TEXAS SOCIETY OF MAMMALOGISTS



PROGRAM, ABSTRACTS, AND NEWSLETTER 33rd Annual Meeting 13-15 February 2015 Texas Tech University Center at Junction

Texas Society of Mammalogists

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Cover illustration of a gopher, genus Thomomys, by Terry Maxwell.

Texas Society of Mammalogists 33rd Annual Meeting 13-15 February 2015

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2015 Program Schedule

Friday, 13 February

3:00-7:30pm	Registration	Dining Hall
6:00pm	Dinner (serving line open 6:00-6:30pm)	Dining Hall
7:00pm	Announcements/Welcome Address TSM President Scott Chirhart	Dining Hall
7:30pm	Poster Presentations	Dining Hall
8:30pm	Meeting of the Executive Committee	Packard Building

Saturday, 14 February

7:00am	Breakfast and Registration (serving line open 7:00-7:30am)	Dining Hall
8:00am	Introduction and Announcements TSM President Scott Chirhart	Dining Hall

PAPER SESSION – Dining Hall

(Presenters' names are underlined)

Chair: Matt Mauldin, Centers for Disease Control

Papers 1-9 are to be considered for the TSM Award.

- 8:05 Paper 1 **EVOLUTION OF THE ZONADHESIN GENE DEPICTS A UNIQUE HISTORY DURING THE ORIGIN OF EUTHERIAN MAMMALS** <u>Emma K.</u> <u>Roberts¹</u>, Daniel M. Hardy², Roy N. Platt II¹, Caleb D. Phillips⁴, and Robert D. Bradley^{1,3}. ¹Department of Biological Sciences, Texas Tech University, ²Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, ³Natural Science Research Laboratory, Museum of Texas Tech University, ⁴Research and Testing Laboratory, Lubbock, Texas.
- 8:20 Paper 2 **IDENTIFYING ECOLOGICAL CORRELATES OF HANTAVIRUS PREVALENCE IN SMALL MAMMAL ASSEMBLAGES WORLDWIDE** <u>Matthew</u> <u>T. Milholland</u>¹, Gabriel E. García-Peña^{2,3,4}, Gerardo Suzán Azpiri², James N. Mills⁵, and Iván Castro-Arellano¹. ¹Department of Biology, Texas State University, ²Departamento de Etología y Fauna Silvestre, Facultad de Medicina Veterinaria y Zootecnia, Universidad Nacional Autónoma de México, ³UMR MIVEGEC, Maladies Infectieuses et

Vecteurs: Ecologie, Génétique, Evolution et Contrôle, ⁴Centre de Synthèse et d'Analyse sur la Biodiversitè, ⁵Emory University – Population Biology, Ecology, and Evolution Program.

- 8:35 Paper 3 **DOES PHYLOGENETIC EVIDENCE EXIST TO EXCLUDE** *ISTHMOMYS* **FROM** *PEROMYSCUS*? <u>Megan S. Keith¹</u>, Robert D. Bradley^{1,2}, and Roy N. Platt II^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Natural Science Research Laboratory, Museum of Texas Tech University.
- 8:50 Paper 4 ELUCIDATION OF SINE SUBFAMILIES IN PEROMYSCUS MANICULATUS <u>Kevin A. M. Sullivan</u>, Roy N. Platt, Robert D. Bradley, and David A. Ray. Department of Biological Sciences, Texas Tech University.
- 9:05 Paper 5 DIVERSIFICATION OF TERRESTRIAL SMALL MAMMALS ACROSS THE ISTHMUS OF TEHUANTEPEC <u>Nicté Ordóñez-Garza¹</u> and Robert D. Bradley^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Museum of Texas Tech University.
- 9:20 Paper 6 **PATTERNS OF GENETIC DIVERSIFICATION IN A WIDELY DISTRIBUTED SPECIES OF BAT,** *MOLOSSUS MOLOSSUS* <u>Laramie L. Lindsey¹</u> and Loren K. Ammerman². ¹Department of Biological Sciences, Texas Tech University, ²Department of Biology, Angelo State University.
- 9:35 15 Minute Break

Chair: Ray Willis, Midwestern State University

- 9:50 Paper 7 UNDERSTANDING LINE RETROTRANSPOSON ACTIVITY IN SCIURIDS USING A NOVEL PHYLOGENOMIC METHOD Sarah Mangum, Neal Platt, and David Ray. Department of Biological Sciences, Texas Tech University.
- 10:05 Paper 8 EDAPHIC FACTORS AS A MEASUREMENT OF SPATIAL DIVISION BETWEEN OCELOT, *LEOPARDUS PARDALIS* (CARNIVORA: FELIDAE), AND BOBCAT, *LYNX RUFUS* (CARNIVORA: FELIDAE), HABITAT IN SOUTH TEXAS Justin P. Wied, Jon S. Horne, and Michael E. Tewes. Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville.
- 10:20 Paper 9 THE REPRODUCTIVE ANATOMY OF FEMALE COMMON BOTTLENOSE DOLPHINS (TURSIOPS TRUNCATUS) FROM TEXAS Dara N. Orbach, Christopher D. Marshall, and Bernd Würsig. Department of Marine Biology, Texas A&M University at Galveston.
- Papers 10 17 are to be considered for the William B. Davis Award.
- 10:35 Paper 10 A SYNOPTIC MODEL OF OCELOT AND BOBCAT SPACE USE John P. Leonard¹, Eric L. Rulison¹, Tyler Campbell², Alfonso Ortega-Sanchez², Justin P.

Wied¹, G. Wesley Watts III¹, and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ² East Wildlife Foundation.

- 10:50 Paper 11 INVADERS OF THE GULF COASTAL PRAIRIE: EFFECTS OF INVASIVE ANTS ON SMALL MAMMALS AND TICKS <u>Adrian A. Castellanos¹</u>, Sarah A. Hamer², Lisa D. Auckland², Gabriel L. Hamer³, Michael E. Morrow⁴, Pete D. Teel³, and Jessica E. Light¹. ¹Department of Wildlife and Fisheries Sciences, Texas A&M University, ²Department of Veterinary Integrative Biosciences, Texas A&M University, ³Department of Entomology, Texas A&M University, ⁴U.S. Fish and Wildlife Service.
- 11:05 Paper 12 BASELINE BIODIVERSITY ASSESSMENT OF SMALL MAMMALS, TICKS, AND TICK-BORNE PATHOGENS IN SOUTH TEXAS <u>Aleyda P. Galán¹</u>, Hunter A. Folmar¹, Sarah A. Hamer², Tyler A. Campbell³, Jessica E. Light¹.
 ¹Department of Wildlife and Fisheries Sciences, Texas A&M University, ²Department of Veterinary Integrative Biosciences, Texas A&M University, ³East Wildlife Foundation.
- Paper 13 INTERGROUP VARIATION IN ESTROGENIC PLANT CONSUMPTION FOR THE BLACK-AND-WHITE COLOBUS MONKEY, COLOBUS GUEREZA OF KILBALE NATIONAL PARK, UGANDA Kathryn M. Benavidez¹, Tara R. Harris², Colin A. Chapman³, Dale C. Leitman⁴, Jessica Rothman⁵, and Michael D. Wasserman⁶. ¹Department of Biology, Texas State University, ²Director of Conservation, Minnesota Zoo, ³Department of Anthropology, McGill University, ⁴Department of Nutritional Science and Toxicology, University of California, Berkeley, ⁵Department of Anthropology, Hunter College, CUNY, ⁶Department of Environmental Science and Policy, St. Edward's University.
- 12:15 **Lunch** (serving line open 12:15-12:45pm)
- 1:15 Group Photo behind the Packard Building

PAPER SESSION – Dining Hall

Chair: Cory Ross, Texas A&M University - San Antonio

- 1:45 Paper 14 SEASONAL FLUCTUATIONS IN ROOST USE BY TADARIDA BRASILIENSIS IN A HIGHWAY OVERPASS, SAN ANGELO, TOM GREEN CO., TEXAS <u>Stephanie G. Martinez</u>, Loren K. Ammerman, and Robert C. Dowler. Department of Biology, Angelo State University.
- 2:00 Paper 15 **INNERVATION PATTERNS ACROSS THE PINNIPED MYSTACIAL VIBRISSAL ARRAY: A PRELIMINARY STUDY** <u>Erin E. Mattson¹ and Christopher</u> D. Marshall^{1,2}. ¹Department of Marine Biology, Texas A&M University at Galveston,

²Department of Wildlife and Fisheries Sciences, Texas A&M University at College Station.

- 2:15 Paper 16 ASSESSMENT OF INVASIVE MONGOOSE HOME RANGE AT FARMS WITH PRESENCE OF CATTLE FEVER TICKS IN PUERTO RICO Madison Torres¹, Candice Rodriguez¹, Joseph Veech¹, Adalberto A. Peréz de León², and Ivan Castro-Arellano¹. ¹Department of Biology, Texas State University, ²Knipling-Bushland U.S. Livestock Insects Research Laboratory, USDA - Agricultural Research Service, Kerrville, Texas.
- 2:30 Paper 17 **BOBCAT** (*LYNX RUFUS*) **POPULATION DRIVERS IN SOUTH TEXAS** <u>G. Wesley Watts III¹, Justin P. Wied¹, Arturo Caso¹, Sasha Carvajal¹, Alfonso Ortega-S., Jr.², Tyler Campbell², and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ²East Wildlife Foundation.</u>

Papers 18 - 19 are to be considered for the Rollin H. Baker Award.

- 2:45 Paper 18 ADDITIONAL RECORDS OF SMALL MAMMALS OF GUANDERA BIOLOGICAL RESERVE, CARCHI PROVINCE, ECUADOR AND COMPARATIVE ANDEAN SMALL MAMMAL ECOLOGY <u>A. Rachel Ritchie¹</u>, Thomas E. Lee, Jr.¹, Sarah Vaca-Puente², Santiago F. Burneo², and Alejandra Camacho².
 ¹Department of Biology, Abilene Christian University, ²Sección Mastozoología - Museo de Zoología, Pontificia Universidad, Católica del Ecuador.
- 3:00 Paper 19 **BEHAVIOR PATTERNS OF TROPICAL CATS IN THE TAMAULIPAN BIOTIC PROVINCE** <u>Shelby B. Carter</u>, Michael E. Tewes, William C. Stasey, Arturo Caso, Sarah Carvajal, and Lauren Balderas. Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville.

Paper 20 is not competing for an award.

3:15 Paper 20 – **OCELOT POPULATION STATUS AND COMPARISON OF POPULATION ESTIMATES USING TWO ESTIMATION TECHNIQUES** <u>Eric L.</u> <u>Rulison¹</u>, Justin Wied¹, Arturo Caso¹, John Leonard¹, Daniel J. Kunz², Andrew N. Tri³, Alfonso Ortega-Sanchez⁴, Tyler Cambell⁴, and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, ² Texas Parks and Wildlife Department, ³Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, ⁴East Wildlife Foundation.

3:30 15 Minute Break

3:45pm Business Meeting Packard Building All members, including students, please attend!

5:30-9:00pm		Annual Banquet and Auction	Dining Hall
	5:30-6:30	Dinner (serving line open 5:30-6:00pm)	
	5:30	Silent Auction opens for bidding	
	6:30-7:00	Award Presentations	
	7:00-8:00	Guest Speaker Address:	

Gopher Bill and Me

(The importance of appreciating biodiversity through the lens of taxonomy and phylogenetics)

Dr. Rodney Honeycutt Pepperdine University

8:00-9:00	Live Auction Silent Auction ends 10 minutes after Live Auction	
Socializing	and Dancing	Dining Hall

Sunday, 15 February

9:00pm-?

7:30am	Breakfast (serving line open 7:30-8:00am)	Dining Hall
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Oral Presentation Abstracts

Paper 1

EVOLUTION OF THE ZONADHESIN GENE DEPICTS A UNIQUE HISTORY DURING THE ORIGIN OF EUTHERIAN MAMMALS <u>Emma K. Roberts¹</u>, Daniel M. Hardy², Roy N. Platt II¹, Caleb D. Phillips⁴, and Robert D. Bradley^{1, 3}. ¹Department of Biological Sciences, Texas Tech University, ²Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, ³Natural Science Research Laboratory, Museum of Texas Tech University, ⁴Research and Testing Laboratory, Lubbock, Texas. (emma.k.roberts@ttu.edu)

The reigning paradigm of cellular biology suggests that structure determines function with regard to protein interactions. Molecules that are directly involved in reproduction are often subject to rapid evolutionary change. Zonadhesin (ZAN) is a multi-domain sperm recognition protein that is crucial in species-specific fertilization. The mRNA for this protein spans more than 7 kb in most taxa with three domains that are directly related with facilitating the adhesion function of the protein, including a hemostatic glycoprotein called von Willebrand D (VWD) domain, mucin, and a receptor component. Mammalian VWD domains are highly variable between some taxa and conserved in others. The VWD domain mRNA sequences for sixteen different orders of placental mammals, including 54 species, were obtained from GenBank and Ensembl, aligned, and then analyzed using both Bayesian and maximum likelihood methods to generate a phylogenetic tree. In most cases, relationships corresponded to phylogenies recovered from other datasets. For example, Primates, Rodentia, Chiroptera, Perissodactyla, etc. each were recovered as monophyletic groups. Based on this study, baseline information suggests that variability among ZAN sequences in mammals is phylogenetically informative.

Paper 2

IDENTIFYING ECOLOGICAL CORRELATES OF HANTAVIRUS PREVALENCE IN SMALL MAMMAL ASSEMBLAGES WORLDWIDE <u>Matthew T. Milholland</u>¹, Gabriel E. García-Peña^{2,3,4}, Gerardo Suzán Azpiri², James N. Mills⁵, and Iván Castro-Arellano¹. ¹Department of Biology, Texas State University, ²Departamento de Etología y Fauna Silvestre, Facultad de Medicina Veterinaria y Zootecnia, Universidad Nacional Autónoma de México, ³UMR MIVEGEC, Maladies Infectieuses et Vecteurs: Ecologie, Génétique, Evolution et Contrôle, ⁴Centre de Synthèse et d'Analyse sur la Biodiversitè, ⁵Emory University – Population Biology, Ecology, and Evolution Program. (ic13@txstate.edu)

Zoonotic pathogens are the dominant cause of novel and reemerging infectious diseases. Hantaviruses (family *Bunyaviridae*) and their associated human diseases occur globally and differ according to their geographic distribution and type of illness exhibited in humans. Prevention of these diseases requires surveillance of seroprevalence in animal populations. Hantaviruses occur in close association with particular rodent, shrew, and bat reservoirs. Small mammal assemblage structure and species richness are suggested as strong drivers for the maintenance and spread of hantavirus infections. Dominance indices of competent hosts and assemblage characteristics may predict disease risk. We gathered abundance distributions from peer-reviewed literature reporting assemblages where individuals have been tested for hantavirus antibodies, and report at least one seropositive individual in the assemblage. Our objectives were: first, to determine the ecological correlates of hantavirus prevalence in small mammal assemblages by continent, hemisphere, and worldwide; second, to compare and contrast different diversity and dominance indices and the phylogenetic diversity with seroprevalence; and finally, to develop a predictive model for hantavirus prevalence in small mammal assemblages using defined ecological correlates. Preliminary results suggest a relationship between the weighted site seroprevalence and the relative species abundance, observed species richness, and phylogenetic relatedness of species within the assemblage.

Paper 3

DOES PHYLOGENETIC EVIDENCE EXIST TO EXCLUDE *ISTHMOMYS* **FROM** *PEROMYSCUS*? <u>Megan S. Keith¹</u>, Robert D. Bradley^{1,2}, and Roy N. Platt II^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Natural Science Research Laboratory, Museum of Texas Tech University. (megan.corley@ttu.edu)

Several studies have attempted to resolve phylogenetic relationships among *Peromyscus* and closely affiliated genera, yet despite the wealth of knowledge available for this group of rodents, many of these issues remain unresolved. The major phylogenetic conflict within this group concerns the treatment of closely related genera including *Peromyscus, Habromys, Isthmomys, Megadontomys, Neotomodon, Osgoodomys,* and *Podomys.* This study focuses on the taxonomic status of *Isthmomys.* A few studies have indicated a sister relationship between *Isthmomys* and *Reithrodontomys*; however, no study has been designed to rigorously test the phylogenetic placement of *Isthmomys.* To test the placement of *Isthmomys* with relation to *Peromyscus* and *Reithrodontomys* we used nodal support across various genes as well as overall likelihood scores of topologically constrained trees. Despite these analyses, preliminary results indicate that we were unable to confidently describe the relationship of *Isthmomys* with *Reithrodontomys* or *Peromyscus* utilizing genetic markers. These findings are interesting considering the disparity in gross morphological features between *Isthmomys* and other genera. Our results may demonstrate the necessity for increased genetic sampling to confidently place *Isthmomys*.

