreases. We are currently using a CO<sub>2</sub> powered hand-held net-gun to capture adult quail during summer months and at opportunistic events during winter. The net gun propels a 5.08 cm square mesh 121.92 cm wide net with 8 rubber coated weights. After capture, all quail are monitored for 14 day for potential capture myopathy. To date, 8 quail (out of 26 attempts) have been captured with the net-gun in ~ 3 months of preliminary testing. All quail captured have surpassed the 14 day monitoring period. Currently, no quail have been harmed (i.e., injury due to net weights) using this capture method. So far, vegetative composition appears to be a major limiting factor when using the net-gun to capture quail because of entanglement issues. Net entanglements allowed quail to escape unabated or causing improper deployment. Future research will focus on continued efforts to hone the net-gunning technique to improve capture rates as well as taking blood sample to test stress hormones. Capture effort and stress hormone samples will be compared between quail captured with Stoddard traps and net-guns. We believe this capture method can potentially aid in mid-summer disease monitoring and/or augment quail sample sizes for research projects without relying solely on the Stoddard walk-in-funnel traps.

### **38. THE LARGE UNGULATE DINNER TABLE: WHO'S COMPETING WITH WHOM FOR FORAGES IN SOUTH TEXAS?\*\*\***

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**Abstract:** Stable isotope analysis can be applied to investigate niche partitioning among species; information gained, which species compete for similar forage resources, could provide guidance when adjusting stocking rates of large ungulates on south Texas ranches. Our objective was to determine diet overlap among cattle (*Bos spp.*), white-tailed deer (*Odocoileus virginianus*), and nilgai (*Boselaphus tragocamelus*) in south Texas. During autumn, winter and spring 2012–2014, we randomly collected 20 fresh fecal samples for each species across six 2,500-ha study sites on East Wildlife Foundation ranches in south Texas. Total grazing niche is defined as variation within and between species, hence we analyzed carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) isotope signatures using *F*-tests with grazing niche overlap indicated if  $P > 0.05$ . Preliminary analyses of the  $\delta^{13}\text{C}$  fecal sample signature of large ungulate species from autumn 2012 indicated a species\*study site interaction ( $P < 0.05$ ); therefore, we analyzed each site separately. The  $\delta^{13}\text{C}$  fecal isotope signature suggested there was no diet overlap among cattle and nilgai at 3 sites where nilgai were present, nor between cattle and deer at 5 of the 6 sites ( $P \leq 0.006$ ). However, deer and nilgai diets overlapped at all 3 sites and deer and cattle diets overlapped at one site ( $P \geq 0.126$ ). Preliminary results from autumn 2012 suggest (1) nilgai compete with deer; (2) nilgai and cattle do not compete; and (3) cattle and deer only compete when little grazeable forage is available.

### **39. AN ANALYSIS OF BOBWHITE HOME RANGE SIZE IN RESPONSE TO LARGE SCALE RESTORATION EFFORTS \*\***

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**Abstract:** Restoring degraded habitat results in acute disturbance to the landscape which persists until new vegetation communities are established. Many restorations are done on a small scale which allows animals to disperse over a short distance to find other suitable habitat. Our study site offers a unique opportunity to look at northern bobwhite (*Colinus virginianus*) reactions to restoration of native vegetation 109.3 ha dominated by exotic grasses. Our objectives are to (1) determine the effect of the restoration-related disturbance on home range size and core area size of bobwhites, and (2) determine if year or site influences home range size. Our study area is located on the Hixon ranch in La Salle County, Texas. This area has been treated with prescribed fire, herbicides, mechanical removal of brush and continuous disking. Sixty-four birds from the 109.3 ha restoration site and a 84.9 ha experimental control, were radio-collared and tracked 3 times per week from May–September 2013 and May–August 2014. Birds with 20 or more relocations imported into ArcGIS to determine home range size in the

control pasture and the restoration (pre and post restoration activities). Our sample included 19 birds from 2013 and 26 birds from 2014. Home range sizes were similar ( $P = 0.876$ ) on the control and restoration sites before and after restoration-related disturbances. In addition, home ranges were similar between years and between sexes. Our results suggest that bobwhite home ranges remain relatively the same during large-scale disturbances resulting from habitat restoration activities.

#### **40. MONITORING BIRD MIGRATION ALONG THE LOWER TEXAS COAST: A COMPARISON OF COASTAL AND INLAND SITES\*\***

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**Abstract:** Increasing wind energy development along the Texas coast has highlighted the need for a better understanding of the migratory movements. Millions of birds are directed along the Texas coast to reach either their temperate breeding or tropical wintering grounds. Although recent research has shown that bird migration concentrates along the Lower Texas Coast, the extent of bird migration from the coast to areas further inland remains relatively unknown. We monitored bird movements with 2 automated radar units, one remaining stationary at a coastal site, and the other moving among three inland sites located at 15, 30, and 45 km inland from the coast. Our radar units helped us to quantify the magnitude, flight direction, and flight altitude of migrating birds at each site. We will report on our initial findings from a fall and spring season on the dispersal of migrating birds away from the coast. The detailed information on bird migration of this study will help to guide management strategies for migratory birds along the Lower Texas Coast to minimize impacts from ongoing wind energy development.

#### **41. THE INFLUENCE OF CAMERA-TRAP SETTINGS ON CAPTURE SUCCESS IN DESERT WILDLIFE SPECIES\*\***

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**Abstract:** Camera-traps have become an important and useful tool for monitoring wildlife populations. Early studies, which utilized camera-traps, focused primarily on rare and elusive species. However, this non-invasive technique is now being used on a wide range of species and environments worldwide. Despite the growing popularity of camera-trap studies, little information exists on the relationship between capture success and the amount of time allowed between individual photographic events. Our study was located on two different areas in southeast New Mexico. Camera traps were used to monitor pronghorn (*Antilocapra americana*) use of anthropogenic water sources and modified fence passes. Cameras were deployed in conjunction with the release of translocated pronghorn in January 2013 and 2014. During the study, cameras were programmed to capture either 1, 3, 5, or 10 photos in a sequence with various time delays between photos and triggers. To date, nearly 300,000 images have been collected where groups of up to 25 individuals were documented. Understanding the influence of photographic rate on capture success in pronghorn, as well as other desert wildlife species may increase the efficiency and design of future camera trapping efforts.

## **42. HABITAT CHARACTERISTICS ASSOCIATED WITH WILD TURKEY USE OF CONSTRUCTED ROOSTS IN SOUTH TEXAS\*\***

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**Abstract:** Roosting habitat is an essential requirement of Rio Grande wild turkeys (*Meleagris gallopavo*). Typically large trees such as live oak (*Quercus virginianus*) and hackberry (*Celtis occidentalis*) provide important roosting habitat in south Texas. These large trees are not abundant in the western half of the Rio Grande Plains, and it appears that live oak and hackberry mortality has increased as a consequence of the recent drought. Therefore roosting habitat may become limited in south Texas, which could result in wild turkey declines and/or local extirpation. Wild turkeys use structures constructed by humans, such as transmission towers, telephone poles and constructed roosts, which are structures built specifically to serve as turkey roosts, where natural roosts are limited. Therefore, we initiated a project during summer 2014 to quantify specific landscape and vegetation community characteristics associated with existing wild turkey constructed roosts to determine the most appropriate sites to erect constructed roosts on a landscape. The objective of this 3 year project is to use constructed roosts to improve wild turkey roosting habitat to increase turkey use landscapes where populations are limited or absent. Specific attributes of 71 existing used and unused constructed roosts were measured during summer 2014. Data will be analyzed to isolate important attributes preferred by wild turkeys, and then these attributes will be used to select sites for erection of constructed roosts on study areas. Radio telemetry and cameras will be used to monitor turkey use of constructed roosts.

## **43. SPATIAL ANALYSIS OF CONSTRUCTED RIO GRANDE WILD TURKEY ROOST SITES RELATIVE TO FOOD AND WATER SOURCES\*\***

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**Abstract:** Roosting structures, such as mature live oak (*Quercus virginianus*) and hackberry (*Celtis occidentalis*) are essential Rio Grande wild turkey (*Meleagris gallopavo*) habitat components in South Texas. Unfortunately, recent drought has resulted in mortality of these large tree species throughout South Texas, therefore potentially limiting critical roosting habitat for wild turkeys. Numerous landowners and/or land managers have recognized that loss of mature trees could result in reduced wild turkey populations and have placed constructed roosts consisting of old utility poles in areas frequented by wild turkeys. How-

ever, not all constructed roosts are used by wild turkeys. It is possible that the proximity of food and water to turkey roosts is an important determinant in wild turkey use of roosts. Therefore, our research hypotheses is that roost sites that are closer to sources of food and water are more likely to be used by wild turkeys than roost sites located greater distances from sources of food and water. Over 70 existing constructed roosts have been identified and field work was initiated in May 2014 and will terminate in August 2014. GPS locations were obtained for constructed roosts, and opportunistically for active natural roosts, as well as sources of food and water on 9 ranches distributed throughout south Texas. GIS will be used to analyze GPS location data and results will facilitate siting future constructed roosts on the landscape that will encourage their use by wild turkeys. The results of this research may enable landowners to provide constructed roosts where natural roosts are declining, limited or absent, thereby providing a critical habitat component that would improve wild turkey populations in South Texas.

#### **44. EFFECTS OF BROADCASTING SUPPLEMENTAL FEED TO NORTHERN BOBWHITES ON SURVIVAL AND POPULATION GROWTH IN THE SOUTHERN ROLLING PLAINS, WEST TEXAS**

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**Abstract:** As food resources are often believed to be limiting factors for northern bobwhites (*Colinus virginianus*) many, especially in the xeric landscapes of Texas, have begun to empirically look at whether supplemental feed can benefit bobwhite populations through periods of climactic and environmental stress. Specifically, we assessed the application of feed (sorghum grain) along roadsides and into the adjacent vegetation, known as broadcast feeding, using modified range cattle feeders. Using 2 pastures on the 6666 Ranch in central King County, Texas, we demarcated 12 (~404.6 ha) units to be randomly assigned with 3 feed treatments; a full feed rate (~69.1 kg/km), a half feed rate (~34.5 kg/km), and controls (no feed) with 4 units per treatment. From 12 October 2013 through 24 March 2014 we radio collared 293 birds to evaluate survival. Using a preliminary Kaplan-Meier analysis, we observed over-winter (Oct–Mar) survival rates of 52.3, 64.9, and 13.8% for the full, half, and control feed units, respectively. The efficacy of this technique, feed rate, and timing was evidenced most strongly during a February snow storm in which there was an ~40% drop off in survival on our control units, 4 times larger than the other treatment units. The half feed rate was just as effective as the full rate, suggesting we can bring down the overall cost for landowners, ranchers, and wildlife agencies wishing to implement this management technique. As over-winter survival has been identified as one of several demographic parameters vital to population growth we will use our results to model growth over multiple years. This will allow us to address harvest rate concerns and assist landowners in making better informed decisions both financially and with their equipment and time.

#### **45. EFFECTS OF PRESCRIBED FIRE, TILLAGE, AND HERBICIDE TO REESTABLISH NATIVE VEGETATION ON OLD FIELDS WITHIN THE BLACKLAND PRAIRIE ECOREGION OF TEXAS.**

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**Abstract:** The objective of this study was to determine the effectiveness of prescribed fire, tillage, and herbicide as methods for the reestablishment of native tallgrass vegetation on former Blackland prairie sites. A split plot randomized block design was used to expose subplots to fire, herbicide, and tillage and all combinations of these methods. We used the Daubenmire method to estimate cover and frequency for existing vegetation before and after treatment and to estimate density for 5 native grasses and two native forbs that were seeded after treatments were complete. Additional data collected on 7 exotic grasses and 1 exotic forb was analyzed. Mean cover was found to change for all species except King Ranch bluestem (*Bothriochloa ischaemum*), big bluestem (*Andropogon gerardii*), and white prairie clover (*Dalea candida*). All treatments increased side-oats grama (*Bouteloua curtipendula*), little bluestem (*Schizachyrium scoparium*), and yellow Indian grass (*Sorghastrum nutans*). A combination of tillage and fire was found to be most effective for increasing big bluestem, whereas fire alone was most effective for increasing white prairie clover. Tillage and the combinations of herbicide, fire, and tillage were the most effective in decreasing exotic species except perennial rye grass (*Lolium perenne*) and Johnson grass (*Sorghum halepense*). In general the combinations of herbicide, fire, and tillage had the most negative effects on exotic species and the most positive effects on native species. The results of this study will be used to develop management recommendations for reestablishment of native species on tame pastures in the Blackland Prairie Ecoregion of Texas.

#### **46. IS CHRONIC EXPOSURE TO LOW LEVELS OF AFLATOXINS INVOLVED IN THE QUAIL DECLINE?**

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**Abstract:** There is concern that chronic exposure to low level aflatoxin contamination in supplemental feed may be a contributing factor to the quail decline by depressing reproduction. Acute dosages of 100 ppb aflatoxin in poultry cause liver dysfunction, resulting in ill-health, and reduced egg production and hatchability. We conducted feeding trials using 15 pairs of northern bobwhites (*Colinus virginianus*) and scaled quail (*Callipepla squamata*) during the breeding season. Twice a week, we gave replicate groups of 3 breeding pairs 20 g of cracked corn laced with 0, 25, 50 or 100 ppb aflatoxin B1; a control group received no corn. Preliminary results indicate no ill effects of chronic, intermittent aflatoxin ingestion on either species of quail over 25 weeks. The quail tend to gain weight when caged. Females gained more weight than males and the largest weight gains for both species occurred in the 100 ppb aflatoxin and no-corn/no aflatoxin groups. Feed intake was unrelated to aflatoxin levels and remained fairly steady at 22g/day for bobwhites and 18g/day for scaled quail. Number of eggs laid, egg weight and yolk weights varied between species but not between aflatoxin treatment levels. Overall hatching success of incubated eggs was 83% and was not related to levels of aflatoxin consumed by the parents. In conclusion, it appears that both northern bobwhites and scaled quail are able to tolerate intermittent, chronic ingestion of feed with aflatoxin contamination, within the permitted levels for human, bird and livestock use respectively, without ill effect.