Paper 4

ELUCIDATION OF SINE SUBFAMILIES IN *PEROMYSCUS MANICULATUS* <u>Kevin A.</u> <u>M. Sullivan</u>, Roy N. Platt, Robert D. Bradley, and David A. Ray. Department of Biological Sciences, Texas Tech University. (kev.am.sullivan@gmail.com)

Transposable elements (TEs) are segments of DNA that can mobilize in a genome. They include diverse types including Short INterspersed Elements (SINEs), (Long INterspersed Elements (LINEs), Long Terminal Repeat (LTR) retrotransposons and DNA transposons. SINEs have been demonstrated to be a valuable marker set in phylogenetic analysis. We identified B2 SINEs in the recently released genome draft of *Peromyscus maniculatus* and characterized SINE subfamily evolution within the genome. In future work, we will use SINE loci to elucidate the phylogeny of *Peromyscus*, portions of which have proven difficult to resolve using more traditional methods. The identification of well-defined subfamilies and PCR results suggesting polymorphism of SINE insertion loci suggest that implementation of ME-scan, a TE analysis protocol, will lead to a well-resolved phylogeny of *Peromyscus*.

Paper 5 **DIVERSIFICATION OF TERRESTRIAL SMALL MAMMALS ACROSS THE ISTHMUS OF TEHUANTEPEC** <u>Nicté Ordóñez-Garza¹</u>, and Robert D. Bradley^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Museum of Texas Tech University. (nicte.ordonez-garza@ttu.edu)

Several species of terrestrial small mammals are co-distributed in the sparse highlands of Mesoamerica. This region has a complex history of formation that has shaped it for several million years. The objective of this study is to understand if the Isthmus of Tehuantepec (IT) is a vicariant barrier for the small mammals in the region, and to estimate the time of origin of this endemic fauna. Phylogenetic analyses of mitochondrial DNA of different species of Reithrodontomys, Peromyscus, and Neotoma were used to determine levels of inter-genetic differentiation, and to compare the phylogeographic signal of these taxa to aid in the interpretation of historical biogeographic events that may have broadly impacted these taxa across the IT. Sequences of cytochrome-b gene from samples collected in Mexico and Central America supported the taxonomic status of the *P. beatae* northwest of IT, and suggests that *P.* beatae southeast of the IT is a separate genetic unit. For Neotoma ferruginea, our results suggest it as a genetic unit different from *N. mexicana*, distributed west of the IT. A similar phylogenetic pattern occurs in Reithrodontomys mexicanus and other species co-distributed across the IT. Studies on several species of vertebrates of the same region are congruent with the lineage diversification during the end of the Pliocene and mostly during the Pleistocene, suggesting that climate change have an effect on the bio-diversification across the Mesoamerican highlands.

Paper 6

PATTERNS OF GENETIC DIVERSIFICATION IN A WIDELY DISTRIBUTED SPECIES OF BAT, *MOLOSSUS MOLOSSUS* Laramie L. Lindsey¹ and Loren K. Ammerman². ¹Department of Biological Sciences, Texas Tech University, ²Department of Biology, Angelo State University. (laramie.lindsey@ttu.edu)

The taxonomy and evolutionary relationships of the velvety free-tailed bat, *Molossus molossus*, from Central and South America long has been debated. Within this species, and in fact the entire genus *Molossus*, specimens have been difficult to identify and have presented several taxonomic challenges. The objective of this project was to characterize the genetic relationship among individuals representing subspecies of the widely distributed species, *M. molossus*. We tested the hypothesis that genetic patterns of diversification would reflect subspecies lineages. The mitochondrial gene, cytochrome b (cytb) was amplified and sequenced for specimens throughout its geographic range. A Bayesian analysis of 678 base pairs of the cytb gene was conducted for 63 specimens with *M. alvarezi* as an outgroup. Genetic divergence was estimated and haplotype analysis was conducted. Excluding the divergent Cuban specimens, ten haplotypes were recovered. The major haplotype was found in 60% of the samples and had a widespread geographic distribution. Our results showed that some subspecies such as M. m. daulensis and M. m. tropidorhynchus, based on morphology and geographic location, are consistent with the mitochondrial lineages recovered. However, not all currently recognized subspecies of *M. molossus* were recovered by this analysis. Overall there was low average divergence across all specimens (4.7%), however a mitochondrial lineage containing the Cuban subspecies, M. m. tropidorhynchus, was 7.9% divergent from the other M. molossus specimens.

This level of divergence and the recovery of a monophyletic lineage containing all Cuban specimens was consistent with recognition of the taxon as a distinct species.

Paper 7

UNDERSTANDING LINE RETROTRANSPOSON ACTIVITY IN SCIURIDS USING A NOVEL PHYLOGENOMIC METHOD <u>Sarah Mangum</u>, Neal Platt, and David Ray. Department of Biological Sciences, Texas Tech University. (sarah.mangum@ttu.edu)

Transposable elements (TEs) are selfish genetic elements capable of mobilizing in a genome. In most mammals, TEs occupy more than half of the genome. LINEs and SINEs are often the dominant active TE in mammalian genomes. Previous bioinformatic analyses identified reduced activity from the LINE-1 (L1) lineage in the genome of the thirteen-lined ground squirrel, *Ictidomys tridecemlineatus* (formerly known as *Spermophilus tridecemlineatus*). The reduction in L1 activity began 19-25 million years ago and all signs of activity ceased ~ 5 million years ago. LINE extinction events are rare in mammals. If verified, over one hundred sciurid species may have evolved under reduced or extinct L1 loads, an observation that would significantly alter our understanding of mammalian genomics. This study utilizes a high-throughput sequencing technique to investigate *Ictidomys* L1 extinction in the context of the broader sciurid phylogeny. Using degenerate L1 primers, ~450bp fragments from ORF2, reverse transcriptase, were amplified and sequenced. From the millions of resulting reads, L1 activity across the sciurid phylogeny was quantified using various distance and phylogenetic methods. By using taxa that diverged before and after the L1 extinction, we were able to quantify the potential for L1 activity across the phylogeny.

Paper 8

EDAPHIC FACTORS AS A MEASUREMENT OF SPATIAL DIVISION BETWEEN OCELOT, *LEOPARDUS PARDALIS* (CARNIVORA: FELIDAE), AND BOBCAT, *LYNX RUFUS* (CARNIVORA: FELIDAE), HABITAT IN SOUTH TEXAS Justin P. Wied, Jon S. Horne, and Michael E. Tewes. Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville. (justin.wied@students.tamuk.edu)

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 taken 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.

Paper 9 **THE REPRODUCTIVE ANATOMY OF FEMALE COMMON BOTTLENOSE DOLPHINS (***TURSIOPS TRUNCATUS***) FROM TEXAS <u>Dara N. Orbach</u>, Christopher D. Marshall, and Bernd Würsig. Department of Marine Biology, Texas A&M University at Galveston. (orbachd@tamug.edu)**

Dolphins, whales, and porpoises possess unique vaginal folds, the functions of which are unclear. Existing publications of the presence, numbers, shapes, and sizes of these structures are sparse and use inconsistent terminology and anatomical landmarks. The reproductive tracts of 11 female common bottlenose dolphins (Tursiops truncatus) that died along the Texas coast were used to develop a sampling protocol and test a functional hypothesis of the vaginal folds in postcopulatory control of paternity. Up to 22 gross morphological measurements were systematically collected using calipers and rulers. Variations in the number, development, and positioning of vaginal folds were assessed across age classes. Double-contrast vaginograms were performed on 3 specimens using computed tomography (CT) scans to compare and validate gross morphological measurements. The microanatomy of the vaginal folds and vaginal walls of 5 specimens was characterized using histological techniques (modified Mallory's trichrome stain). The average measurements for adults were larger than yearlings for all gross morphological calculations. The dolphins possessed two vaginal folds with similar positioning in the vagina across age classes. The cranial fold was substantially more developed than the caudal fold, particularly among adults. The microanatomy of the vaginal walls and vaginal folds consisted of loose connective tissue and smooth muscle bands. No skeletal muscle was found. There were no differences in the density of connective tissue or percent muscle banding per slide between the two tissue types (t= 1.079, d.f.= 87, p= 0.284). It is logistically challenging to observe the sociosexual behaviors of most free-ranging cetaceans. Anatomical data can provide insights into the evolution of cetacean reproduction and mating systems. Our protocol details how to analyze female cetacean reproductive tracts and can facilitate biologically meaningful comparisons between reproductive states, age classes, populations, and species. Alternative functional hypotheses of vaginal folds can then be addressed.

Paper 10

A SYNOPTIC MODEL OF OCELOT AND BOBCAT SPACE USE <u>John P. Leonard¹</u>, Eric L. Rulison¹, Tyler Campbell², Alfonso Ortega-Sanchez², Justin P. Wied¹, G. Wesley Watts III¹, and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ² East Wildlife Foundation. (john.leonard@students.tamuk.edu)

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. Throughout its range in the United States, it is sympatric with the bobcat (*Lynx rufus*). Using telemetry data collected from 2011 to 2014 with GPS and VHF collars, we developed several synoptic models of ocelot and bobcat space use. 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.

Paper 11

INVADERS OF THE GULF COASTAL PRAIRIE: EFFECTS OF INVASIVE ANTS ON SMALL MAMMALS AND TICKS <u>Adrian A. Castellanos¹</u>, Sarah A. Hamer², Lisa D. Auckland², Gabriel L. Hamer³, Michael E. Morrow⁴, Pete D. Teel³, and Jessica E. Light¹. ¹Department of Wildlife and Fisheries Sciences, Texas A&M University, ²Department of Veterinary Integrative Biosciences, Texas A&M University, ³Department of Entomology, Texas A&M University, ⁴U.S. Fish and Wildlife Service. (acastellanos@tamu.edu)

Ticks are important vectors of pathogens that impact both animal and human health. Small mammals serve as hosts for ticks and may serve as reservoirs for many tick-borne pathogens, making it necessary to examine small mammal and tick distributions and prevalence to better understand disease ecology and protect human and animal health. In the southeastern United States, small mammal and tick populations are affected by the presence of red imported fire ants (RIFA; Solenopsis invicta), an invasive predator that preys upon both vertebrate and invertebrate species. Our objective was to elucidate the impact of RIFA on tick-borne disease systems. Two field sites in Texas were assessed for interactions among small mammals, ticks, tick-borne pathogens, and RIFA. At each field site, treatment (to suppress RIFA populations) and control plots were sampled monthly using Sherman live traps and tick drag sampling to determine mammal and tick density and collect samples for pathogen testing. Field samples were processed in the lab using standard DNA extraction, PCR, and sequencing techniques to detect tick-borne pathogens belonging to the genera Borrelia, Ehrlichia, and Rickettsia. We captured over 1300 mammals of eight species, with the most abundant being the hispid cotton rat, Sigmodon hispidus. The most common tick species encountered was the Gulf Coast tick, Amblyomma *maculatum.* We have detected several species of human tick-borne pathogens within ticks and rodents, although all at low prevalence. Our data indicate that treatment plots (where RIFA populations are suppressed) have higher densities of small mammals and ticks relative to control plots, suggesting that RIFA may be impacting the ecology of tick-borne disease transmission at these study sites.

Paper 12

BASELINE BIODIVERSITY ASSESSMENT OF SMALL MAMMALS, TICKS, AND TICK-BORNE PATHOGENS IN SOUTH TEXAS <u>Aleyda P. Galán¹</u>, Hunter A. Folmar¹, Sarah A. Hamer², Tyler A. Campbell³, and Jessica E. Light¹. ¹Departement of Wildlife and Fisheries Sciences, Texas A&M University, ²Department of Veterinary Integrative Biosciences, Texas A&M University, ³East Wildlife Foundation. (agalan286@tamu.edu)

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, to serve as baseline data from which change can be monitored in the future given changes in land use and climate. Our primary objective is to document the diversity

of species of small mammals (primarily rodents), found on EWF properties 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 utilized several capture techniques including Sherman live traps, mist nets and opportunistic pitfall traps across two field seasons and documented the presence of 15 small mammal species, of which *Peromyscus leucopus* (the white-footed mouse) was most abundant. Here we present preliminary data of presence of tickborne pathogens in the genera *Borrelia* (causative agent for Lyme disease and other diseases) and *Rickettsia* (causative agents for spotted fevers and typhus). Using PCR and DNA sequencing, we are screening both rodents and ticks removed from rodents for these tick-borne pathogens. 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.

Paper 13

INTERGROUP VARIATION IN ESTROGENIC PLANT CONSUMPTION FOR THE BLACK-AND-WHITE COLOBUS MONKEY, *COLOBUS GUEREZA* OF KILBALE NATIONAL PARK, UGANDA <u>Kathryn M. Benavidez¹</u>, Tara R. Harris², Colin A. Chapman³, Dale C. Leitman⁴, Jessica Rothman⁵, and Michael D. Wasserman⁶. ¹Department of Biology, Texas State University, ²Director of Conservation, Minnesota Zoo, ³Department of Anthropology, McGill University, ⁴Department of Nutritional Science and Toxicology, University of California, Berkeley, ⁵Department of Anthropology, Hunter College, CUNY, ⁶Department of Environmental Science and Policy, St. Edward's University. (kmb238@txstate.edu)

Alterations in diet have occurred throughout the evolutionary history of primates, including the *Homo* lineage. Currently, a distinct change in the modern human diet is occurring with an increase of soy consumption in many parts of the world. However, the physiological and behavioral implications of this change are unclear. Soy possesses phytoestrogens, which are estrogen mimics that are known to have effects on reproductive physiology and behavior in vertebrates, but effects on wild primates are not well understood. We observed the behavioral activities of eight black-and-white colobus monkey troops (Colobus guereza) living in Kibale National Park, Uganda, for one year, with a focus on dietary strategies. We analyzed staple plant foods of the monkeys to determine estrogenic activity using transient transfection assays and examined intergroup variation in the consumption of estrogenic plants across the eight groups. The percent of diet coming from these estrogenic plant items varied from 1.24 to 5.85. To test for behavioral effects of phytoestrogen consumption, we examined the relationship between percent of diet from estrogenic plants and percent of time spent grooming and self-grooming, with no significant trends detected. As effects of estrogenic plant consumption occur at the individual level, future research will examine changes in hormone levels before and after consumption of the identified estrogenic plant items. By further examining variation in phytoestrogen consumption both within and across primate species, we hope to clarify the role of these estrogenic compounds in the evolutionary history of modern humans.

Paper 14

SEASONAL FLUCTUATIONS IN ROOST USE BY TADARIDA BRASILIENSIS IN A HIGHWAY OVERPASS, SAN ANGELO, TOM GREEN CO., TEXAS <u>Stephanie G.</u> <u>Martinez</u>, Loren K. Ammerman, and Robert C. Dowler. Department of Biology, Angelo State University. (smartinez60@angelo.edu)

Previous research has documented that populations of Brazilian Free-tailed Bats, Tadarida brasiliensis, use highway overpasses as day roosts in parts of central Texas. Such populations are known to fluctuate in size seasonally, but few colonies in western Texas have been studied. In this study, we surveyed a large population of T. brasiliensis roosting in a highway overpass in San Angelo, Tom Green County, Texas to determine if roost use has changed since the site was last surveyed in 1995. Population counts and roost use were documented from February 2014 through January 2015 by recording the percentage of bridge crevices occupied by bats. An estimate of 2.7 bats per 1 cm of crevice length was used to calculate the estimated total number of bats. The fluctuations we observed in spring and summer were consistent with previously documented seasonal activity for T. brasiliensis in Texas. At the end of November occupancy decreased substantially. The lowest occupancy recorded (0 bats) was during January 2015, and the highest occupancy recorded was during August 2014 with an estimated 191,795 bats. We noted that during times of extended rainfall, the bridge expansion joints filled with and heavily dripped rainwater, causing many roosting areas of the bridge to be wet and often not habitable. Because of this, many bats temporarily relocated during rainy weather conditions. Comparison to a previous study conducted on the same roosting population in 1995 show similar trends in occupancy. In 1995, the lowest occupancy of 0 bats recorded was during the month of December and the highest occupancy recorded was in September with an estimated 205,336 bats. We suggest that since the winter season in 1995 had milder weather conditions with temperatures mostly remaining above freezing, the colony did not experience as much fluctuation in numbers around this time, and more bats were documented at the bridge roost from November to January in comparison to 2014. Despite differences in yearly weather conditions, we suggest that the colony is stable and exhibits similar population fluctuations to those seen 20 years ago.