#### **47. SPATIAL DISTRIBUTION OF DAMA GAZELLE MALES ON A WEST TEXAS RANCH**

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**Abstract:** Dama gazelles (*Nanger dama ruficollis*) are critically endangered in their native range in the Sahelo-Saharan region of Africa. However, captive breeding populations are well established on private ranches in Texas. An understanding of the natural spacing of these animals is important to breeding and reintroduction efforts because adult males will fight to injure or kill if they do not have adequate space to fulfill their needs. To determine their spatial distribution, we placed GPS collars on 3 adult and 2

subadult male dama gazelles living on a large west Texas ranch. Except for the fence around their 8,996 ha pasture, conditions were similar to free-ranging situations in their native environment. The 95% Kernel Home Ranges (KHR) of adult males averaged  $1,783 \pm 364$  ha, and each of these males maintained an exclusive core area of  $440 \pm 144$  ha which approximated the 50% KHR. Subadult males were often seen together, and their home ranges and core areas overlapped with those of adult males. Home ranges of subadults were more diffuse (95% KHR  $3,150 \pm 1,567$  ha), and they made more excursions beyond their usual boundaries than adult males did. Identification of the exclusive-use core home range areas of adult male dama gazelles is important when calculating the number of adult males that can be kept on a property. Further research is ongoing to identify the role of food abundance versus behavioral mechanisms on home range size of male dama gazelles, and the spatial distribution and requirements of the female groups.

#### **48. COMPARATIVE HABITAT SELECTION OF FERAL HOGS AND NORTHERN BOBWHITES IN SHRUB-DOMINATED RANGELAND**

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**Abstract:** The continued increase in numbers and distribution of feral hogs (*Sus scrofa*) may be a contributing factor in the long-term decline in quail populations. Feral hogs are known to eat the eggs of ground-nesting birds, but whether they impact the quail populations is unknown. By comparing the habitat use of quail and feral hogs we intend to provide guidance on the rangeland sites where control of feral hogs will have the greatest positive impact on northern bobwhites (*Colinus virginianus*) populations. On a large ranch in South Texas, we combined GPS data on the movements of 40 feral hogs collected in a prior study, with 10 years of spring call-count data available for quail on the ranch and 3 nearby properties. The ranchland was underlain by clay, clay-loam, sandy loam and sandy soils. The only habitat selection shown by bobwhites was for upland areas on deep sandy soils, in contrast feral hogs favored areas underlain by clay soils. In spring and summer, when quail have nests on the ground that are vulnerable to predation by mammals, feral hogs were strongly associated with water and riparian habitats which are not suitable nesting habitat for quail. However, the network of creeks and drainages allowed hogs to infiltrate into drier rangeland areas where quail do nest. The strong preference of feral hogs for use of irrigated fields at night provides a vulnerability that hunters and trappers can exploit in order to reduce hog populations.

#### **49. DYNAMIC INTERACTION WITHIN OCELOT AND BOBCAT MALE-FEMALE PAIRS**

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**Abstract:** Between 2013 and 2014, we collared 2 ocelots (*Leopardus pardalis*; 1M, 1F) and 2 bobcats (*Lynx rufus*; 1M, 1F) with GPS collars, programmed to record locations at 30-minute intervals during specific time periods. The ocelot and bobcat male-female pairs showed overlapping home ranges,

allowing us to examine interactions between individuals. We calculated a coefficient of static interaction for each of the pairs, and conducted a proximity analysis to determine if the distance maintained between individuals was influenced by month, time of day or moon phase. Additionally, we calculated a dynamic interaction index, which examines cohesiveness in azimuth and speed between any two individuals. We plotted changes in dynamic interaction values over time, finding a brief period of strong positive association in the ocelot male-female pair. The bobcat pair showed less evidence for positive association than did the ocelot pair.

## **50. DEER DENSITIES AND SUPPLEMENTAL FEED HAVE MINIMAL EFFECT ON FORB COMMUNITIES IN SOUTH TEXAS**

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**Abstract:** Forbs constitute a major portion of white-tailed deer (*Odocoileus virginianus*) diets when they are available. We hypothesized that palatable forbs decrease with increasing deer density; whereas, forbs less palatable to deer increase with increasing density. We estimated percent canopy cover of forbs during June 2013–2014 on 2 ranches, each with treatments of 0, 20, 40, or 60 deer in 81-ha enclosures. Supplemental feed was provided *ad libitum* in all enclosures. We also determined forb biomass in caged and uncaged plots within the enclosures during March and May 2014. Monthly observations (20 individuals of each species/enclosure) were made on the presence or absence of 2 species of palatable forbs, blackfoot daisy (*Melampodium cinereum*) and low menodora (*Menodora heterophylla*), during 2014. Percent cover of palatable and unpalatable forbs was similar ( $P = 0.1154$  and  $P = 0.3706$ , respectively) among treatments. In all treatments, standing crop of palatable and unpalatable forbs was similar between plots protected from deer and unprotected plots across months (month x density x cage,  $P = 0.6892$  and  $P = 0.5251$ , for palatable and unpalatable forbs, respectively). Probability of detecting marked blackfoot daisy plants declined with increasing deer density ( $P = 0.0281$ ); whereas, probability of detecting marked low menodora plants did not change with increasing density ( $P = 0.9015$ ). Changes in detectability of marked blackfoot daisy indicate that deer foraging depletes certain forbs during the growing season; however, canopy cover and standing crop results indicate that effects of deer foraging are not sufficient to shift composition of palatable and unpalatable forbs.

## **51. AN EXAMINATION OF FLOCK DYNAMICS OF THE BLACK-CRESTED TITMOUSE IN THE EDWARDS PLATEAU OF TEXAS**

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**Abstract:** The black-crested titmouse (*Baeolophus atricristatus*, hereafter BCTI) is a small, non-migratory passerine that has a tendency to form family flocking groups due to delayed juvenile dispersal each summer. Because of a relatively recent split as a separate species from its sister-taxa, the tufted titmouse (*Baeolophus bicolor*), the BCTI has holes in its life history, making it a solid candidate in which to study family flocking dynamics. The goal of our study was two-fold: (1) to observe if intrinsic factors, such as weight or sex, or extrinsic factors, such as territory size or habitat homogeneity, affect BCTI juvenile natal dispersal, (2) investigate if BCTI territory size or flock size varied annually. To accomplish this, during the spring of 2013 and 2014 we captured and color-banded over 130 individual BCTI, representing over 20 complete family groups. GPS coordinates were taken at regular increments throughout the year to gather territory data from banded families, and a GIS layer from the Texas Parks and Wildlife Department was obtained to analyze habitat homogeneity of each territory. The program ArcGIS was utilized for GPS and GIS data analysis. Before fledging, hatchling BCTI were weighed and sexed (via feather DNA extraction). Our preliminary results suggest that intrinsic factors are influencing which juveniles fail to disperse, with heavier males being more likely to remain with their parents throughout the year. Preliminary analyses on territory size and flock composition data have revealed larger territories and flock size during the fall/winter months. For 2015, we will continue our examination of spatial patterns regarding BCTI and the role of delayed juvenile dispersal in the formation of family flocks.