Paper 15

INNERVATION PATTERNS ACROSS THE PINNIPED MYSTACIAL VIBRISSAL ARRAY: A PRELIMINARY STUDY <u>Erin E. Mattson¹</u> and Christopher D. Marshall^{1,2}. ¹Department of Marine Biology, Texas A&M University at Galveston, ²Department of Wildlife and Fisheries Sciences, Texas A&M University at College Station. (mattsone@tamug.edu)

Vibrissae, or whiskers, are well-developed organs of mammalian tactile sensory systems that are essential for pinniped foraging success. Current literature on vibrissal systems suggests that innervation investment varies depending on environment (i.e. terrestrial, semi-aquatic, fully aquatic). However, comparative data for aquatic mammal vibrissal innervation are lacking. Although some innervation data exist for the largest vibrissae from several fully aquatic mammals, no studies have analyzed successive, medial-to-lateral innervation densities across the muzzle in fully aquatic mammals. Reported innervation investment of the entire mystacial vibrissal array is likely overestimated. The objective of this research is to investigate the innervation and microstructure of harp seal (*Pagophilus groenlandicus*) vibrissae follicle-sinus complexes (F-SC) through histological techniques and to propose a more accurate innervation

investment of the entire vibrissal array by including a medial-to-lateral component. Gross anatomical observations show that harp seals possess 88-105 vibrissae that are organized into 6-8 rows and 10-11 columns. The F-SCs possess a tripartite blood organization system characteristic of other pinnipeds. Distribution of major branches of the deep vibrissal nerve is symmetrical around the hair shaft in smaller, medial vibrissae but becomes more asymmetrically distributed in larger, ventrolateral vibrissae. Preliminary results indicate that the largest F-SCs are innervated by an average of $1,413 \pm 327$ axons/F-SC. Successive innervation density averages range from 452 axons/F-SC to 1613.6 axons/F-SC, with an overall average of 958.58 axons/F-SC. When extrapolated, these medial-to-lateral data suggest that harp seals have approximately 84,350 - 100,650 axons/entire mystacial array. Under conventional innervation estimate methods, without considering successive axon densities, harp seals would have an estimated 124,350 - 148,400 axons/entire mystacial array. This approximately 47% discrepancy stresses the importance of including medial-to-lateral innervation densities in analyses. Future work will involve scaling innervation to F-SC surface area and volume, collecting F-SC morphometrics, and analyzing the innervation distribution within F-SCs while vibrissae are protracted.

Paper 16

ASSESSMENT OF INVASIVE MONGOOSE HOME RANGE AT FARMS WITH PRESENCE OF CATTLE FEVER TICKS IN PUERTO RICO Madison Torres¹, Candice Rodriguez¹, Joseph Veech¹, Adalberto A. Peréz de León², and Ivan Castro-Arellano¹. ¹Department of Biology, Texas State University, ²Knipling-Bushland U.S. Livestock Insects Research Laboratory, USDA - Agricultural Research Service, Kerrville, Texas. (mt1305@txstate.edu)

The ectoparasite *Rhiphicephalus (Boophilus) microplus* (Cattle Fever Tick) serves as the primary vector for the pathogen *Babesia* which causes Bovine Babesiosis in cattle. Puerto Rico is currently experiencing a *Babesia* outbreak in which current management practices have failed to control disease prevalence. One factor that has not been directly addressed is the high pervasiveness of invasive wild mongooses (*Herpestes javanicus*) in Puerto Rico and their potential to serve as an alternate Cattle Fever Tick host. The biological characteristics of this species make it a suitable candidate for maintaining and spatially spreading the Cattle Fever Tick vector and its associated pathogens. Radio-telemetry data and ectoparasite loads were collected for 25 mongooses at four farm sites in Puerto Rico for the initial phase of the project. Comparison of mongoose home range overlap with cattle pastures and ectoparasite identification will provide insight to assess the role of mongooses in sustaining Cattle Fever Tick populations.

Paper 17

BOBCAT (*LYNX RUFUS*) **POPULATION DRIVERS IN SOUTH TEXAS** <u>G. Wesley</u> <u>Watts III¹</u>, Justin P. Wied¹, Arturo Caso¹, Sasha Carvajal¹, Alfonso Ortega-S., Jr.², Tyler Campbell², and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ²East Wildlife Foundation. (weswatts@gmail.com)

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.

Paper 18

ADDITIONAL RECORDS OF SMALL MAMMALS OF GUANDERA BIOLOGICAL RESERVE, CARCHI PROVINCE, ECUADOR AND COMPARATIVE ANDEAN SMALL MAMMAL ECOLOGY <u>A. Rachel Ritchie¹</u>, Thomas E. Lee, Jr.¹, Sarah Vaca-Puente², Santiago F. Burneo², and Alejandra Camacho². ¹Department of Biology, Abilene Christian University, ²Sección Mastozoología - Museo de Zoología, Pontificia Universidad, Católica del Ecuador. (arr09c@acu.edu)

In 2014 a mammal survey was conducted in an ecotone region including the páramo and temperate forest on the Eastern Versant of the Andes in Carchi province, Ecuador. Sherman traps, Tomahawk traps, pitfall traps, and mist nets were used to collect mammal specimens at two sites one at 3,340 m and the other above 3,600 m. A total of 142 specimens representing 14 species were collected from the survey area. The species collected include: *Didelphis pernigra, Microryzomys altissimus, M. minutus, Nephelomys albigularis, Neusticomys monticolus, Reithrodontomys soderstromi, Thomasomys baeops, T. cinnameus, T. rhoadsi, T. ucucha, Sturnira bidens, S. bogotensis, and Myotis keaysi. One additional species (Mazama rufina)* was salvaged as a partial skull from the forest near the biological station. The effect of elevation on Ecuadorian rodents was found by comparing past studies form both sides of the Andes. These studies reveal an ecological gradient and turnover of cricetid rodent diversity (at the taxonomic level of tribe) occurs between 2,070 m and 2,500 m in elevation.

Paper 19

BEHAVIOR PATTERNS OF TROPICAL CATS IN THE TAMAULIPAN BIOTIC PROVINCE <u>Shelby B. Carter</u>, Michael E. Tewes, William C. Stasey, Arturo Caso, Sarah Carvajal, and Lauren Balderas. Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville. (shelbycarter511@hotmail.com)

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 by Stasey (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.

Paper 20

OCELOT POPULATION STATUS AND COMPARISON OF POPULATION ESTIMATES USING TWO ESTIMATION TECHNIQUES <u>Eric L. Rulison¹</u>, Justin Wied¹, Arturo Caso¹, John Leonard¹, Daniel J. Kunz², Andrew N. Tri³, Alfonso Ortega-Sanchez⁴, Tyler Cambell⁴, and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, ² Texas Parks and Wildlife Department, ³Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, ⁴East Wildlife Foundation. (elrulison@gmail.com)

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 two 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^2) in 2011 to 3 individuals $(12.10/100 \text{ km}^2)$ in Fall 2014, varying in that time. CAPTURE population estimates in the southern grid ranged from 4 individuals (19.8/100 km²) in 2011 to 4 individuals (19.8/100 km²) in Fall 2014, varying in that time. These population estimates vary greatly considering camera monitoring documented ≥ 4 and averaged 7.4 individuals on the northern grid and ≥ 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 capturerecapture 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.

POSTERS AT-A-GLANCE

1 - BIODIVERSITY OF THE SMALL MAMMALS IN TWO DIFFERENT HABITATS WITHIN THE DALQUEST DESERT RESEARCH STATION Robert W. Stewart

2 - DYNAMIC INTERACTION WITHIN OCELOT AND BOBCAT MALE-FEMALE PAIRS John P. Leonard

3 - BATS FROM THE REGIONAL NATURAL PARK "EL VINCULO" (VALLE DEL CAUCA, COLOMBIA) AND ITS BUFFER ZONE Daniela Arenas-Viveros

4 - BAT META-COMMUNITY STRUCTURE IN AN ANTHROPOGENIC LANDSCAPE (COFFEE ECOREGION, COLOMBIA) María Cristina Ríos-Blanco

5 - DEMOGRAPHICS AND ACTIVITY OF THE MEXICAN LONG-NOSED BAT, LEPTONYCTERIS NIVALIS (PHYLLOSTOMIDAE) IN BIG BEND NATIONAL PARK, TX, USA E. R. Adams

6 - DIVERSITY OF THE ORDER CHIROPTERA AND THEIR ECTOPARASITES WITHIN THE DALQUEST DESERT RESEARCH STATION (PRESIDIO AND BREWSTER CO., TEXAS) Matthew R. Fox

7 - DIVERSITY SURVEY OF CARNIVOROUS MAMMALS AT THE DALQUEST RESEARCH SITE Erika Mitchell

8 - HABITAT SELECTION OF THE WHITE-ANKLED MOUSE (*PEROMYSCUS PECTORALIS*) IN VAL VERDE CO., TEXAS Clint N. Morgan

9 - CONSERVATION GENETICS OF A CRITICALLY ENDANGERED BOLIVIAN SPECIES OF ENDEMIC MAMMALS (RODENTIA, HYSTRICOGNATHI, *ABROCOMA BOLIVIENSIS*) Randall S. Rittmann

10 - EVALUATING TIME IN THE NESTBOX AS A BEHAVIORAL MARKER OF THE BIOLOGICAL CLOCK IN COMMON MARMOSETS (*CALLITHRIX JACCHUS*) Raquel Alonso and Christa Leach 11 - THE ROLE OF BIOMETEOROLOGY IN THE SCENT-MARKING BEHAVIOR OF RED WOLVES (*CANIS LUPUS*) Hannah M. Jones

12 - PRELIMINARY ACOUTISTIC MONITORING BAT SURVEY NEAR WATER SOURCES IN A SEMIRURAL AND A RURAL AREA OF SOUTHERN BEXAR COUNTY,TEXAS Stephanie L. Womack

13 - POSSIBLE ROLE OF INVASIVE MONGOOSE IN SUSTAINING CATTLE FEVER TICK POPULATIONS IN PUERTO RICO Candice Rodriguez

14 - A PRICKLY QUESTION: HOW MANY QUILLS DOES A PORCUPINE HAVE? Barbara F. Welch

15 - CLARIFICATION OF THE DISTRIBUTION OF THE EASTERN MOLE (*SCALOPUS AQUATICUS*, TALPIDAE) ON THE SOUTHERN ROLLING PLAINS REGION OF TEXAS. Mitchell J. Crittenden

16 - SPECIES DELIMITATION IN THE GENUS *CALOMYS* (RODENTIA: SIGMODONTINAE) Narayan Kandel

17 - MORPHOMETRIC AND GENETIC VARIATION IN EIGHT BREEDS OF ETHIOPIAN CAMELS (*CAMELUS DROMEDARIUS*) Christopher D. Dunn

18 - GENETIC VARIATION AMONG EIGHT BREEDS OF ETHIOPIAN CAMELS (CAMELUS DROMEDARIUS) Gage R. Rowden

19 - MOLECULAR EVOLUTION OF CYTOCHROME B IN HIGH ELEVATION SOUTH AMERICAN RODENTS Armando Monroy

20 - MOLECULAR SYSTEMATICS OF *GEOMYS* BASED ON TWO NUCLEAR AND TWO MITOCHONDRIAL GENES James Q. Francis

21 - PHYLOGENETIC RELATIONSHIPS IN *THOMASOMYS* (RODENTIA: CRICETIDAE). Bryan Y. Lim

22 - UNDERSTANDING SPECIES LIMITS OF *PEROMYSCUS MEXICANUS* GROUP USING A GENETIC APPROACH María R. Nuñez

23 - GENETIC DIVERSITY OF BOWHEAD WHALES (*BALAENA MYSTICETUS*) BASED ON THE SEQUENCES OF THREE MITOCHONDRIAL GENES Alesha R. Rimmelin

24 - MOLECULAR EVOLUTION OF THE CYTOCHROME-B GENE IN MOLES (*LIPOTHYPHLA TALPIDAE*) WITH DIFFERENT LEVELS OF FOSSORIALITY Brian Rodriguez

25 - RELATIONSHIP BETWEEN THE EXTRACELLUALR MATRIX PROTEIN HAS2 AND LONGEVITY IN BAT SPECIES Aimee N. Denham

26 - REEVALUATING PHYLOGENETIC RELATIONSHIPS WITHIN THE *PEROMYSCUS BOYLII* GROUP Marisa Elise Wagley

27 - TRANSPOSABLE ELEMENTS AND LINE-1 ACTIVITY IN *PEROMYSCUS MANICULATUS* Wesli Kay Stubbs

28 - TOUGH LIVING FOR FOSSORIAL RODENTS AT HIGH-ELEVATIONS Susan Sherali

29 - CRYPTIC SPECIES AND CONTACT ZONES: USING MOLECULAR MARKERS TO ASSESS *GEOMYS* DISTRIBUTIONS IN OKLAHOMA Cristina Coffman and Rebecca Dimanche

Poster Presentation Abstracts

The following posters (1-15) are to be considered for the Vernon Bailey Award.

Poster 1 (G) BIODIVERSITY OF THE SMALL MAMMALS IN TWO DIFFERENT HABITATS WITHIN THE DALQUEST DESERT RESEARCH STATION <u>Robert W. Stewart</u> and Ray E. Willis. Department of Biology, Midwestern State University.

(robert.stewart.0220@students.mwsu.edu)

The Dalquest Desert Research Station is a 1214-hectare property belonging to Midwestern State University. The property is situated in the heart of Trans-Pecos Texas and encompasses a unique set of Chihuahuan desert environmental characteristics. The western third of the property is typical of the Bandera Mesa with rolling hills, ravines, and rocky outcrops all covered with *Larrea tridentate, Prosopis glandulosa, Acacia* spp., *Fouquieria splendens, Agave lechuguilla, Yucca* spp., and Cactaceae. The western two thirds of the property drop off into a system of canyons that provide a diverse and unique set of environments. These include thick *Salix* spp., *Prosopis glandulosa*, and *Acacia* spp. thickets, vernal pools and riparian waterways, year-round springs, heavy river stone gravel, and sandy creosote flats. These environments provide a rich and varied set of food and shelter for rodents over the entire property. Sherman live traps are being used to conduct a baseline presence-absence survey in conjunction with a biodiversity comparison of the rodents in the canyon habitat and mesa habitat. Thus far 2625 trap nights have been set between June 2013 and January 2015. 10 species have been sight identified, or captured and identified, with noticeable differences of community diversity between the two designated habitats.

Poster 2 (G)

DYNAMIC INTERACTION WITHIN OCELOT AND BOBCAT MALE-FEMALE PAIRS John P. Leonard¹, Eric L. Rulison¹, Tyler Campbell², Alfonso Ortega-Sanchez², Justin P. Wied¹, G. Wesley Watts III¹, and Michael E. Tewes¹. ¹Feline Research Center, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ² East Wildlife Foundation. (john.leonard@students.tamuk.edu)

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.

Poster 3 (G)

BATS FROM THE REGIONAL NATURAL PARK "EL VINCULO" (VALLE DEL CAUCA, COLOMBIA) AND ITS BUFFER ZONE <u>Daniela Arenas-Viveros^{1,2}</u>, Alan Giraldo-López¹, and Carlos A. Saavedra-Rodríguez¹. ¹Grupo de Investigación en Ecología Animal, Departamento de Biología, Universidad del Valle, Cali, Colombia, ²Department of Biological Sciences, Texas Tech University. (daniela.arenasviveros@ttu.edu)

Diversity, richness and abundance, as well as mobility of bats were measured in areas with different vegetation cover in the Regional Natural Park "El Vínculo" and its buffer zone in the Hacienda La Campiña and the Sonsito River Basin. Twenty-two species of bats of five families were captured; being the nose leaf bats (Phyllostomidae) the most rich and abundant family. The highest species richness was obtained in the buffer zone (Hacienda La Campiña) and the highest abundance inside the Park (Restoration zone). Bats moved in all directions and between all areas of study, with distances ranging from 250 m in *Carollia perspicillata* to 2.12 km in *Glossophaga soricina*. The sampled area forms a functional system where vegetation mosaics are small modified surfaces within a larger matrix, which are used by highly mobile species that benefit from environments with forest cover (RNP) and open areas in the surrounding matrix (buffer zones).