## **52. GRADE POINT AVERAGE AS A METHOD TO GAUGE UNDERGRADUATE STUDENT MARKETABILITY FOR EMPLOYMENT AS A WILDLIFE PROFESSIONAL**

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**Abstract:** A goal of universities is to produce successful, employable professionals. Carefully crafted curricula, experiential learning opportunities, and practice in oral and written communication skills have been identified as essential components for students to be marketable for employment. Methods by which universities gauge student marketability have been debated. We followed the academic and professional careers of 100 wildlife students at Texas A&M University-Kingsville from 2006–2011. We assessed student graduating GPA, involvement in internships, length of time to complete internships, student organization membership and involvement, time from graduation to employment, and type of employment. The most important predictor of success (obtaining employment within the profession) was GPA. Of the 32 students who graduated with a 3.0 GPA or above (based on a 4.0 scale), 94% were employed within their profession by graduation. Rates of employment by graduation declined exponentially as GPA declined. Nearly one-third of students whose GPA was below 3.0 did not find employment within their profession during the first year post graduation. Wildlife students that had a GPA above 2.75 found employment with federal, state, and private organizations, whereas students whose graduating GPA's fell below 2.75 only found employment within the private ranching industry. Students whose GPA was below 2.2 were not employed within their profession 2 years post-graduation. Students that had GPAs of 3.0 or above ( $n = 32$ ) also were more likely to complete internships within one semester (84%) and were active in student organizations (81%) compared to those students that had a 2.49 GPA or below ( $n = 37$ ; 65% and 30%, respectively), which likely aided those motivated students in securing employment within their profession. We recommend the use of graduating GPA as a method to determine the likelihood of student employment upon graduation with an undergraduate degree in range and wildlife management, and hope that this entices undergraduate students to take their education seriously.

### **53. POTENTIAL OCELOT AND BOBCAT DIETARY PARTITIONING: VEGETATION PREFERENCES OF RODENTS ON EAST EL SAUZ RANCH**

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**Abstract:** Small mammal species, the main food resource for ocelots (*Leopardus pardalis*), bobcats (*Lynx rufus*) and coyotes (*Canis latrans*) were monitored to determine abundance throughout the year. Resource partitioning allows for sympatric species to survive. Prey of ocelots and bobcats have been reported as being similar. A potential partition in rodents may exist in the vegetation communities prey inhabits because of different cover-types preferred by ocelots and bobcats. We investigated rodent abundance in different vegetation communities to compare with diet studies to further describe ocelot use of habitat type. Four trapping grids were installed on the East El Sauz Ranch. Each grid was a 10-m<sup>2</sup> array containing 100 Sherman traps spaced 10 m apart. Traps were baited with a mixture of oats and sunflower seeds and set for 4 consecutive days. Sampling occurred on each grid 4 times each year. We obtained vegetation community mapping from the East Wildlife Foundation, as well as from the National Oceanic and Atmosphere Administration Coastal Change Analysis Program Regional Land Cover to overlay each trap location. In 6,098 trap nights, we captured 1,310 small mammals, reptiles, amphibians, and birds. Nine different small mammal species were captured and the location vegetation types were summarized for each vegetation layer (either East or NOAA). White-footed mice (*Peromyscus leucopus*) were widespread in all communities, but they were one of the few rodents captured in dense woody cover. Cotton rats (*Sigmodon hispidus*) occurred in open grassland areas most frequently. Analyses to separate prey species are continuing. However, the goal is to develop a prey map for each grid indicating possible hunting locations for ocelots and bobcats. Those prey-vegetation community associations may be extrapolated to areas outside the grids to illustrate habitat requirements of ocelots and bobcats.

### **54. GOLDEN EAGLE NESTING IN SOUTHERN NEVADA**

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**Abstract:** Because of suggested declines in golden eagle (*Aquila chrysaetos*) populations in the western United States, United States Fish and Wildlife Service (USFWS) are closely monitoring population trends throughout their range. An inventory of golden eagles in 2 ecosystems in Nevada (northern Mojave Desert and southern Great Basin) began in 2011 with the objectives to: (1) locate nest sites and territories across several mountain ranges (Kawich Range, Belted Range, Stonewall Mountain, Cactus Range, Black Mountain, Quartz Mountain, Tolicha Peak, Sheep Mountain, Pintwater Range, Desert Range, Pahrangat Range, Spotted Range, Buried Hills, Half Pint Range), (2) determine breeding population size and nesting requirements, and (3) map suitable nesting habitat based on nest site parameters. Cliff and canyon habitat of the Southern Great Basin and Northern Mojave Desert was surveyed by helicopter from 2011–2013. Nest site parameters used for analysis were: general location, mountain range, cliff height, cliff length, aspect, slope, habitat, elevation, size, use, productivity, distance to water, viewshed, and available prey habitat. Using these parameters, a suitability index was created using Geospatial Modeling Environment

in ArcMap 10.1 to map potential nesting habitat throughout these ecoregions. A total of 98 nest sites (old/abandoned and newly decorated) was analyzed. During the three years of inventory, 10 of these nests were active, all of which showed 100% fledging success. Results of this project will aid in establishing a monitoring program to provide guidance for avoiding and minimizing disturbances and other kinds of future “take” for federal agencies in consultation with USFWS.

## **55. AVIAN RESPONSE TO BRUSH MANAGEMENT ON THE WELDER WILDLIFE REFUGE**

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**Abstract:** North American prairies are one of the most endangered natural resources on the continent, and the biotic communities that depend on them are likewise imperiled. In particular, grassland obligate birds are experiencing rapid population declines across North America. Anthropogenic actions have been identified as the primary driver of these declines. Among these actions, fire suppression and grazing management have facilitated encroachment by native and introduced woody species. Considerable attention has been focused on prairie restoration and avian conservation in the Great Plains region of North America; far less attention has been given to the Gulf Coast prairies. We are attempting to assess avian community response to prairie restoration efforts on the Welder Wildlife Refuge, a private refuge located in a transitional zone between the Gulf Prairies and Marshes and the South Texas Plains. We have established control and treatment plots of approximately 140 ha each. Within each plot we have established 29 variable circle survey points. We conducted breeding bird surveys in May and June 2014 using the point count method, and will conduct wintering bird surveys in January 2015 using the line transect method. All birds detected by sight or sound were identified to species and their distance from the observer was estimated. We are currently conducting density estimates based on species-specific detection probabilities in Program DISTANCE. We also sampled vegetation with 30 m line transects at each survey point. These data will provide a baseline of avian community composition and densities, and vegetation composition, in each study plot for comparisons of effects following brush removal efforts.

## **56. BRINGING BACK THE DEAD: MOLECULAR SEXING OF AVIAN CARCASSES**

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**Abstract:** Genetic material obtained from fossils, archaeological remains, and museum specimens has revolutionized the study of ancient populations. Less common is the use of recently deceased specimens, which are often badly decomposed or recovered where the environmental conditions are not conducive for the preservation of DNA. However, some tissues, such as bone or avian toe pads, might preserve DNA when soft tissues have decomposed. We collected 8 adult reddish egrets (*Egretta rufescens*) post mortem from the Laguna Madre, Texas to determine if we could successfully extract DNA. The duration between death and retrieval ranged from ca. 2 weeks to  $\geq 3$  months. We extracted DNA from toepad skin ( $n = 3$ ), bones ( $n = 6$ ), and feathers ( $n = 4$ ). We used a set of 3 primers developed specifically for herons

and egrets to amplify portions of the avian W and Z chromosomes at 140 and 250 bp. We were able to amplify DNA in all toe pad and bone samples, and in 3 of the 4 feather samples and subsequently determine sex of 7 of the 8 individuals (6 males and 1 female). Furthermore, we were able to amplify a relatively short segment of mtDNA. These results show that information can be gained from the remains of birds, which may be useful in instances where the species of concern is threatened or endangered, or when samples were not collected at capture.

## **57. MOLT CHRONOLOGY AND THE EFFECT OF MOLT INTENSITY ON SOMATIC PROTEIN RESERVES IN NORTHERN PINTAILS WINTERING ALONG THE LOWER TEXAS COAST**

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**Abstract:** The northern pintail (*Anas acuta*) population has experienced declines over the last few decades, and has remained below the North American Waterfowl Management Plan's population goal of 5.6 million since 1975. During fall migration and winter northern pintails experience pre-alternate molt. Molt requires an extensive amount of protein to supply amino acids used in the formation of feathers. The goal of this study is to determine the influence of molt intensity on somatic protein reserves of northern pintails during fall and winter. We collected 351 northern pintails along the Lower Texas Coast from October to March 1997–1999. We examined each specimen for intensity of molt in 34 feather tracts. We used a grab-sample technique to expose feather sheaths to determine the proportion of new feather growth. Carcass composition was determined by lipid extraction with petroleum ether in a modified Soxhlet apparatus, followed by ashing in a muffle furnace to determine protein and mineral content. Based on regression analysis, we found that molt intensity explained 15% of the variation in somatic protein of females and < 1% of the variation in males. We found strong evidence for a quadratic time trend in molt across 26 feather tracts for male northern pintails ( $R^2 = 0.75$ ,  $P < 0.001$ ), and some support for a linear time trend in female northern pintails ( $R^2 = 0.27$ ,  $P < 0.001$ ). These data suggests that northern pintails are meeting their energy requirements for pre-alternate molt through dietary intake.

## **58. EFFECTS OF NEONICOTINOID EXPOSURE ON EMBRYONIC DEVELOPMENT AND CARDIOVASCULAR HEALTH IN NORTHERN BOBWHITES**

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**Abstract:** Since their emergence in the early 1990s, neonicotinoid pesticides have grown exponentially in popularity to become the world's most widely used insecticides. Although there is considerable research concerning the lethality of neonicotinoids, their sub-lethal and developmental effects are still poorly understood, especially with regards to non-mammalian species. The goal of this research is to observe the effects of the neonicotinoid imidacloprid on physical and physiological development of northern bobwhite (*Colinus virginianus*) embryos, in ovo, at various stages of development. Bobwhite eggs ( $n = 250$ ) were injected with imidacloprid concentrations of 0 (sham), 10, 50, 100, and 150 g/kg of egg mass, administered on developmental day 0 (pre-incubation), 3, 6, 9, or 12. Embryos were staged and dissected on day 19 and heart, liver, lung and kidney were measured and preserved for future DNA

testing. Preliminary results show instances of severe physiological defects, and organs which differ significantly in mass from sham specimens. Future research will include hatching dosed eggs to determine if embryonic exposure of imidacloprid affects the cardiovascular fitness of adult birds. Further, transcriptomics analyses will be completed to evaluate how genes influence susceptibility to the insecticide.

## **59. AVIAN DIVERSITY IN EARLY-TO MID-ROTATION EUCALYPTUS PLANTATIONS IN SOUTHWEST LOUISIANA**

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**Abstract:** Eucalyptus (*Eucalyptus spp.*) plantations have the potential to boost availability of small-diameter hardwood for pulpwood or bioenergy feedstock, and acreage of eucalyptus in Texas and Louisiana has grown by approximately 3,000 acres per year since 2007. However, implications of this change for native wildlife species are largely unknown. To examine biodiversity within eucalyptus plantations, we investigated breeding bird abundance, occupancy, and diversity within five 1-year-old eucalyptus plantations in southwestern Louisiana and compared them to an equal number of reference slash pine (*Pinus elliottii*) stands of roughly the same age (1-year-old) and vegetation structure as the eucalyptus stands (6-year-old). Single 500-m transects  $\geq 50$ -m away from stand edges were established in each stand and surveyed five times during breeding season. A total of 27 avian species was detected and determined to be utilizing survey areas. Preliminary analysis of variance tests indicated greater detections of blue grosbeak ( $P = 0.036$ ) and indigo bunting ( $P = 0.0012$ ) in eucalyptus stands than 6-year-old pine and greater detections of prairie warbler ( $P = 0.0436$ ) and eastern towhee ( $P = 0.0059$ ) in 6-year-old pine stands than eucalyptus. Detection of red-headed woodpeckers were higher in stands of 1-year-old pine than in eucalyptus ( $P = 0.0481$ ). Yellow-breasted chat detections differed among all stand types ( $P = 0.008$ ), with 6-year-old pine stands having the greatest number. While most species were similar across all stand types, specialists such as eastern meadowlarks and eastern kingbirds were only detected in 1-year-old pine stands. We will use DISTANCE and PRESENCE software to further compare avian communities among stands and identify vegetation characteristics influencing abundance and occupancy.