Poster 4 (G)

BAT META-COMMUNITY STRUCTURE IN AN ANTHROPOGENIC LANDSCAPE (**COFFEE ECOREGION, COLOMBIA**) <u>María Cristina Ríos-Blanco¹, Jairo Pérez-Torres², and Richard D. Stevens¹. ¹ Department of Natural Resources Management, Texas Tech University, ² Department of Biology, Pontificia Universidad, Javeriana, Colombia. (cristina.rios-blanco@ttu.edu)</u>

Bats are well known to play an important role in tropical ecosystems. They provide multiple services such as seed dispersal and pollination. These services are provided not by just one bat species, but by a whole bat community providing an ecosystem service. Using metacommunity theory to understand the patterns and structuring of these assemblages, allows the integration of different spatial and temporal scales to explain relationships between species, environments, and spatial components. The objective of this research was to determine the structure of the bat metaassemblage immersed in an anthropogenic landscape (The Coffee Ecoregion-Colombia). We reviewed 5,279 bat records from the study area found in the most important museums in Colombia, and in international databases. We evaluated the distribution pattern which best describes the location of the different species of bats in the ecoregion. 56 species were recorded in the 26 selected sites; most were in the family Phyllostomidae. Elevation and structural complexity of the vegetation had the highest association with bat composition. Environmental variables explained the bat meta-assemblage structure in a species sorting model. The distribution pattern of the meta-assemblage corresponded to a Clements quasi-structure. This implies that the species distributed throughout nearly the entire range have the possibility of moving throughout the entire region. Then, the spatial connection between the numerous habitats of the ecoregion is maintained with the species who have the broader distributions. These results show that although it is apparent ecological stability, environmental changes related with anthropogenic land use, which could affect the presence of these bats as well as the ecological roles in the ecoregion.

Poster 5 (G) DEMOGRAPHICS AND ACTIVITY OF THE MEXICAN LONG-NOSED BAT, *LEPTONYCTERIS NIVALIS* (PHYLLOSTOMIDAE) IN BIG BEND NATIONAL PARK, TX, USA <u>E. R. Adams</u> and L. K. Ammerman. Department of Biology, Angelo State University. (eadams13@angelo.edu)

We initiated a pilot study using PIT tagging at a maternity colony of Mexican long-nosed bats (Leptonycteris nivalis) at Mount Emory Cave in Big Bend National Park, TX in 2014. This species is endangered throughout their range in the U.S. and Mexico. This colony is known to be largest in size during the peak of Agave flowering in the summer months but there is no information on the arrival and departure dates each year. Further, the frequency and duration of foraging bouts are unknown. Our objective was to detect seasonal occurrence, nightly activity, and demographic information about this species at their northernmost roost. We implanted 38 bats with PIT tags and used a Biomark IS1001 and cable antenna in a novel serpentine configuration to monitor the medium-sized cave entrance. We detected 61% of tagged individuals at least once from May-September (Adults=8, Juveniles=15). At first, detection rates were low until the antenna configuration was improved. We calculated the maximum nightly activity for 13 bats ranging from one to eight nights in July and August. On average adults and juveniles were active for 7.85 hours. Pregnant females were captured at the cave much earlier than expected (26 April) and we detected a tagged juvenile male much later than expected (1 September). PIT tagging additional bats in this colony to increase our sample size and initiating PIT tag monitoring earlier in the upcoming season will continue to provide a more comprehensive understanding of the activity of this species.

Poster 6 (G)

DIVERSITY OF THE ORDER CHIROPTERA AND THEIR ECTOPARASITES WITHIN THE DALQUEST DESERT RESEARCH STATION (PRESIDIO AND BREWSTER CO., TEXAS) <u>Matthew R. Fox</u> and Ray E. Willis. Department of Biology, Midwestern State University. (matthew.fox.0906@students.mwsu.edu)

The Dalquest Desert Research Station (DDRS) contains 3000 acres straddling Brewster and Presidio counties of southwest Texas in the northern Chihuahuan Desert. It is adjacent to the northern edge of Big Bend Ranch State Park and within the geographic area known as the Trans-Pecos. The research station is comprised of two primary geological regions. The western edge is scrubland with intermittent arroyos dominated primarily by creosote bush and lechuguilla. The eastern two-thirds of the property is a large canyon system containing sporadic natural springs and vernal pools. More than twenty species of Chiroptera are resident or migratory to the Trans-Pecos, more than any other Texas geographical biome, making it the ideal location for the study of bats in Texas. Research thus far has focused on the collection of baseline data of bats present on MSU property. Mist netting for bats has been conducted at least one night per month from March 2014 to January 2015. Netting has resulted in the capture of eight bat species belonging to the Vespertilionidae and Molossidae families. In addition to a taxonomic survey, bat ectoparasites have been collected in order to record ectoparasite abundance, diversity, and species specificity. Initial field inspections of captured bats have yielded a mosaic of ectoparasitic arthropods. The acarine family Spinturnicidae and the nycteribiid family of Diptera have been found in strong association with some Dalquest bats. Additionally, Ischnopsyllidae

and Argasidae have been collected. Future research and further identification of ectoparasitic species will potentially reveal ecological associations of DDRS bats and their parasites.

Poster 7 (G) **DIVERSITY SURVEY OF CARNIVOROUS MAMMALS AT THE DALQUEST RESEARCH SITE** <u>Erika Mitchell</u> and Ray E. Willis. Department of Biology, Midwestern State University. (mitchell.erika7765@gmail.com)

The Dalquest research site is a 3,000 acre area lying adjacent to the Big Bend Ranch State Park in southwestern Texas. To survey diversity of the carnivorous mammals, seven Primos Truth 46 trail cameras were placed opportunistically along a canyon bed over a distance of three miles. Over the duration of 215 continuous days, ringtail (*Bassariscus astutus*), bobcat (*Lynx rufus*), mountain lion (*Puma concolor*), northern raccoon (*Procyon lotor*), coyote (*Canis latrans*), and the common gray fox (*Urocyon cinereoargenteus*) have been photographed. This data shows the expected species with the exclusion of the kit fox (*Vulpes macrotis*) and the American black bear (*Ursus americanus*) that may be dispersing from the breeding population in the Big Bend National Park. In a continuing 300 days, ten cameras will be placed in the higher elevated mesa and three additional cameras will be placed in the canyon areas. The cameras in both regions will be baited with either TRIGGER scent lure or fresh chicken parts to test their effects of lures on trapping success for the area.

Poster 8 (G)

HABITAT SELECTION OF THE WHITE-ANKLED MOUSE (*PEROMYSCUS PECTORALIS*) IN VAL VERDE CO., TEXAS <u>Clint N. Morgan</u> and Robert C. Dowler. Department of Biology, Angelo State University. (clint.morgan@angelo.edu)

The purpose of this study conducted at the Devils River State Natural Area – Big Satan Unit (DRSNA - BSU), in Val Verde County, Texas, has been to delineate the seasonal vegetative resource selection of the white-ankled mouse (Peromyscus pectoralis), comparing trap-line indices of abundance, to geospatial plant community data using ArcGIS. There has, to date, been a lack of ecological studies conducted on this species in southwestern Texas, including a deficit in studies conducted in a mosaic of habitats, such as those at DRSNA - BSU. Trapping data were collected from a total of 40 sites over a 21 month period (Feb 2013 - October 2014), resulting in 10,607 trap-nights. To account for sampling variability, data were compiled seasonally and abundance indices were calculated per site from captures/trap-night. Using ArcGIS software, trap-lines were buffered by the known approximate convex-polygon home range of *P. pectoralis* $(A = 3,340m^2)$ reported by Baccus & Mullican (1990), and spatially overlaid with the known active vegetation series of DRSNA - BSU documented and mapped by Keith (2011). Peromyscus pectoralis has been captured in the following habitats: Curly Mesquite-Sideoats Grama, Blackbrush, Ceniza, Ashe Juniper-Oak, and Guajillo Series. The presence/absence of each habitat was tested against the abundance indices of P. pectoralis using multiple linear regression modeling within the software R. The seasonal analysis provided negative correlations between the Curly Mesquite-Sideoats Grama (P = 0.0004), Ceniza (P = 0.03), and the Guajillo vegetation series (P = 0.04). Positive correlations were also observed for the Blackbrush (P =0.01) and Ashe Juniper-Oak vegetation series (P = 0.04). These habitat-specific correlations

support findings in studies conducted in central Texas as well as provide novel vegetative habitat affinities for this species.

Poster 9 (U)

CONSERVATION GENETICS OF A CRITICALLY ENDANGERED BOLIVIAN SPECIES OF ENDEMIC MAMMALS (RODENTIA, HYSTRICOGNATHI, ABROCOMA BOLIVIENSIS) <u>Randall S. Rittmann</u> and Jorge Salazar-Bravo. Department of Biology, Texas Tech University. (randall.rittmann@ttu.edu)

The goal of this project is to establish the bases for the long-term conservation strategy (an action plan) for the conservation of the Bolivian chinchilla rat (*Abrocoma boliviensis*). The latest assessment of the conservation status of Bolivian mammals identified four species as critically endangered in the country, two of them rodents: *A. boliviensis* and *Chinchilla lanigera*. Although *A. boliviensis* is identified as critically endangered, there are currently no protection plans implemented for the conservation of this species. This task is hindered because it is not yet know if populations assigned to this species correspond to one or more species, as there are important morphometric and ecological differences among populations. Therefore, the objectives of this project are to, (a) identify how many species there are within what is currently thought of as one species and (b) determine what is the position of the species within the Cavioidea. The results of this research project will be of paramount importance, as they will serve to draw an action plan for the conservation of this charismatic member of the Bolivian fauna.

Poster 10 (U)

EVALUATING TIME IN THE NESTBOX AS A BEHAVIORAL MARKER OF THE BIOLOGICAL CLOCK IN COMMON MARMOSETS (*CALLITHRIX JACCHUS*) <u>Raquel</u> <u>Alonso¹</u>, <u>Christa Leach¹</u>, Stephanie Womack¹, Suzette Tardif², and Corinna Ross¹². ¹Department of Arts & Sciences, Texas A&M University-San Antonio, ²Barshop Institute for Longevity & Aging Studies, University of Texas Health Science Center San Antonio. (cnross@tamusa.tamus.edu)

Marmosets have recently been developed as an aging research model and a number of phenotypic tools to assess aging have been translated from rodent, primate, and human studies into a comprehensive testing system in the marmoset. However, a preclinical marker of many human diseases associated with aging decline is the inability to comprehend and recall time as a normal function of the biological clock and associated with executive function decision making. Assessing comprehension of time in a non-human primate has proven difficult because there are no easily translatable ways to ask "what day is it?" or "who is the current President?" One possible alternative to assess function in the biological clock is to assess an animal's preparation for the end of the day and entry into a sleeping nest. Video was recorded for twelve male-female pair housed marmosets maintained at the Southwest National Research Primate Center beginning two hours prior to lights out which occurred daily at 7pm. The video was scored using instantaneous sampling every 3 minutes for whether the focal animal (in this case all males) were in the nestbox or outside of the nestbox. Scores were then calculated for the number of times an animal was in the nestbox for each 30 minute time frame. While there was a great deal of variability between individuals with some animals being found in the nestbox for the entire two hour time span prior to lights out and others never entering the box we found that on average the

animals spent more time within the nest box thirty minutes prior to lights out when compared to 2 hours prior (30 min = 8.08 ± 0.94 ; 120 min= 4.08 ± 1.14 ; p=0.012). We believe this non-invasive behavioral assessment may offer a new technique for evaluating maintenance of the biological clock function in future studies.

Poster 11 (U)

THE ROLE OF BIOMETEOROLOGY IN THE SCENT-MARKING BEHAVIOR OF RED WOLVES (*CANIS LUPUS***)** <u>Hannah M. Jones</u> and Wendi K Wolfram. Biology Department, Hardin-Simmons University. (Hannah.Jones@hsutx.edu)

The study of biometeorology, the impact of environmental factors on living organisms, helps field biologist identify how abiotic conditions, such as time of day and lunar phase, impact animal behavior. Multiple studies focusing on conditions such as activity level during the time of day have been conducted on Grey wolves (*Canis lupus*), however, very little is known about their impact on the endangered Red wolf (*Canis rufus*). The purpose of this study was to examine the impact of time of day and lunar phase on the scent-marking behavior of Red wolves. As these canids are primarily crepuscular due to predation activity and more active during this time, scent-marking behaviors will also be higher during these periods. The six-month study found that general activity levels were higher during both early morning and early evenings. Scent-marking behaviors increased in the hours preceding dawn and continued through the morning. In addition, scent-marking behavior also showed to increase in the hours following dusk. Understanding the impact of biometeorological effects on the behavior of Red wolves is a key component to helping preserve this endangered species.

Poster 12 (U)

PRELIMINARY ACOUTISTIC MONITORING BAT SURVEY NEAR WATER SOURCES IN A SEMIRURAL AND A RURAL AREA OF SOUTHERN BEXAR COUNTY,TEXAS <u>Stephanie L. Womack</u> and Jose R. Valdez Barillas. Department of Biology, Texas A&M University San Antonio. (swomack87@gmail.com)

Bat populations play an essential role in ecosystems, contributing to pest control, pollination, and seed dispersal. There are at least 33 different species of bats that have been reported in Texas, with at least 6 reported in Bexar County. As the urban areas of southern Bexar County encroach upon previously rural areas, it is important to monitor and survey the bat population affected by these changes. Bexar County harbors many previously undocumented sites, with minimal reports surveying the active bat populations in the southern region. Over three months in 2014 (July, October, and November), using the SM2Bat acoustic recording system and Analook software, we conducted a preliminary acoustic monitoring survey of the bat population near water sources at one rural and one semirural site in southern Bexar County to generate baseline data on the potential number and diversity of bats present in this area. Results from this study report a total of 200 unique recordings across 8 days, with calls ranging in frequency from a maximum of 84.55 kHz to a minimum of 21.14 kHz. Data suggests the presence of at least 3 bat species, including Nycticeius humeralis, Parastrellus hesperus, and Lasiurus borealis. This is the first survey recently conducted on the south and southwest region of San Antonio and further research and acoustic monitoring, combined with mist netting would be needed to better identify the current composition of bat species in southern Bexar County.

Poster 13 (U)

POSSIBLE ROLE OF INVASIVE MONGOOSE IN SUSTAINING CATTLE FEVER TICK POPULATIONS IN PUERTO RICO <u>Candice Rodriguez</u>¹, Madison Torres¹, Joseph Veech¹, Ivan Castro-Arellano¹, and Adalberto A Perez De Leon². ¹Department of Biology, Texas State University, ²Knipling-Bushland U.S. Livestock Insects Research Laboratory, Kerrville, Texas. (c r8@txstate.edu)

Since cattle diseases can affect farming operations, and compromise food safety, it is crucial to monitor and manage them. . *Bovine babesiosis* is a tick-borne disease caused by the pathogen *Babesia* (*B. bovis, B. bigemina, and B. divergens*) transmitted primarily by *Rhiphicephalus* (*Boophilus*) *microplus* (Southern Cattle Tick) . *Babesia* causes severe morbidity and mortality in cattle; hindering cattle development, cattle sustainability and economic growth of areas that depend on cattle ranching. Puerto Rico currently suffers from a babesiosis outbreak where current management practices have been ineffective. Present efforts are being focused to manage the tick vector. This island has no native land mammals but an ubiquitous introduced small carnivore (Small Indian Mongoose, *Herpestes javanicus*) might be sustaining tick populations. Preliminary data was collected to provide insight on a possible host-ectoparasite relationship between the mongoose and the ticks. Mongoose were trapped and fitted with radio telemetry collars to ascertain locality of mongoose in regards to cattle pastures. Mongoose were recaptured and thoroughly checked for ticks to determine their role as a potential host.

Poster 14 (U)

A PRICKLY QUESTION: HOW MANY QUILLS DOES A PORCUPINE HAVE? <u>Barbara F. Welch</u>, Emily Wilkinson, and Robert C. Dowler. Department of Biology, Angelo State University. (bwelch1@angelo.edu)

The adaptive value of quills to the North American porcupine (*Erethizon dorsatum*) is undisputed and several studies have addressed the nature of the pelage of porcupines. The number of quills on a porcupine, however, has not been directly counted. Anecdotal evidence has suggested the approximate number of 30,000. We examined the distribution and density of quills on porcupines and performed a count of all quills on one individual. Quills are restricted primarily to the dorsal surface with quills absent on the ventral side, parts of the face and ears. Density of quills varies as well, with the highest density in the mid-dorsal region of the body, lower quill counts on the head, shoulders, and sides, and lowest densities above the tail in the rosette and on the tail. An adult female road-killed porcupine was selected for an actual quill count. The animal was skinned and quills then removed prior to counting. Total number of quills on this individual was 35,346. Age, sex, and individual variation in number of quills remain unstudied.

Poster 15 (U) **CLARIFICATION OF THE DISTRIBUTION OF THE EASTERN MOLE** (*SCALOPUS AQUATICUS*, **TALPIDAE**) **ON THE SOUTHERN ROLLING PLAINS REGION OF TEXAS** <u>Mitchell J. Crittenden</u> and Joel G. Brant. Department of Biology, McMurry University. (crittenden.mitchell@mcm.edu)

The eastern mole, *Scalopus aquaticus*, occurs throughout the panhandle and eastern portion of the state. Until recently, a gap in distribution could be found on the Southern Rolling Plains Region (Callahan, Coke, Coleman, Fisher, Jones, Nolan, Runnels, Shackelford, and Taylor Counties). We compared recent collections of *S. aquaticus* on the Southern Rolling Plains to soil maps to determine the preferred habitat of this fossorial species. We then visited these potential habitats in search of sign of mole activity. Victor Harpoon traps were placed along observed runs throughout the region in attempts to obtain new voucher specimens. Shallow foraging runs were observed in seven new habitat patches in Callahan, Fisher and Jones counties. A voucher specimen was obtained from Fisher County for the first time in recorded history. This study increases our knowledge of the distribution of this often overlooked member of the mammalian fauna of Texas. Future efforts will investigate additional potential patches on the Southern Rolling Plains and assess the genetic variation of these new populations relative to other populations in Teas and the Eastern United States.

The following posters (16 - 27) are to be considered for the Clyde Jones Award.

Poster 16 (G) **SPECIES DELIMITATION IN THE GENUS** *CALOMYS* (**RODENTIA: SIGMODONTINAE**) <u>Narayan Kandel</u> and Jorge Salazar-Bravo. Department of Biological Sciences, Texas Tech University. (narayan.kandel@ttu.edu)

Rodents of the genus Calomys are small granivorous rodents in the family Cricetidae (Rodentia: Sigmodontinae) widely distributed in open habitat formations throughout South America, from Venezuela to southern Argentina; currently, a total of 13 species are recognized in the genus. Several species in this genus are easily identifiable, however no less than two thirds of the recognized species are remarkably homogenous morphologically, although chromosomal, biochemical and genetic data intimates the presence of cryptic species. A handful of new species have been described in the last decade, most from relatively poorly sampled geographic areas in South America; however, most of these are based on limited amount of data, analyzed with inadequate methods of analysis. In order to understand the species limits within the genus, the goal of this project is to use the most inclusive sampling to date (continental-wide sampling, over 200 Cyt-B sequences) and single locus-based species methods (e.g., bGMYC- Bayesian Generalized Mixed Yule Coalescent, PTP- Poisson Tree Process methods, and Geneland); as expected, there was some disagreement in the species recognized by these different methods. In general, the results indicate that some nominal species may need to be synonymized (e.g. Calomys boliviae, C. venustus, and C. callidus) whereas others probably underestimate the (e.g., Calomys sorellus). In order to more rigorously test these species limit hypotheses, we suggest to conduct a multilocus based validation and discovery approach.

Poster 17 (G)

MORPHOMETRIC AND GENETIC VARIATION IN EIGHT BREEDS OF ETHIOPIAN CAMELS (*CAMELUS DROMEDARIUS***)** Yoseph W. Legesse³, <u>Christopher D. Dunn¹</u>, Matthew R. Mauldin⁶, Gage R. Rowden¹, Nictè Ordeñez-Garza¹, Sied A. Mohammed⁴, Mohammed K. Yusuf³, Gad Perry⁵, and Robert D. Bradley^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Museum of Texas Tech University, ³Department of Animal Production, College of Agriculture and Environmental Sciences, Haramaya University, Ethiopia, ⁴Department of Animal and Range Sciences, College of Dryland Agriculture, Jigjiga University, Ethiopia, ⁵Department of Natural Resource Management, Texas Tech University, ⁶National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia. (christopher.dunn@ttu.edu)

Ethiopian camels (*Camelus dromedarius*) historically have been a domesticated and closely guarded economic staple to indigenous peoples located throughout the country's territorial states. Seventeen morphometric variables were utilized to determine intra-species variation within eight breeds of camels, common in these regions. In addition, DNA sequences from the mitochondrial cytochrome-*b* locus and seven nuclear microsatellite loci were examined to access genetic differentiation and to determine phylogenetic relationships. Exomorphic variation was detected in two of the breeds (Afar, and Jigjiga) using principle component analysis and linear discriminant function analysis. Cytb was examined in ten individuals and depicted some separation within the breeds. Microsatellites in 105 individuals were analyzed with Structure 2.3.4 using five of the seven markers. The data for 524 individuals were analyzed and indicated three distinct groups. Finally it appears separation of breeds is supported with cytb data and morphometric data.

Poster 18 (U)

GENETIC VARIATION AMONG EIGHT BREEDS OF ETHIOPIAN CAMELS (*CAMELUS DROMEDARIUS*) <u>Gage R. Rowden¹</u>, Christopher D. Dunn¹, James Q. Francis¹, María Nuñez¹, Yoseph Legesse², Robert D. Bradley^{1,3}. ¹Department of Biological Sciences, Texas Tech University, ²Department of Animal Production, College of Agriculture and Environmental Sciences, Haramaya University, Ethiopia, ³Museum of Texas Tech University. (gage.rowden@ttu.edu)

The camel breeds of the Somali, Oromia, and Afar Regional States of Ethiopia (*C. dromedarius*) are integral to the economy and the livelihood of the indigenous people occupying this region. Domestication of camels provides milk, meat, and other essential goods to the human population. It is thought that the different genetic traits contribute to each of these products based on distinctions in the genes. This study represents a portion of a research initiative designed to identify breed-specific molecular markers that can be used to predict which camel breeds carry traits associated with increased milk and meat production. Herein, we examine the mitochondrial cytochrome-*b* gene (*cyt*-b) to determine intra-species variation within eight breeds of camels (Afar, Kerreyu, Borana, Issa, Hoor, Jijiga, Aydin, and Liben) from Ethiopia. Although *cyt*-b presumably does not have any influence on milk or meat production, our goal was to determine if any of the maternal, camel lineages showed evidence of superior or inferior production. If so, *cyt*-b could be utilized to determine selection of breeds for milk and meat

production. In addition, this study provides useful information regarding the phylogenetic relationships of these breeds.

Poster 19 (UG) **MOLECULAR EVOLUTION OF CYTOCHROME B IN HIGH ELEVATION SOUTH AMERICAN RODENTS** <u>Armando Monroy</u> and Jorge Salazar-Bravo. Department of Biological Sciences, Texas Tech University. (armando.monroy@ttu.edu)

The availability of oxygen acts as a significant selection pressure for species living in high altitude environments. Punomys kofordi and Andinomys edax are two closely related species of South American rodents that inhabit high elevations in the Andes Mountains. Punomys kofordi is found in Bolivia and Peru, inhabiting environments above 4000m in elevation. In contrast, Andinomys edax has populations in Bolivia and Argentina ranging from 4000m down to 650m in elevation. Our project aims to understand if the differences in elevation within Andinomys and between Andinomys, Punomys, and other high elevation species, such as those in the Eligmodontia genus, drive corresponding levels of natural selection at a molecular level. To address this question, we obtained the DNA sequence of the gene cytochrome b, which is involved in cellular respiration, from tissues of the representative species. To highlight the effect of elevation, the sequences were grouped into different ranges of elevation with each range covering 500m. Patterns of substitution rates along these DNA sequences and patterns of amino acid replacements were analyzed. Together, these two methods can provide evidence of selection acting according to the pressure of oxygen availability. Evidence of positive selection exists when comparing human populations living in climatically different environments, so we predict that the same positive selection will be present in these two rodents living in different environments.

Poster 20 (U)

MOLECULAR SYSTEMATICS OF *GEOMYS* **BASED ON TWO NUCLEAR AND TWO MITOCHONDRIAL GENES** Emma K. Roberts¹, Erica Gomez³, Sheri Ayers⁴, James Q. <u>Francis¹</u>, and Robert D. Bradley^{1,2}. ¹Texas Tech University, ²Museum of Texas Tech University, ³Las Palmas Medical Center, El Paso, Texas, ⁴Cellmark Forensics, Farmers Branch, Texas. (jq.francis@ttu.edu)

Phylogenetic relationships among members of the genus *Geomys* have been difficult to discern because of the conservation of morphological characters, presumably as a result of their fossorial lifestyle. Early studies of chromosomes and allozymes generated a few phylogenetic hypotheses, but most were hindered by taxonomic sampling and low resolving power of characters due to homoplastic events. In recent years, DNA sequence data has been obtained from two mitochondrial genes, 12S ribosomal RNA (12S rRNA) and cytochrome-*b* (*cytb*), and one nuclear gene, retinoid-binding protein 3 (*Rbp3*), and used to generate phylogenetic relationships for all members of the genus. Herein, we utilize a combined dataset and include a second nuclear marker, the coding region of the alcohol dehydrogenase gene (*Adh-1*). Using a combination of molecular techniques and phylogenetic analyses, we were able to include many samples of *Geomys* and several *Cratogeomys* samples, a sister genus. Although this study is preliminary with only twelve species examined, the data appears to be useful for addressing phylogenetic

relationships among the genus *Geomys*. However, more taxa and species of *Geomys* need to be further examined to obtain better resolution of the phylogenetic relationships in this group.

Poster 21 (U) **PHYLOGENETIC RELATIONSHIPS IN THOMASOMYS (RODENTIA: CRICETIDAE)** <u>Bryan Y. Lim¹</u>, Nathan M. Dougherty¹, Ian A. Gunn¹, John Iragena¹, Denise Naude¹, Maureen Tuyizere¹, J. Delton Hanson², Joshua M. Brokaw¹, and Thomas E. Lee, Jr.¹. ¹Department of Biology, Abilene Christian University, ²Research and Testing Laboratories, Lubbock, Texas. (byl14a@acu.edu)

Thomasomys is a genus of 30 - 40 rodent species distributed primarily in northwestern South America. Previous phylogenetic investigations based on the mitochondrial cytochrome b gene and the nuclear RAG1 gene provided well resolved nodes at the species level. In contrast, most deep nodes joining multiple species had short branches and low bootstrap values, suggesting a rapid radiation early in the diversification of *Thomasomys*. Furthermore, these data resulted in reconstructions that rendered one common species, *T. baeops*, paraphyletic with respect to the more narrowly distributed Peruvian species, *T. taczanowskii*. In order to further test these hypotheses we have obtained sequences from the noncoding mitochondrial D-loop region. Early results suggest that the D-loop is highly variable. Due to substantial length polymorphism, D-loop sequences have proven difficult to compare across species but may provide informative characters to resolve species boundaries.

Poster 22 (U)

UNDERSTANDING SPECIES LIMITS OF *PEROMYSCUS MEXICANUS* **GROUP USING A GENETIC APPROACH** <u>María R. Nuñez</u>¹, Nicté Ordóñez-Garza¹, Gage R. Rowden¹, and Robert D. Bradley^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Natural Science Research Laboratory, Museum of Texas Tech University. (maria.nunez@ttu.edu)

The genus *Peromyscus*, deer mice, is one of the most widely distributed mammalian taxa in North America. Due to their broad distribution this genus consists of more than 70 species. Currently *Peromyscus* is divided into 13 species groups. *Peromyscus nudipes* is one of the species in the *P. mexicanus* species group, and it is distributed from Nicaragua to Panama. *P. nudipes*' systematic relationships to the other *P. mexicanus* species have not been well studied. For this study, 65 Cytochrome-b (cytb) sequences were examined, 28 samples were obtained from GenBank and the other 37 from the Museum of Texas Tech University. Mitochondrial DNA was extracted with standard DNA methods. Standard Polymerase Chain Reaction (PCR) procedures were followed using primers LGL765 and LGL766 for amplification. The laboratory work included PCR cleaning, and cycle sequencing using the same primers. Cycle sequencing reactions were purified and products were sequenced with an automated sequencer. Resulting sequences were aligned and proofed using sequencer 4.10.1 (Gene Codes Corp). A phylogenetic tree was generated using Maximum Likelihood and Bayesian methods, and genetic distances among samples to assess levels of genetic divergence of the species in the *P. mexicanus* group were calculated with the Kimura 2-perameter model of evolution.

Poster 23 (U)

GENETIC DIVERSITY OF BOWHEAD WHALES (BALAENA MYSTICETUS) BASED ON THE SEQUENCES OF THREE MITOCHONDRIAL GENES <u>Alesha R. Rimmelin¹</u>, Christina Q. Tran¹, John W. Bickham², J. Craig George³, Robert Suydam³, and Amy B. Baird¹. ¹University of Houston – Downtown, ²Battelle Memorial Institute, ³North Slope Borough. (arimmelin@gmail.com)

The Bowhead whale (*Balaena mysticetus*) population in the Bering-Chukchi-Beaufort Seas off the coast of northern Alaska has been studied for over 30 years to monitor genetic diversity, population estimates, and overall population health. Here, we analyzed the DNA of over 100 samples for the cytochrome-b, ND1, and control region genes to assess the current state of diversity in the BCB stock. We also created a haplotype network from over 500 samples across 3 decades to investigate the variation among haplotypes in the population as well as the relationships and distances of each haplotype to another. This data will serve to enhance our current knowledge of this specific population and bowhead population trends in general, as well as inform the International Whaling Commission's deliberations regarding the sustainability of the bowhead hunt.

Poster 24 (U)

MOLECULAR EVOLUTION OF THE CYTOCHROME-B GENE IN MOLES (LIPOTHYPHLA TALPIDAE) WITH DIFFERENT LEVELS OF FOSSORIALITY <u>Brian</u> <u>Rodriguez</u> and Jorge Salazar-Bravo. Department of Biological Sciences, Texas Tech University. (brian.rodriguez@ttu.edu)

Broadly distributed in Asia, Europe and North America, members of the family Talpidae present a rich variety of anatomical and physiological specializations that have enabled them to exploit a diverse range of habitats: terrestrial, semi-aquatic, aquatic/fossorial, semi-fossorial, and fossorial. An energetically demanding lifestyle, coupled with the hypoxic atmosphere characteristic of the subterranean and aquatic environment may change the selective regime of genes that encode proteins involved in cellular respiration. Here, we examine the molecular evolution of the cytochrome b gene, a mitochondrial-encoded gene participating in oxidative phosphorylation in this monophyletic family. Several methods designed to detect the presence and direction of selection at the molecular level requires a phylogenetic tree for the group of interest; however, despite numerous studies to the effect the phylogeny of this group remains controversial. To address this shortcoming we used a multi-locus approach to reconstruct a well-resolved phylogenetic tree for the family. Our main hypothesis is that the colonization of the subterranean and aquatic niches created regimes of positive, directional selection in the cytochrome b gene. We estimated the rates of synonymous (dS) and non-synonymous (dN) substitutions, ω and selection on AA based on physicochemical characteristics along different branches, across codons and simultaneously across codons and along lineages in the family. We detected evidence of positive selection on cytochrome-b variation in only 3 of 379 codon positions: 43, 360 and 372. Results of our phylogenetic analysis of codon-substitution patterns revealed that the evolution of cytochrome-b in this group of moles is chiefly governed by purifying selection.