## **60. AN EVALUATION OF STRIP-TRANSECTS FOR WINTERING WATERFOWL ON NATIONAL WILDLIFE REFUGES**

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**Abstract:** Aerial surveys have long been conducted on National Wildlife Refuges (NWR) as a means to gauge abundance of migrating and wintering waterfowl. Most refuges rely on cruise surveys, which are a census attempt and do not yield confidence limits or estimates of precision. In an attempt to improve on survey methodology and get local abundance information for use in biological planning efforts, we piloted the use of strip-transects on Sequoyah NWR, Oklahoma, and Washita NWR, Oklahoma. Our goal was to design a relatively precise survey ( $CV < 20\%$ ) for focal species or focal guilds of waterfowl. Surveys were conducted both on and off refuge, with one-half of the survey area covered by strip-transects at each refuge. Eleven surveys of wintering waterfowl were conducted at Sequoyah NWR between February 2012 and February 2014, and 7 were conducted at Washita NWR between November 2012 and February 2014. Precision was evaluated across surveys that occurred within the same month (regardless of year) and for individual surveys. Precision across survey periods of the same month was acceptable; for example, Mallards (*Anas platyrhynchos*) at Sequoyah NWR had CVs (SE of population estimate / population estimate) of 33%, 13%, and 17% in December ( $n = 2$  surveys), January ( $n = 4$ ), and February ( $n = 3$ ), respectively. Precision of individual surveys was poor, however. At Washita NWR precision was evaluated for dabbling ducks, diving ducks, Canada Geese (*Branta canadensis*), and light geese; CVs were consistently greater than 20% for diving ducks, Canada Geese, or light geese, and they were below 20% for dabbling ducks on only 1 of 7 survey occasions. At Sequoyah NWR performance of individual surveys was evaluated for Mallards, Gadwall (*Anas strepera*), other dabblers, diving ducks, and geese; individual surveys yielded acceptable precision on 1 of 11 survey occasions for Mallards, 1 of 11 occasions for Gadwall, and on 2 of 11 occasions for other dabblers. Poor precision of individual surveys was likely related to uneven distribution of waterfowl on the landscape. Surveys of refuges or similar areas (e.g., wildlife management areas) may yield acceptable population abundance information for a given period (e.g., month) when multiple surveys can be combined. However, if the goal is to obtain meaningful abundance estimates for a single point-in-time, then aerial surveys are likely not a viable option.

## **61. ANALYZING ENVIRONMENTAL DRIVERS AND THEIR EFFECTS ON MOVEMENT AND CONNECTIVITY OF NORTHERN BOBWHITES**

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**Abstract:** Northern bobwhite (*Colinus virginianus*) populations have precipitously declined since the 1960s, with multiple variables implicated as the proximate cause, including habitat fragmentation. Technology has historically limited our ability to determine how bobwhites actually respond to habitat fragmentation and how best to convert fragmented areas for use by bobwhite populations. One emerging field gaining ground in wildlife conservation is corridor ecology, whereby fragmented habitat is connecting by way of habitat corridors; thus, connecting, or perhaps reconnecting, isolated populations. Here, we propose to determine if and how bobwhites use corridors and how they differ from or alter home ranges. We will monitor wild bobwhite populations by way of conventional radio telemetry and new GPS telemetry, previously non-attempted in bobwhites, to analyze annual movements. We will assess movement patterns in relation to several environmental drivers including habitat structure and composition, moisture and thermal influences, food availability, and other resource needs throughout their lifecycle. Resulting data should aid in defining and determining the existence and potential utility of corridors as conduits of movement for bobwhites. This information will also be useful in assessing the effects of environmental drivers on bobwhite movements, and provide an understanding of how, when, and why bobwhites utilize certain land cover types and how best to implement conservation management practices.

## **62. INVERTEBRATE AND SEED BANK POTENTIAL OF MOIST SOIL MANAGEMENT UNITS IN WEST TEXAS AND THE LOWER RIO GRANDE VALLEY**

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**Abstract:** Moist soil impoundments in the Southwestern US provide food resources to waterfowl, shorebirds and other wildlife. Waterfowl and shorebirds consume seeds and invertebrates to meet the nutritional needs of migration and molting in the Southwest. We created moist and wet conditions in soil core samples collected from wetland units to determine the plant species germinating under those treatments. We conducted water column and benthic core samples to monitor invertebrate biomass and diversity. Our research will assist wetland biologists to make informed decisions in managing wetlands in Texas and New Mexico.

### **63. SEASON OF PRESCRIBED BURNING ON OLD WORLD BLUESTEM MORTALITY**

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**Abstract:** Non-native Old World bluestems, particularly Kleberg bluestem (*Dicanthium annulatum*), have created vast acreages of monocultures, resulting in difficulties for land managers to restore native perennial grass communities. The purpose of this research is to determine how varying the season of prescribed burning (SOB) affects the relationships between Kleberg bluestem and other native vegetation. This study is being conducted at the South Pasture Research Facility in Kleberg County, Texas. We have established ten permanent plots with grazing exclosures, each approximately 10 m<sup>2</sup>, to investigate the influence of season of burning on vegetation. Four plots are being treated with summer burns and four plots with winter burns while the remaining two plots will receive no burning treatment. Using permanently fixed quadrats and marked individuals, mortality and recruitment densities are being sampled before and after burning treatments. There was a weak SOB effect on adult bluestem mortality ( $P = 0.066$ ) with summer burning mortality being higher than winter burning mortality, while native individuals were not affected ( $P = 0.7826$ ). An interaction between SOB and time since treatment affected dead-crown density, which was higher in summer-plots following treatment and remained constant across all control and winter treatments. Further sampling is being conducted to assess shifts in community composition and any associations between neighboring species, as well as individual perennial grass morphology and production. By studying effects of different seasons of prescribed burning, we hope to improve understanding of the best use of fire for managing invasive Old World bluestems.

### **64. CONSERVING SOUTH TEXAS BIRDS THROUGH GK-12 EDUCATION AND CITIZEN SCIENCE**

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**Abstract:** Over 540 bird species have been recorded in South Texas, making this a prime location for birdwatchers and wildlife enthusiasts. To document these bird species, the South Texas Wintering Birds website has acted as a collection of these sightings for the past 7 years. To further this effort, an educational outreach component to increase the involvement of K-12 students is being proposed. Public schools do not emphasize natural history or wildlife into their curricula nor do many teachers have the background to integrate these subjects into their classroom. This project will help alleviate this issue and provide the community with wildlife education to enhance the knowledge of birdlife in South Texas. In this study, wild bird education curriculum aligned with state standards will be developed for use in elementary, middle, and high school classrooms and assessed for the students' interest and knowledge of wildlife prior to and after the program. Teachers will participate in workshops to gather the background and information they need in order to conduct lesson plans successfully. Teachers will also be assessed on their knowledge and interest in wildlife prior to and after the program and participate in evaluations of the lesson plans created. In addition, students and the community will be further introduced to the South Texas Wintering Birds website as a citizen science opportunity to document bird sightings. Lessons and activities created will provide local teachers with additional tools to incorporate wildlife and the environment into their classrooms and for students to be given the opportunity to apply science and math concepts to the real world.

## **65. A COMPARISON OF THE ARBOREAL BEHAVIOR OF OLD WORLD, NEW WORLD, AND HYBRID COLUBRID SNAKES**

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**Abstract:** Colubrid snakes have been documented to hybridize in the wild. While there is data on hybridization, there is a lack of data on how behavior in hybrid offspring differs from their pure parents. A total of 24 Colubrid snakes was observed for their arboreal behavior and hide box selection. These snakes had been allocated into 6 different testing groups, group 1 consisting of 4 yearling corn snake/rat snake hybrids (*Pantherophis* + *Scotophis*), group 2 consisting of 4 pine snake/rat snake hybrids (*Pituophis* + *Scotophis*), group 3 consisting of 4 second generation intergrade rat snakes (50% *Scotophis obsoleta*, 37.5% *S. alleghaniensis*, 12.5% *S. spiloides*), group 4 consisting of 4 yearling Okeetee corn snakes (*Pantherophis guttatus*), group 5 consisting of 4 Texas rat snakes (*Scotophis obsoleta*), and group 6 consisting of 4 trinket snakes (*Coelognathus helena helena*). All snakes were captive born and all groups except group 5 consisted of siblings. Snake groups were placed in testing tanks with 2 identical hide box options in different elevations within the tank. Paper towels were used as the cage substrate and a water dish was provided. Animal feeding was synchronized and one round of data collection occurred for each group. Each round consisted of 5 days of data collection with tanks being checked 5 times daily. The arboreal behaviors and hide box selections were documented and differences between groups and sexes were analyzed. Chi-square results show arboreal preference for groups 1, 2, 3, and 6, a terrestrial preference for group 4 and no distinct preference for group 5 ( $X^2 = 0.640$ ,  $df = 1$ ,  $n = 4$ ,  $P \leq 0.05$ ). One way ANOVA and Tukey HSD tests indicate that group 1 and group 2 had a significantly higher selection of the arboreal locations than group 4 at the 0.05 level of significance. These data indicates that there are

alterations of behavior in hybrid colubrids and this may have implications on management strategies on threatened avian species found within hybrid zones.

## **66. NORTHERN BOBWHITE USE OF WOODY COVER IN THE SOUTHERN EDWARDS PLATEAU**

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**Abstract:** Northern bobwhite (*Colinus virginianus*) populations have declined substantially within the Edwards Plateau. Although the proximate cause(s) of this decline is unknown, it has been suggested that decades of excessive herbivory via livestock and native and exotic wildlife have been detrimental to bobwhites within this region. One feature of bobwhite habitat, woody cover, may be suppressed in areas where browsing remains high. Bobwhites require low-growing woody plants for thermal and escape cover. Furthermore, understanding how woody cover should be interspersed across the landscape may be critical in restoring bobwhites across the region. In 2014, we initiated a study in Real County, Texas to determine what habitat components were most important in providing occupancy of bobwhites across a ranch recovering from decades of over-abundant livestock, exotic game, and white-tailed deer. We trapped and radio-marked bobwhites across 3 different plant communities with varying amounts of woody cover and tracked these birds 2-3 times/week and marked their locations via GPS. We will run a proximity analysis of bobwhite locations to woody cover and compare this data to the proximity of randomly generated points to delineated woody plants across 3 areas with varying amounts of woody cover. Determining bobwhite selection of interspersed patches of woody cover will aid managers in planning brush management and restoration within the Edwards Plateau.

## **67. EFFECTS OF PREDATOR ABUNDANCE ON NORTHERN BOBWHITE NEST SUCCESS**

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**Abstract:** The northern bobwhite (*Colinus virginianus*) is an important game bird in Texas. Much is known about bobwhite nesting ecology; however, relatively little is understood regarding how predator abundance influences nest fate. The objective of our research was to determine how nest predator abundance influences nesting success. Our study was conducted on 4 spatially independent study sites across South Texas 2000–2008, and 2014 in Brooks, Goliad, Real, and Zavala counties. Predator

abundance was determined by running scent stations 3-consecutive days/month and averaged each month during the breeding season. Nest fates (successful or depredated), determined by radio-telemetry, will then be correlated to the nearest scent station and its respective predator abundance. Data analyses are ongoing. Our study will conclude in 2016.

#### **68. HABITAT-SUITABILITY BOUNDS OF WOODY AND HERBACEOUS COVER FOR NORTHERN BOBWHITES**

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**Abstract:** Across their range, northern bobwhites (*Colinus virginianus*) inhabit a variety of vegetation community types with varying amounts of woody and herbaceous cover. According to the theory of slack in the use of habitat, bobwhites can substitute habitat components with similar components when one is lacking (e.g., woody cover for herbaceous cover and vice versa). This phenomenon has made it difficult for wildlife biologists to manage for optimal amounts of woody and herbaceous cover across the bobwhites' range. The objective of this study was to quantify the suspected relationship between herbaceous and woody cover in bobwhite habitat. We captured bobwhites on 3 spatially independent ranches in 3 counties (Goliad, Zavala, and Real) across South Texas. Each ranch contained contrasting vegetation communities ranging from mid-grass coastal prairie, sparse Tamaulipan thornscrub, post-oak savannah, short-grass/live oak savannah, and shrubby shin oak shrub-lands. Bobwhites were fitted with radio-transmitters and monitored 2–3 days/week. We measured woody canopy cover, herbaceous canopy cover and height, and screening cover at bobwhite locations and at paired random locations. We analyzed the relationship between herbaceous and woody cover using simple linear regression. Woody canopy cover was 200% greater at bobwhite points-of-use than at random locations. There was a relationship between herbaceous and woody cover where herbaceous cover was greater with less woody cover and vice versa at bobwhite locations. Understanding this relationship will aid managers in managing for optimal levels of cover for bobwhites throughout South Texas.

#### **69. INVASIVE SPOTTED KNAPWEED INTRODUCED TO TEXAS THROUGH NATIVE GRASS SEEDING**

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**Abstract:** Spotted knapweed (*Centaurea stoebe*), native to Europe and western Asia, was first documented in North America in 1893. It is now established throughout much of the continental United

States and listed as a noxious weed in 16 states due to its invasive nature and deleterious effects on native ecosystems. Here we report on the spread of this plant into Texas via contaminated native grass seed. In June and July 2014, we discovered that this plant had been introduced on Balcones Canyonlands National Wildlife Refuge in 4 areas that had been planted with a native grass seed mixture in May 2013. All 18 of the spotted knapweed plants found were collected as voucher specimens or dug up, bagged in multiple layers of plastic, and placed in a commercial waste container for disposal at a landfill. We concluded that the source of the infestation was the native grass seed, and not contamination of equipment used on the sites, because that was the only factor common to all invasion sites. In addition, the occurrence of spotted knapweed at sites seeded by 2 separate purchases of seed suggests that there were likely other areas in Texas inadvertently seeded with spotted knapweed seed as a contaminant. All land managers in the state need to be vigilant for this species on sites seeded with native grass seed purchased since the fall of 2012.