Poster 25 (U) **RELATIONSHIP BETWEEN THE EXTRACELLUALR MATRIX PROTEIN HAS2 AND LONGEVITY IN BAT SPECIES** <u>Aimee N. Denham</u> and Loren K. Ammerman. Department of Biology, Angelo State University. (adenham@angelo.edu)

Bats have a significantly longer lifespan than other mammals of similar size, and have not been recorded to develop cancer. The longevity and anti-cancer properties displayed by bats are features shared by another well-studied mammal, the naked mole rat. The naked mole rat is shown to have a unique sequence of hyaluronan synthase 2 (HAS2) and reduced activity of hyaluronan (HA) degrading enzymes. Known genomic sequences of several species of bats have been analyzed to determine differences in amino acid substitution for the HAS2 gene. Furthermore, RNA extracted from captured bats was subjected to real-time polymerase chain reaction to be used to measure the expression level of HAS2 and possibly HA-degrading enzymes. Genomic sequence analysis revealed that the bat species examined did not have the same unique amino acid substitutions in HAS2 as the naked mole rat. Real-time PCR experiments revealed that the relative quantity and normalized expression levels of HAS2 varied between the tissue samples examined in each bat species, but was not overexpressed when compared to β -actin, a common reference gene. Further work needs to be directed towards determining alternative methods for the longevity and anti-cancer mechanisms bats possess.

Poster 26 (U)

REEVALUATING PHYLOGENETIC RELATIONSHIPS WITHIN THE *PEROMYSCUS BOYLII* **GROUP** <u>Marisa Elise Wagley¹</u>, Megan S. Keith¹, and Robert D. Bradley^{1,2}. ¹Department of Biological Sciences, Texas Tech University, ²Natural Sciences Research Laboratory, Museum of Texas Tech University. (marisa.wagley@ttu.edu)

The genus *Peromyscus* has been the focus of many systematic studies because of the diversity that exists within this group of rodents. This genus can be divided into 13 species groups, the specific arrangements of each being a topic for evaluation. The *Peromyscus boylii* species group is of special interest because of the speciation that has occurred within this group. This is due to the diverse environmental and geographical isolation that has followed in the regions of Mexico in which these species occur. Previous studies have examined morphological, allozymic, mitochondrial and nuclear DNA sequences, and karyotypic data to try to resolve species level relationships within this group. Herein, we propose to utilize a combined dataset consisting of one mitochondrial (*Cytb*) and five nuclear genes (*Adh*1-I2, *Fgb*-I7, *Dmp*1, *GHR*, *Rbp*3) to attempt to resolve relationships within the *boylii* species group. DNA sequences from these genes will be analyzed in a phylogenetic context (Bayesian and likelihood methods) in order to determine the evolutionary relationship of species within the *boylii* group.

Poster 27 (U)

TRANSPOSABLE ELEMENTS AND LINE-1 ACTIVITY IN *PEROMYSCUS MANICULATUS* <u>Wesli Kay Stubbs</u>, Roy N. Platt II, and David A. Ray. Department of Biological Sciences, Texas Tech University. (weslikay.stubbs@ttu.edu)

Transposable elements (TEs) are a major component of all mammalian genomes. These genomic components have the ability to replicate, move, and accumulate in the genome, potentially

having significant impacts on genome structure and function. In this study RepeatModeler was used to analyze the entire newly released *Peromyscus maniculatus* genome for TEs. 73 potentially novel TE's were identified. Around 50% of the *P. maniculatus* genome is derived from TEs with LINEs (long, interspersed elements) and SINEs (short, interspersed elements) taking up a large proportion. One major family of LINEs in the *P. maniculatus* is the LINE-1 family. Extending previous work, LINE-1 (L1) elements were then analyzed specifically in order to determine the number of active L1 lineages in the genome. Unlike most other mammals that have only a single LINE-1 lineage, *P. maniculatus* harbors two distinct, recently active subfamilies. This study uses a phylogenetic tree to shows the different lineages of the L1 TE, as well as showing the two lineages that are currently active in the *P. maniculatus* genome.

The following posters (28 - 29) are not in competition for an award.

Poster 28

TOUGH LIVING FOR FOSSORIAL RODENTS AT HIGH-ELEVATIONS <u>Susan Sherali</u> and Jorge Salazar-Bravo. Department of Biological Sciences, Texas Tech University. (susan.sherali@ttu.edu)

Ctenomys is the only living genus of the family Ctenomyidae and composed of species with fossorial habits (living underground). The objective of this research is to compare the cytochrome b gene sequences (a gene associated with cellular respiration) from populations and species living in high versus low elevation in the Andes Mountains of South America. We hypothesize that species living in the highlands will show higher levels of selection at the molecular level, than those of populations and species living in the lowlands. We will test this hypothesis by estimating the rates of synonymous (dS) and nonsynonymous (dN) substitutions and their ratio (ω) along different branches, across codons and simultaneously across codons and along lineages in the family; in addition, we will test for positive selection on quantitative physicochemical amino acid properties; the data was analyzed in bins of 500-m in elevation for a large representation of the species diversity in the genus.

Poster 29

CRYPTIC SPECIES AND CONTACT ZONES: USING MOLECULAR MARKERS TO ASSESS GEOMYS DISTRIBUTIONS IN OKLAHOMA <u>Cristina Coffman, Rebecca</u> <u>Dimanche</u>, and Michelle L. Haynie. Department of Biology, University of Central Oklahoma. (ccoffman5@uco.edu, rdimanche@uco.edu)

The aim of this project is to utilize genetic markers to address two questions concerning members of the genus *Geomys* (pocket gophers) found in Oklahoma: 1) What are the distribution boundaries of *G. bursarius* (plains pocket gopher) and *G. breviceps* (Baird's pocket gopher) in central Oklahoma and 2) Is *G. jugossicularis* present in the Oklahoma panhandle? The mitochondrial DNA cytochrome b (*cytb*) gene, the Y chromosome *SmcY* gene, and a suite of 14 microsatellite markers will be used to identify specimens collected in central Oklahoma and the panhandle. The geographic boundary between *G. bursarius* and *G. breviceps* in central Oklahoma is undefined, though Heaney and Timm proposed a boundary based on morphological data and a known contact zone has been identified in Norman. Testing will be done to determine if the boundary suggested by morphological data is supported by genetic data, and if additional

contact zones exist along the boundary of the two species. Genetic data obtained from samples collected in central Oklahoma will be compared to samples collected from within the well-defined ranges of the two species (western Oklahoma – *G. bursarius*; southeastern Oklahoma – *G. breviceps*) to ensure correct genetic identification and to account for the possibility of hybridization between the two species in central Oklahoma. Additionally, samples collected in the panhandle will be compared to known *G. bursarius* samples to determine if they represent a different species.

Texas Society of Mammalogists 33rd Annual Business Meeting Texas Tech University Center 14 February 2015

AGENDA

- 1. Approval of the Minutes of the 2014 Business Meeting
- 2. Report of Secretary-Treasurer, Loren Ammerman
- 3. Report of Permanent Secretary, Lisa Bradley
- 4. Report of Editor, Russell Pfau
- 5. Reports of Committees
 - a. Committee for Honorary Members, Phil Sudman
 - b. Committee on Conservation, Mike Tewes
 - c. Committee for Student Honoraria, Monte Thies
 - d. ad hoc Government Relations Committee, Mike Tewes
 - e. ad hoc Auction Committee, Marcia Revelez
 - f. ad hoc Financial Advisory Committee, Phil Sudman
- 6. Election of President-Elect
- 7. Election of Secretary-Treasurer
- 8. Election of Permanent Secretary
- 9. New Business
 - a. Selection of site for 2016 Annual Meeting
 - b. Other New Business
- 10. Closing Remarks of TSM President, Scott Chirhart
- 11. Adjourn

Texas Society of Mammalogists Treasurer's Report for Calendar Year 2014 Submitted by Loren K. Ammerman, Secretary-Treasurer

Income and expenses of TSM for the 2014 calendar year are shown below. The checking account for TSM was moved from Citibank to The Bank and Trust when the local Citibank location closed in June. Our investments are handled by Morgan Stanley. The checking account balance as of the first of the year was \$12,905.58. Total income in 2014 was \$16,041.16 and total expenses were \$14,394.90. The checking account had \$4,551.84 at the end of 2014. A total of \$10,000 was transferred to Morgan Stanley in March 2014. TSM total assets at the end of 2014 were \$91,408.65. Investment fund increased in value by \$5,377.58. A total of \$916.19 was paid to Morgan Stanley in fees for the year.

Checking Account Balance as of 25 December 2013	\$12,905.58
Investment Account (Morgan Stanley) balance 1 January 2014	\$71,479.23
Total TSM assets as of 1 January 2014	\$84,384.81
2014 Income	
2014 Annual Meeting income (registration, meals and lodging fees)	\$9,166.00
Membership Dues	\$280.00
T-shirts (34 shirts to presenters for free)	\$890.00
Auction Income	\$4,600.00
Contributions	\$273.52
Patron memberships	\$793.60
Postage collected for shirts	\$30.00
Meeting photos	\$6.00
Checking account interest	\$2.04
Total income	\$16,041.16
2014 Expenses	
2014 Annual Meeting Expenses to TTU Center	\$7,893.50
Entertainment - DJ in 2014	\$600.00
Refreshments/Beverages	\$444.43
Program copy charges (ASU print shop)	\$206.96
Name tags (2013 and 2014)	\$148.18
Supplies (binders, ink cartridge, binder clips, envelopes)	\$81.69
Student Awards	\$2,900.00
T-shirt charges (Gandy Ink)	\$930.25
Deposit for DJ in 2015	\$300.00
Speaker Honorarium	\$500.00
Framing charges - Honorary member award	\$113.07
New checks	\$20.95
Postage to mail T-shirts	\$73.98
GKG fees for domain and hosting renewal (2013 and 2014)	\$116.25
PayPal fees 2013 and 2014 (\$30 PayPal Pro + \$31.74 transaction fees)	\$61.74
Bank fees (Citibank)	\$3.90
Total expenses	\$14,394.90
Checking Account Balance 8 January 2015	\$4,551.84
Investment Account (Morgan Stanley) balance 31 December 2014	\$86,856.81
Total TSM assets as of 31 December 2014	\$91,408.65

Texas Society of Mammalogists



Newsletter

2015

The 33rd Annual Meeting

2015 Banquet Speaker

Our banquet speaker will be Dr. Rodney Honeycutt, presenting "Gopher Bill and Me" (the importance of appreciating biodiversity through the lens of taxonomy and phylogenetics). Dr. Honeycutt is Professor of Biology at Pepperdine.



Patron Membership

Members are encouraged to consider becoming Patrons of the Society by donating \$100 (or more) to support the Society's student paper awards. A list of Patron members is published on the website and in the program. Regular Patron membership is achieved with a donation of \$100. Members who exceed \$100 in donations to the Society's student awards fund will receive a certificate recognizing their total donation level as follows: \$125, Ocelot Level; \$250, Bobcat Level; \$500, Puma Level; \$1000, Jaguar Level. Members can upgrade at any time, and all donations are cumulative. There is no time limit or minimum contribution requirement as a member works toward the next level. Donation levels are confidential.

Collection Case Drawers: Free!

The Natural Science Research Laboratory of the Museum of Texas Tech University has several hundred used wooden drawers (20+ years old) available for FREE to any non-profit organization that can pick them up and haul them off (or is willing to pay for shipping). The details are:

• Quantity: 800. Size: 24 ³/₄" W x 36" L x 1 3/8" D. Made to fit GLV or VA Steel Fixture cases.

• Quantity: 60. Size: 52 ³/₄" W x 36" L x 2 7/8" D. Made to fit GLC or VB Steel Fixture cases.

If interested, please contact Heath Garner, Curator of Collections, <u>heath.garner@ttu.edu</u>, phone 806-834-7641.

Abilene Christian University

Abilene Christian University, 1600 Campus Court, Abilene, TX 79699



Tom Lee

Phone: 325-370-4442 Email: leet@acu.edu

<u>Research Interests, Projects, and Grants:</u> Applied for QEP grants from Abilene Christian University

Undergraduate Students and Their Research:

- **Rachel Ritchie**: Mammal Survey of the Guandera Field Station, Carchi Province, Ecuador.
- Bryan Lim: Phyogenetics analysis of the genus *Thomasomys*.
- I am working with ACU students and others in Abilene to construct a natural area out of Lake Kirby.

Additional Information:

I have continued to research the mammals of Ecuador (with Santiago Burneo and Ale Camancho) and the mammals of the Southern Rolling Plains (with Joel Brant). For the mammals of Ecuador work I have completed another field trip to Guandera in the High Andes of Northern Ecuador. Rachel Ritchie will present the findings of last summer's research. Furthermore, I am working with Josh Brokaw and Bryan Lim on the phylogenetics of the Ecuadorian genus *Thomasomys*. Two of my former students (Grayson Allred and Stephanie Martinez) are now finishing their master's degrees at Angelo State University and Stephan Roussos in finishing his Ph.D. at Texas Tech University. I am continuing to working with John Hanson and Miguel Pinto on additional research on Ecuadorian mammals. Hopefully there will be at least one more new species named this coming year from Ecuador. This summer I will be teaching ecology in Oxford England.

Angelo State University

Department of Biology, Angelo State University, San Angelo, TX 76909



Loren K. Ammerman

Phone: 325-486-6643 Email: loren.ammerman@angelo.edu Web page: www.angelo.edu/dept/biology/faculty_staff/ lorenkammerman.html

<u>Research Interests, Projects, and Grants:</u> I am interested in working with students to use molecular data to reconstruct evolutionary relationships of organisms and to investigate species boundaries. I also am interested in community structure and the ecology of bats, especially in Big Bend National Park and the Lower Canyons of the Rio Grande. My students and I continue to collaborate with Robert Baker and Texas Tech University to voucher bat specimens that are submitted to the Texas Department of State Health Services. This summer will be the eighth year to monitor the colony size of *Leptonycteris nivalis* in Emory Cave using thermal infrared imaging techniques.

Current Graduate Students and Their Research:

- Erin Adams Cave use and migratory movements of Mexican long-nosed bats (*Leptonycteris nivalis*) (MS thesis student, Fall 2013-present)
- Grayson Allred Bat activity at Devil's River State Natural Area, Big Satan Unit (MS thesis student co-advised with Bob Dowler, Fall 2013-present)
- Krysta Demere Diet of the Canyon Bat, *Parastrellus hesperus*, determined using molecular methods (MS thesis student, Fall 2014-present)
- Citlally Jimenez Characterization of roost sites of the Southern Yellow Bat (*Lasiurus ega*) in southern Texas (MS thesis student, Fall 2014-present)
- Stephanie Martinez Annual and seasonal fluctuations in urban roost use by *Tadarida brasiliensis* (MS thesis student co-advised with Bob Dowler, Fall 2013-present)

Current Undergraduate Students and Their Research:

• Aimee Denham – Comparison of the gene expression of extracellular matrix protein HAS2 in bat tissues (Undergraduate Honor's Thesis, Faculty Mentored Grant, Fall 2014-Spring 2015)

Additional Information:

The Angelo State Natural History Collection has almost 18,000 mammal specimens and 10,000 tissue specimens. The collection is searchable at https://www.angelo.edu/dept/biology/asnhc/. Contact Loren Ammerman or Robert Dowler if you have any questions about the collection.



Robert C. Dowler

Phone: 325-486-6639 Email: robert.dowler@angelo.edu Web page: www.angelo.edu/dept/biology/faculty_staff/robertdowler.html

Research Interests, Projects, and Grants:

I recently received funding to determine the status of the Plains Spotted Skunk (*Spilogale putorius interrupta*) in Texas, as well as examine the genetic variability across the species range. I will be hiring two graduate students as Research Assistants beginning in June 2015. I would be interested in all specimen records in Texas for eastern spotted skunks, as well as any sightings or photographs with locality data. Michael Dixon,

Loren Ammerman and I, along with graduate students Clint Morgan, Austin Osmanski, and Grayson Allred, are finishing our project to survey mammals, reptiles, and amphibians of the Devils River State Natural Area- Big Satan Unit. My other research in Texas continues on the ecology of medium-sized carnivores. I am continuing work on a book entitled the Skunks of Texas with coauthors Jerry Dragoo and Adam Ferguson. I am also interested in the conservation biology and systematics of Galapagos rodents, collaborating with a colleague at the Brookfield Zoo in Chicago and with Cody Edwards at George Mason University.

This summer I will be co-leading (with Dr. Michael Dixon) a study abroad course on natural history museums and the history of biology to the United Kingdom, France, Germany, and Sweden.

Graduate Students and Their Research:

- Clint Morgan is in his final semester working on microhabitat selection by *Peromyscus pectoralis* as part of research on the mammals of the Devils River State Natural Area- Big Satan unit.
- Grayson Allred (co-chaired with Loren Ammerman) is finishing an acoustic monitoring survey of bats at the Devils River State Natural Area-Big Satan unit.
- Zachary Ellsworth is planning to collect data on foraging behavior of radio-collared hog-nosed and striped skunks
- Malorri Hughes is continuing research on the nematode parasite (*Skrjabingylus*) in skunks, after her preliminary undergraduate research.
- Stephanie Martinez (co-chaired with Loren Ammerman) has finished data collection to address patterns of roost use of free-tailed bats (*Tadarida brasiliensis*) at a bridge colony in San Angelo, Texas.
- Kaitlynn LeBrasseur is beginning graduate work this semester and may focus her thesis research on pocket gopher endoparasites.

Undergraduate Students and Their Research:

- Barbara Welch continues to work to determine quill counts and distribution on the porcupine, *Erethizon dorsatum*. and is developing an Integrated Pest Management plan for the Angelo State Natural History Collections.
- Korry Huddleston is beginning to analyze camera trap data for our survey of the Devils River State Natural Area- Big Satan unit.



Marcia A. Revelez

Phone: 325-486-6699 Email: mrevelez@angelo.edu Web page URL: https://www.angelo.edu/dept/biology/asnhc/

Research Interests, Projects, and Grants:

Collection Management, Integrated Pest Management, Best Practices in Museums, Museum Safety, OK Mammalogy. NSF Grant: \$445,303 grant from the National Science Foundation for the "Curation, digitization, and integration of the orphaned University of Memphis Mammal Collection" Co-Pi with Janet Braun and Michael Mares (2.5 yr project)

Baylor University

Dept. of Biology, One Bear Place #97388, Baylor University, Waco, TX 76798-7388



Stephen J. Trumble

Phone: 254-710-2128 Fax: 254-710-2969 Email: stephen_trumble@baylor.edu Web page URL: http://sites.baylor.edu/trumblelab/

Research Interests, Projects, and Grants:

Dr. Trumble has worked on the physiology/ecology of marine mammals since the early 1990's, earning his Ph.D. from the University of Alaska Fairbanks. Dr. Trumble's laboratory (Laboratory of Ecological and Adaptational Physiology; LEAP) has extensive experience in the field of marine mammal physiology and has been involved with pioneering the use of earplugs as a lifetime

chemical matrix in large whale physiological ecology. As an integrative physiologist, Dr. Trumble investigates and has published peer-reviewed papers on basic and applied research involving skeletal muscle physiology, stress/endocrine physiology, lipid biochemistry, digestive physiology and health indices in models ranging from rats to seals to whales.

Current Funded Projects:

- Net pens and stress in chum salmon Oncorhynchus keta; Funded Grant; Glasscock Award
- Determining baseline stress-related hormone values in large cetaceans. ONR Funded.
- Northern fur seal foraging energetics and diet between rookeries in the Pribilof
 - Islands, Alaska: implications for post-weaning survivorship and reproductive success.
 Funded; At-Sea Processors Association- Pollock Conservation Cooperative
- Collaborative Research: Implications of somatic cell sexual identification on cellular adaptations: does the sex of a cell affect its adaptation to exercise and metabolic stimuli in cell culture? ONR Funded.

Graduate Students and Their Research:

- Rebel Sanders; Net pens and stress in chum salmon Oncorhynchus keta
- Tori Neises; Northern fur seal foraging energetics and diet between rookeries in the Pribilof Islands
- Genevieve Godfrey; unknown

Undergraduate Students and Their Research:

• Amanda Stevens; Method development for delaminating bowhead whale earplugs

Kenneth T. Wilkins



Phone: 254-710-2126 (office), 254-710-2151 (lab) Email: ken_wilkins@baylor.edu

Research Interests, Projects, and Grants:

Our projects generally relate to ecology and distribution of small mammals (primarily, rodents and bats) at the population and community levels in natural and urban settings.

Graduate Students and Their Research:

The BU mammalogy lab graduated two doctoral students in December 2014:

Anica Debelica-Lee's dissertation is entitled "Community Structure, Ecomorphology, Resource Partitioning, Diet: Implications for Conservation of a Forest-Dwelling Bat Community." Anica continues to teach part-time at St. Edwards University in Austin.

Han Li wrote a dissertation entitled "Urban Bats: Distribution, Roost Selection, and Foraging Site Selection." During 2014, Han made platform presentations at the International Association for Landscape Ecology (Anchorage AK), American Society of Mammalogists (Oklahoma City), Wildlife Society (Pittsburgh PA), and North American Society for Bat Research (Albany NY). Anica had a poster presentation at the American Society of Mammalogists meeting. Both Han and Anica have published papers (see below) from their dissertations; additional manuscripts are in preparation.

Additional Information:

Publications:

- Debelica-Lee & K.T. Wilkins. 2014. Structure and reproductive patterns in the summertime forest-bat community of southeastern Texas. *Journal of Fish and Wildlife Management*, 5(2):413-421. <u>http://dx.doi.org/10.3996/022014-JFWM-014</u>
- H. Li & K.T. Wilkins. 2014. Patch or mosaic: bat activity responds to fine-scale urban heterogeneity in a medium-sized city in the United States. *Urban Ecosystems*, 17:1013-1031. <u>http://link.springer.com/article/10.1007/s11252-014-0369-9</u>], DOI 10.1007/s11252-014-0369-9.

In press manuscripts:

• N.S. Green and K.T. Wilkins. Habitat associations of the rodent community in a Grand Prairie preserve. The Southwestern Naturalist. Forthcoming in vol. 59(3), 2015.

Recent graduates:

• Nick Green, a 2012 doctoral graduate, works as an ecologist for the Columbia Environmental Research Center, U.S. Geological Survey, Columbia, Missouri.

Centenary College of Louisiana

2911 Centenary Blvd., Centenary College of Louisiana, Shreveport, LA 71104



Scott Chirhart

Phone: 318-869-5209 Email: schirhar@centenary.edu

<u>Research Interests, Projects, and Grants:</u> Evolutionary Biology, including: Evolutionary/Population Genetics, Vertebrate Speciation and Systematics, Molecular Variation Undergraduate.

Houston Museum of Natural Science

Houston Museum of Natural Science, Dept. of Vertebrate Zoology, 5555 Herman Park Dr, Houston, Tx 77030-1799



Dan Brooks

Phone: 713-639-4776 Fax: 713-639-4767 Email: dbrooks@hmns.org Web page URL: www.hmns.org

<u>Research Interests, Projects, and Grants:</u> This year was very busy with the opening of 3 new Permanent Exhibits for the Division of Vertebrate Zoology:

- Glassell Hall of Tropical Marine Life (opened in Feb)
- Vintage Texas Wildlife Dioramas (July)
- the newly ground-up revamped Farish Hall of Texas Wildlife.
- Frensley/Graham Hall of African Wildlife Conservation continues to edutain visitors.

Although I do quite a bit of work with birds, research interests in mammalogy span a variety of topics including community and behavioral ecology, biogeography and taxonomy, harvest patterns, natural history and conservation. I am particularly interested in Neotropical species in lowland regions east of the South American Andes (especially the Peruvian Amazon, Paraguayan Chaco and eastern Bolivia). Additional regions of coverage include Texas, Middle America, Africa and the Philippines.

Current mammalogy projects I'm involved in include:

- Cougar (*Puma concolor* Jardine) recolonization of east Texas (with J. Gonzalez, et al.)
- Documentation of a population of albino raccoons in SE Tx (with A. Castellanos)
- Predation on *Tadarida* by raptors (with K. Conlan)
- Recently compleded the description of four new species of *Scotophilus* (Chiroptera) from Africa (with J. Bickham)

Graduate Students and Their Research:

Working at a museum, I don't have my own grad students but currently serve as an external committee member for several students. In terms of Mammalogy, there are currently three committees I serve on, all Ph.D. candidates:

- Adrian Castellanos (Tx A&M Univ.) Geographic variation in Sciurus variegatoides
- Juan Carlos Diaz (Rice Univ.) Tracking the origins and source of genetic variation in the gene *Vkorc1*
- <u>Kim Dingess</u> (Indiana Univ.) Vocal communication of the Dusky Titi Monkey (*Callicebus donacophilus*)

Additional Information:

The primary driver of the Houston Museum of Natural Science is Education, including outreach. We educate every 4th and 7th grader in Houston Independent School District annually (approx. 700,000 students/yr), have nearly 2.5 million individuals come through the doors per annum, and are the 4th highest attended museum in the country; surpassed only by Smithsonian, AMNH and the MOMA, we are the highest attended US museum west of the Mississippi. Every year I tour college-level classes through our collections and permanent wildlife exhibit halls. If you have any interest in coming for a visit just touch base directly!

McMurry University

Department of Biology, McMurry University, Abilene, TX 79697



Joel G. Brant

Phone: 325-793-3875 Fax: 325-793-4770 Email: brant.joel@mcm.edu

Research Interests, Projects, and Grants:

My research interests are primarily concerned with the natural history of mammals, particularly in Texas and the Chihuahuan Desert. My current research program focuses on the natural history & ecology of mammals in the Southern Rolling Plains, northern Edwards Plateau, and northeastern Chihuahuan Desert. My current projects include a survey of the mammals of the Southern Rolling Plains, specifically Taylor County & surrounding areas

(with Tom Lee); an examination of the ecological distribution and population genetics of *Scalopus aquaticus* in Texas (with Dana Lee); assessing the ecological impacts of wind farms on bat diversity (with Tom Lee); & a survey of the geographic distribution of *Geomys bursarius* on the Southern Rolling Plains.

Current Undergraduate Students:

• Mitchell Crittenden – Mitchell is interested in wildlife management. Currently Mitchell is investigating the distribution of eastern moles (*Scalopus aquaticus*) on the Southern Rolling Plains. Mitchell will graduate with a BS in Biology in May 2015.



Dana N. Lee

Phone: 325-793-3867 Email: lee.dana@mcm.edu

Research Interests, Projects, and Grants:

I primarily study bats and am interested in all aspects of their ecology, genetics, and evolutionary relationships. Although, I use molecular biology tools to study the genetic variation of other wildlife populations. I am a new faculty member at McMurry University and will be working with Loren Ammerman on a funded project during the Summer of 2015. We will investigate species of coronoaviruses found in Texas bat species. I am also interested in methods of non-invasive genetic sampling and will be using

guano samples for this project.

Midwestern State University

Assistant Professor of Biology, College of Science and Mathematics, 3410 Taft Blvd, Wichita Falls, TX 76308



Ray E. Willis

Phone: 940-397-4408 Fax: 940-397-4831 Email: ray.willis@mwsu.edu

Research Interests, Projects, and Grants:

My current research is being conducted at the Dalquest Research Station located on the northeastern border of Big Bend Ranch State Park. My research pertains to characterizing Na,K-pump isoform expression in various tissues to elucidate phylogenetic relationships of under-represented lineages that live in environmentally diverse habitats. I have initiated ongoing

herpetological and mammal surveys of Dalquest with monthly trips throughout the year, along with extended summer opportunities. We have a newly constructed research station that should be ready for use by spring break 2015.

Students and Their Research:

I currently have six graduate students working on various vertebrate morphology and phylogenetic

research projects. I have funding for all current projects and anticipate having room for at least two more students who would be interested in desert vertebrates.

Sam Houston State University

Department of Biological Sciences, Sam Houston State University, Huntsville, TX 77341



Dr. Monte L. Thies

Phone: 936-294-3746 Fax:936-294-3940 Email: woodrat@shsu.edu Web page: http://www.shsu.edu/~bio_mlt

Research Interests, Projects, and Grants:

Current research interests are twofold. First is an expansion of a project we started in 2008 with efforts to characterize the small mammal species assemblage found at the Koanaka Hills, Ngamamiland Province, Botswana. That project carried through two field seasons in Botswana, with research elements focusing on identification of species present, how skeletal elements

may be identified in owl pellet remains from a modern and paleontological perspective, and reconstruction of the paleoclimate of an area. Since then we have shifted over to trying to conduct similar research in western Zimbabwe, which to date is just getting started with field efforts focusing on identification of possible field sites and setting up field school offerings through SHSU in collaboration with the Natural History Museum of Zimbabwe. My second area of interest deals with detailed skeletal (primarily cranial) analyses of several vertebrate groups (mostly small mammals and reptiles) using micro-CT and 3D scanning and modeling techniques. We are currently expanding on the CT methods used in standard CT studies to include differential (iodine) staining of soft tissue anatomy to conduct innervation pathway and bite force comparisons among taxa.

Current Graduate Students and Their Research:

• Corey Green: An examination of environmental mercury contamination associate with artisanal go;d mining in Zimbabwe.

Additional Information:

Work is still ongoing, albeit very slowly, with Texas parks & Wildlife, Bat Conservation International, and several state and local agencies on a project that will provide alternative roost structures for a colony of ~250,000 Mexican free-tailed bats occupying a condemned warehouse here in Huntsville. The goal is to construct a series of large bat houses (each capable of supporting ~50,000 bats) in downtown Huntsville and on the SHSU campus that we hope will begin colonizing soon after construction is completed.

Tarleton State University

Department of Biological Sciences, Tarleton State University, Stephenville, TX 76402



Russell S. Pfau

Phone: 254-968-9761 Email: pfau@tarleton.edu Web page: faculty.tarleton.edu/pfau/

Research Interests, Projects, and Grants:

My main research focus is population and evolutionary genetics. Small mammals have historically been the primary subject of my (and my students' research); but recently, students have had projects involving bacteria, amoeba, crabs, and fish. I have several ongoing projects in addition to those of my current students, including:

• Characterization of the hybrid zone between eastern and western lineages of the cotton rat (*Sigmodon hispidus*) in Arkansas, Oklahoma, and Texas (using nuclear, mtDNA, and Y-chromosome markers).

- Population genetics of the pocket gopher (*Geomys breviceps*) across its geographic distribution in collaboration with Sam Kieschnick, Phil Sudman (Tarleton), and Jessica Light (Texas A&M).
- Population genetics of *Dipodomys elator* (the state threatened Texas kangaroo rat) using DNA extracted from museum specimens.

I recently received funding for a TPWD Section 6 grant entitled "Assessment of genetic diversity of the state threatened Texas kangaroo rat, *Dipodomys elator*, using museum specimens".

Graduate Students and Their Research:

• Aaron Figueroa is writing his thesis on the geographic distribution of shrews (*Blarina brevicauda* and *B. hylophaga*) in the central Great Plains region.



Philip D. Sudman

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Research Interests, Projects, and Grants:

I continue to have a keen interest in pocket gopher genetics/phylogenetics/ population genetics. Since Dr. Jessica Light and her students at TAMU-College Station recently developed microsatellite primers for *Geomys*, this might be a great time for an interested MS student to get in touch with me to discuss potential projects. Current graduate student projects include a data mining

project in collaboration with Fossil Rim Wildlife Center related to cheetah breeding and three avian studies (nest site selection of painted buntings and northern cardinals; breeding pen modifications for Attwater's prairie chickens; and an avian survey of Timberlake Ranch in Mills County).

Texas A&M University-College Station

Department of Wildlife and Fisheries Sciences Texas Cooperative Wildlife Collection Texas A&M, College Station, TX 77843



Jessica Light

Phone: 979-458-4357 Email: jlight2@tamu.edu Web page: peoplec.tamu.edu/~jlight2

Research Interests, Projects, and Grants:

I am an evolutionary biologist with a focus on phylogenetic, population genetic, and ecological interactions between parasites and their hosts. To address these broad research interests, I employ a variety of tools such as molecular (multiple genes, population genetic loci, or genomic data) and morphological data from fieldcollected and museum specimens.

I am currently funded by the National Science Foundation to investigate the

population genetics of expanding populations, focusing on a chewing louse and pocket gopher assemblage. The lead PIs on this grant are Drs. Jim Demastes and Theresa Spradling at the University of Northern Iowa.

In a collaborative project involving faculty across multiple departments at Texas A&M University, we are examining the ecological interactions of red imported fire ants, small mammals, ticks, and tickborne pathogens. Collaborators include Drs. Sarah Hamer, Mike Morrow, Bill Grant, Rose Hsiang, Gabe Hamer, and Micky Eubanks.

My lab also is funded by the East Wildlife Foundation to explore mammal and parasite diversity across East Wildlife properties in south Texas.