## **70. INTERNET MEDIA AS A TOOL FOR QUAIL CONSERVATION AND OUTREACH**

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**Abstract:** Since the late 1970s, northern bobwhite (*Colinus virginianus*) and scaled quail (*Callipepla squamata*) populations have dramatically declined over much of their range in Texas. The Reversing the Decline of Quail in Texas Initiative combines research and education regarding this dilemma. Involving the public in mitigating the causes of decline through direct management and conservation education strategies is a must to stop the decline. Traditional forms of education often involved face-to-face interaction with clientele that make up the agricultural community. There is another group of internet-based constituents whose primary knowledge comes from electronic resources. We combine traditional (high-touch) methods with novel (high-tech) ways to expand the reach of science-based information. There is the potential for synergy between the two. For conservation education related to quail, traditional methods include: county programs, Quail Appreciation Days, the Texas Quail Index, Quail Masters, Bobwhite Brigades, and Distinguished Lectureship in Quail Management. Novel methods include internet-based options like webinars, social media, videos and blogs. From 1 September 2013–15 October 2014, comparisons were made between the two methods. Traditional methods reach 1,045 people, while novel methods reached 251,909, roughly 250 times more people. Novel methods are easily shared among information consumers, effectively multiplying the reach of information created by the Texas A&M AgriLife Extension Service. Given the size of internet users (1.1 billion active Facebook participants, alone), there is great potential to reach people who may not attend traditional outreach events. Likewise, novel methods have the potential to attract users with greater diversity of ages, interests and geographic localities than using traditional methods alone.

## **71. PREVALENCE OF THE LETHAL RACCOON ROUNDWORM AND IMPLICATIONS FOR NORTHERN BOBWHITES**

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**Abstract:** Northern bobwhite (*Colinus virginianus*) populations have declined approximately 80% over the last 40 years, while raccoon (*Procyon lotor*) populations continue to rise. Previous research has evaluated the correlation between raccoons and quail; however, no definitive link has been determined. Here, we investigate the prevalence of a parasitic nematode (raccoon roundworm, *Baylisascaris procyonis*) which resides in the intestines of raccoons and its implication on northern bobwhites. In North America, 70% of adult raccoons and 90% of juvenile raccoons are infected with raccoon roundworm. Raccoons defecate in the environment, releasing parasitic eggs, and the undigested seeds of the scat are ingested by bobwhites. In the bobwhite gut, newly hatched raccoon roundworms eat through the intestines of the bobwhite, often hosting in the brain, causing severe neurological damage. Recent field reports describe bobwhite quail in neurological distress with ruffled feathers, blindness, loss of balance, and an inability to fly. This abnormal behavior leads to death, completing the cycle for raccoons, and potentially contributing to the precipitous population decline of northern bobwhites. This study will verify the presence of raccoon roundworm and prevalence of the parasite on 10 study sites and the pathology to bobwhite quail, ultimately illuminating the parasites contribution to the decline in northern bobwhites.

## **72. GRASSLAND-DEPENDENT SPARROWS AND KING RANCH BLUESTEM ON SMALL, ISOLATED PRAIRIES IN SOUTHEASTERN TEXAS**

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**Abstract:** Many small and isolated prairies occur on the Sam Houston National Forest (SHNF) in southeastern Texas. These naturally disjunct prairies are an isolated extension of the southern portion (Fayette Prairie) of the larger blackland prairie ecoregion. Much of the prairie vegetation either disappeared or has been heavily altered by fire suppression, grazing, development, and agriculture. A more recent threat comes from the establishment of the invasive King Ranch (KR) bluestem (*Bothriochloa ischaemum*), a native grass of Europe and North Africa. It has been planted in Texas by ranchers as cattle forage, and by the highway department along roadsides. From there, seed is unintentionally spread to other areas where it aggressively competes for space with native prairie vegetation, significantly altering the plant composition at some sites. In June 2014, the percent of area covered in KR bluestem at nine prairies on the SHNF ranged from 1.3% to 32% where it often grows in dense homogeneous stands. Several species of grassland-dependent sparrows overwinter on these prairies. Notable among them are three species in the genus *Ammodramus*, including Le Conte's Sparrow (*A. leconteii*), Grasshopper Sparrow (*A. savannarum*), and Henslow's Sparrow (*A. henslowii*). The latter is of particular interest due to conservation concerns. We measured several habitat variables at each point where individual *Ammodramus* sparrows were initially flushed at nine prairies, including the percent of KR bluestem coverage within a 1x1 meter plot. Among 471 *Ammodramus* points, only 34 (7.2%) were dominated by KR bluestem (i.e., KR bluestem coverage  $\geq 50\%$ ) suggesting these birds avoid areas of heavy KR bluestem coverage. A reduction in the amount of prairie habitat available for these

overwintering grassland-dependent sparrows will result if they are indeed avoiding areas taken over by KR bluestem.

### **73. AN EXAMINATION OF GENE FLOW BETWEEN DISTINCT MANAGEMENT UNITS OF THE REDDISH EGRET**

**Golya Shahrokhi**, Department of Biology, Texas State University – San Marcos, TX, 78666, US  
**Clay M. Green**, Department of Biology, Texas State University – San Marcos, TX, 78666, US

**Abstract:** Reddish egret (*Egretta rufescens*) is one of the rarest herons in North America. This plumage dimorphic species ranges from western Mexico including Baja California, to Texas and to the Bahamas, the easternmost portion of its range. The global population has been estimated between 5,000–7,000 individuals. Previous research on gene flow (i.e., microsatellites) across the range revealed distinct populations in Baja California, Texas and the Bahamas; however, important populations in Chiapas, Yucatan, and Florida have not been examined. Furthermore, studies examining mitochondrial DNA (mtDNA) variation in Texas population showed no differentiation within Texas and between color morphs. Our research will use 8 microsatellite loci primers to fill in the gaps across the species' range including samples from Florida, Louisiana, Chiapas and Yucatan and to examine potential gene flow between these distinct populations. We also will use specific regions of mtDNA to examine population structure between regions and also between colonies in each region. Understanding genetic variation and gene flow structure between colonies and regions will aid in developing management strategies for conserving this rare species.

### **74. ROTATIONAL CATTLE GRAZING EFFECTS ON NORTHERN BOBWHITE POPULATION DYNAMICS**

**Shannon Cain**, UNT Quail, The University of North Texas, Denton, Texas 76203, USA  
**Kelly S. Reyna**, UNT Quail, The University of North Texas, Denton, Texas 76203, USA

**Abstract:** Northern bobwhite populations (*Colinus virginianus*) have declined 80% since 1967 and many factors have been determined to be proximate causes including habitat fragmentation and loss, both directly and indirectly from cattle grazing. One emerging notion is that planned rotational grazing benefits cattle, range conditions, and wildlife. Accordingly, we propose to examine indices of bobwhite population dynamics in relation to rotational cattle grazing regimes. Indices of suitable nest structure, nesting success, food availability, and brooding and protective cover will be measured before grazing, immediately after grazing, and at distinct subsequent intervals. Bobwhite movements in relation to grazing will be recorded, and weather parameters will be analyzed. Results will illuminate the relationship between rotational cattle grazing and local bobwhite populations and should provide land managers with information to make key cattle and wildlife management decisions.

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