Postdoctoral Researchers and Their Research:

- Nina du Toit-Heunis is a recent graduate of Stellenbosch University, South Africa. She is funded by the National Research Foundation of South Africa to undertake phylogenetic and population genetic assessments of sucking lice parasitizing rodents. Nina also is investigating sucking louse morphology and chewing louse population genetics.
- Justin Henningsen is a recent graduate from the University of Massachusetts. Justin's primary research interests revolve around reptile ecology, but he is also investigating population genetics of chewing lice parasitizing pocket gophers.

Graduate Students and Their Research:

- Adrian Castellanos is a second year Ph.D. student. For his dissertation research, he will undertake a comparative phylogeographic study across Central America, concentrating his investigation on the variegated squirrel. Adrian also has been leading up an extensive study examining the interactions among invasive fire ants, small mammals, ticks, and tick-borne pathogens.
- Aleyda Galán is a second year M.S. student. Aleyda is examining mammal and pathogen biodiversity in south Texas through the East Wildlife Foundation.
- Whitney Preisser is a second year Ph.D. student. Whitney is interested in examining how parasite diversity (specifically parasites of cricetid rodents) varies across latitude.
- Oona Takano is a second year Ph.D. student and she is an ornithologist interested in host-parasite coevolution, specifically of birds and their lice. Oona is also undertaking a study examining the population genetics of Townsend's big-eared bats (*Corynorhinus townsendii*) in California.

Undergraduate Students and Their Research:

- Hunter Folmar has been working with Ms. Galán, initially as a volunteer in the mammal collection preparing museum specimens. He has since expanded his repertoire to undertake examinations of ectoparasites and molecular investigations of mammals and pathogens from south Texas. Hunter will continue this research during the Spring 2015 semester.
- Matthew Argo will be working with Mr. Castellanos during the Spring 2015 semester. His research will entail investigations of morphological and genetic diversity in variegated squirrels across their distribution.
- Katelyn Lasater will be working with Ms. Preisser during the Spring 2015 semester. She will be examining parasite diversity across latitudes, specifically looking at blood parasites of cricetid rodents.
- Preston Mitchell will continue his work with Ms. Takano, examining avian louse diversity across Africa. His work will involve examination of museum specimens as well as genetic assessments in the lab.

Additional Information:

The mammal division in the Biodiversity Research and Teaching Collection (formerly the Texas Cooperative Wildlife Collection) has been very active. We currently have over 62,000 specimens and we are working our way through hundreds of work case specimens and continuing to work on overall organization. We are completely reorganizing the tissue collection and hope to have tissues available for loan later this year. The BRTC Web Page URL is <u>http://brtc.tamu.edu</u>.

Our location at Texas A&M also provides opportunity for interactions with other mammalogists in the area, most notably Drs. Ira Greenbaum and Duane Schlitter. Both are supports of the BRTC, and Duane has been volunteering his time to help organize the collection. Thanks Ira and Duane!

Texas Tech University



Robert J. Baker

Department of Biological Sciences, and Museum of Texas Tech University, Lubbock, TX 79409 Phone: 806-742-2702 Email: rjbaker@ttu.edu Web page URL: www.biology.ttu.edu; http://www.nsrl.ttu.edu

Research Interests, Projects and Grants:

I will officially retire May 31st, and hope to have an appointment for 2 years as an adjunct faculty member. A goal will be to finish up PhD students Raquel Marchan, Cibele Caio, Julie Parlos, and Howie Huynh. I hope to raise a

substantial amount of money to endow The Bobby Baker Research Endowment for Genomic Studies. If you any of you guys have a few extra million bucks laying around I could help you find an appropriate place.

Jeff Wickliffe and Robert went to Chernobyl and working with Sergey Gaschak we have some tissues from Bank voles that should make excellent genomic studies.

Robert D. Bradley



Department of Biological Sciences, and Museum of Texas Tech University, Lubbock, TX 79409 Phone: 806-834-1303 Email: robert.bradley@ttu.edu Web page: www.biol.ttu.edu, www.nsrl.ttu.edu

Research Interests, Projects, and Grants:

My research interests include: systematic relationships, molecular evolution, genomics, and natural history of mammals, particularly in the cricetid and geomyoid rodents; examination of hybrid zones between genetically distinct taxa; including isolating mechanisms and the dynamics of genetic

introgression; exploring the utility and application of the Genetic Species Concept; examination of the origin and evolution of rodent-borne viruses, especially in the use of rodent phylogenies and genetic structure to predict the transmission and evolution of viruses; modeling predictions associated with epidemiology; and growth and utilization of natural history collections, especially those pertaining to mammals.

Current Projects:

- Systematics of the genus *Peromyscus*.
- Use of genomic methods to investigate speciation in *Peromyscus*.
- Systematic and phylogenetic studies of *Peromyscus boylii* species group.
- Endangered species research on *Dipodomys elator* with Richard Stevens, David Ray, and Neal Platt
- Phylogenetic relationships of Neotomine and Reithrodontomyine rodents.
- Systematic and phylogenetic studies of the genus *Neotoma*.
- Systematic and phylogenetic studies of the genus *Geomys*.
- Ecology of hanta- and arenaviruses in the southwestern US and Mexico.
- Effects of zonadhesin genes in speciation of mammals.
- Population genetics and origin of elk in Texas.
- Revision of the *Mammals of Texas*.
- Impacts of wind turbines on bats.

Graduate Students and Their Research:

- Nicté Ordóñez-Garza (PhD student) is in her 6th year. Dissertation involves exploring the biogeographic impact of the Isthmus of Tehuantepec on rodent fauna.
- Kathy MacDonald (PhD student, Co-chaired with Dr. Richard Strauss) is in her 6th year. Dissertation involves modeling biological and genetic parameters of the *Catarina arenavirus* in *Neotoma micropus*.
- Megan Corley (PhD student) is in her 5th year. Dissertation involves determining phylogenetic relationships within the Neotominae.
- Emma Roberts (PhD student) is in her 3rd year. Thesis involves interaction of egg and sperm fusion proteins in hybridization events.
- Chris Dunn (MS student) is in his 2nd year. Thesis involves determining the origin of the Texas elk herd.
- Laramie Lindsey (PhD student) is in her 1st year. Dissertation undecided but she currently is examining transcriptomes in various species of *Peromyscus* in order to detect genes associated with speciation process.

Graduated Students:

- Timothy McSweeny (MS student 2014). Thesis involved a Museum Science Project "Testing for Formaldehyde in the Museum Environment". Tim is seeking a collections manager/curatorial assistant position.
- Matt Mauldin (PhD 2014). Dissertation involved "Genotypic examination of gene flow between non-sister species of woodrats (*Neotoma floridana* and *N. micropus*) through use of multiple temporal and geographic sampling events". Matt is a Postdoctoral Fellow at the CDC in Atlanta, Georgia.

Undergraduate Students and Their Research:

Last year, 11 undergraduate students (Zach Zimmerman, Kelby Neider, Clinton Gabel, James Francis, Uyi Aisueni, Marisa Wagley, Maria Nunez, Gage Rowden, Sarah Roth, Shawn Macha, Yelena Tyo) were involved in various research projects in the Laboratory.

Additional Information:

My teaching responsibilities include: Mammalogy, Natural History of the Vertebrates, Molecular Systematics and Evolution, Mammalogy for Advanced Students, and Principles of Systematics. In addition, I teach Mammalogy at the Texas Tech University Center at Junction each May (referred to as the Intersession Semester). This is an excellent opportunity to receive credit at the Graduate or Undergraduate level. I also teach "Field Methods" for the Museum of TTU each summer. This three-week course offers an opportunity to garner experience in field biology.

In 2014, I became editor of the two publication series (*Occasional Papers* and *Special Publications*) at the Natural Sciences Research Laboratory. We are seeking to increase the number of contributions to these two series, so please, send us your manuscripts!



Richard D. Stevens

Department of Natural Resources Management, Lubbock TX 79409 Email: richard.stevens@ttu.edu

Research Interests, Projects, and Grants:

Currently we have several ongoing projects as well as a number that we are initiating due to our move to Texas Tech University from Louisiana State University:

• Mojave Desert metacommunity dynamics—The Mojave Desert exhibits much interyear variability in precipitation and productivity. Productivity

inputs affect rodent population density and also the propensity of individuals to disperse to new communities. We are examining how productivity pulses affect the relative contributions of local environmental conditions and regional dispersal to structure of rodent communities in the Mojave National Preserve.

- Patterns of biodiversity of New World bats—Bread and butter of our research program has been to try to better understand patterns of biodiversity of bats in the New World, in particular the Neotropical family Phyllostomidae. Currently we are considering multiple dimensions of biodiversity (i.e., taxonomic, phylogenetic, functional and morphological) to better understand correlations among these dimensions and in particular are to better understand the unique insights (if any) that can come from these different dimensions.
- Conservation of Atlantic Forest bat communities—More bread and butter in the lab has to do with trying to understand patterns of distribution and abundance of bats in Atlantic Forest,

especially in light of forest fragmentation, and how this affects the organization of communities. Atlantic Forest is perhaps the most fragmented forest in the World (reduced to about 7% of its original extent) and what remains is a highly distributed network of patches of various sizes and configurations. Unfortunately, Atlantic Forest has become the premier natural laboratory from which to study effects of fragmentation. Historically we have focused our work on Atlantic Forest found in Paraguay, but recently through collaboration with Renata Muylaert and Milton Ribeiro we have begun examining effects of fragmentation on bat community structure across the entire Atlantic forest. More as things develop.

• Distributional update for Texas Kangaroo rats—Through collaboration with Robert Bradley, David Ray and Neal Platt (Biology TTU) we are re-examining the distribution and abundance of *Dipodomys elator* as well as examining if this species forms a metapopulation within its small geographic range in Texas. We will be intensively sampling about 50 sites within its range for rodents and environmental/habitat characteristics, conducting thousands of miles of nocturnal road surveys and estimating patterns of genetic diversity using both individuals caught in the wild and museum specimens.

Graduate Students and Their Research:

- Garret Langlois—Garret is a Ph.D. student that moved with me from LSU to TTU. He just returned from Paraguay where he was doing much telemetry work trying to characterize behavioral interaction networks for two species of bats: *Artibeus lituratus*, a very abundant frugivore that certainly plays an important role in seed dissemination and other ecosystem processes in the Atlantic Forest, 2) *Chrotopterus auritus*, a very large, sexy carnivore that is fairly rare but Garret has had good luck finding this more elusive species. Garret is interested in forest fragmentation and how this affects interaction networks of these important species of bats.
- Cristina Rios-Blanco—Cristina started her Ph.D. at TTU in August. She is interested in elevation gradients of bats and trying to use elevational contexts to better understand bat metacommunity structure. She will also be developing network theory to apply to metacommunities to better elucidate biological processes important to metacommunity dynamics.
- Erin Stukenholtz—Erin started her Ms. Degree in June. She is interested in dietary patterns of bats, especially differences between pregnant and nonpregnant (males, females and juviniles) bats in terms of their diets and relating this back to the energetics of pregnancy and lactation. Erin will also develop a less invasive means of determining early pregnancy by examining progesterone levels in feces.

Trinity University

Department of Biology, One Trinity Place, Trinity University, San Antonio, TX 78212



David O. Ribble

Phone: 210-999-8363 Email: dribble@trinity.edu Web page: www.trinity.edu/dribble

Research Interests, Projects, and Grants:

I am interested in the evolutionary ecology of small mammals, primarily *Peromyscus* and elephant-shrews. My research in recent years has ranged from

studies of social organization to mating behavior to thermal ecology. My students and I are funded through a Math-Biology NSF grant on a project modeling geographic distributions of select *Peromyscus* in North America. Trinity has finished our new \$127 million Center for the Sciences and Innovation which houses 8 science departments.

Undergraduate Students and Their Research:

- Alyssa Fink A genetic analysis of urban *Sceloperus olivaceus* populations.
- Ashley Tessnow and Tess Macapinlac Modeling Mammal Distributions in North America.
- Steven Bovio population and social structure of *Baiomys taylori*.

University of Central Oklahoma

Department of Biology, Edmond, OK 73034



Michelle L. Haynie

Phone: 405-974-5774 Email: mhaynie@uco.edu

Research Interests, Projects, and Grants:

My research interests lie in population genetics and molecular systematics. Currently, I have students examining genetic diversity in *Neotoma* populations in Arizona and Oklahoma, and *Geomys* populations in Oklahoma. Additionally, I co-advise students examining genetic diversity in collared lizards and mud turtles.

Graduate Students and Their Research:

- Laura Kimmel Phylogeography of Sonoran Mud Turtles in a fragmented landscape; co-advised with Dr. Paul Stone
- Cody Braun Sexual selection in collared lizards; co-advised with Dr. Troy Baird

Undergraduate Students and Their Research:

- Sharonda Carson Genetic variation in striped skunk (*Mephitis mephitis*) populations in the central United States; senior
- Cristina Coffman Genetic examination of *Geomys* contact zones in central Oklahoma (microsatellites); senior
- Rebecca Dimanche Genetic examination of *Geomys* contact zones in central Oklahoma (Y chromosome markers); senior
- Lindsay Stone Genetic variation at Major Histocompatibility Complex loci in *Neotoma albigula*; senior

Additional Information:

I am still in the process of writing the "Mammals of Oklahoma" with Bill Caire and Lynda Loucks. Any information you have regarding Oklahoma mammals would be greatly appreciated.

University of Mary Hardin-Baylor

Department of Biology, University of Mary Hardin-Baylor, Belton, TX 76513



Cathleen N. Early

Phone: 254-295-5041 Email: cearly@umhb.edu Web page: undergrad.umhb.edu/biology/profiles/dr-cathleen-early

Research Interests, Projects, and Grants:

Current focus outside of the classroom is helping equip and manage UMHB's Science Education Resource Center (SERC), which serves to assistant Bell Co. K-12 educators in teaching science. Each fall I organize the annual Science Saturday which provides hands-on activities and demonstrations in Biology, Chemistry, Math, and Psychology for elementary

aged children. All proceeds go to the SERC to purchase materials that teachers can borrow. I am also the faculty sponsor of the Mu Eta Beta chapter of Beta Beta.

Additional Information:

- University service: Undergraduate representative for the College of Sciences on our academic assessment team.
- Professional service: Collegiate Academy Counselor for Texas Academy of Science 2014-2015.

The University of Texas at Austin

Texas Natural Science Center, 2400 Trinity St. Austin, TX 78705



Pamela R. Owen

Phone: 512-232-5511 Email: p.owen@austin.utexas.edu Web pages: Texas Natural Science Center: www.utexas.edu/tmm/

Research Interests, Projects, and Grants:

- Evolutionary history of American badgers (Taxidiinae). I am the author of Evolution of American Badgers, a chapter in Badgers of the World: Systematics, Ecology, Behavior and Conservation. The book is in press, publication scheduled for 2015.
- Late Cenozoic mammalian faunas: Description of antilocaprid (*Capromeryx*) skeletal material from a Pleistocene-Holocene site in Travis County, co-authored with Phill Shaw (one of my museum volunteers), is complete and accepted by Texas Journal of Science.
- Emerging infectious diseases: Advising UT integrative biology graduate student, Ms. Stavana Strutz. Her project is Searching for leishmaniasis: rodent and sandfly trapping in Texas.

Additional Information:

I continue to serve as Associate Editor for *Mammalian Species* (fossil record section) and serve on the Public Education Committee of the American Society of Mammalogists. I provide annual training in mammalogy for five chapters (Capital Area, Good Water, Lost Pines, Hays County, and Guadalupe County) of Texas Master Naturalists.

The University of Texas-Permian Basin

Biology Department, 4901 E. University. Odessa, Texas 79762



Diane Post

Phone: 432-413-6756 Email: post_d@utpb.edu Web page: www.utpb.edu/cas/academic-departments/biologydepartment/faculty/diane-post

University of Houston—Downtown

Department of Natural Sciences, 1 Main Street, Houston, TX 77002



Amy Baird

Phone: 713-222-5301 Email: BairdA@uhd.edu Web page: http://www.uhd.edu/academic/colleges/sciences/ns/faculty/ABaird.html

Research Interests, Projects, and Grants:

My research interests include molecular phylogenetics, phylogeography, and speciation of mammals. Current projects include genetic studies of local populations of pocket gophers; molecular phylogenetics of *Lasiurus*, including phylogeography of the Hawaiian Hoary bat; and molecular genetics of bowhead whales (grant funded through the North Slope

Borough). I've also been working on herps with a phylogeographic study of *Rhinoclemmys pulcherimma* (with John Carr). I am partially funded by a Department of Education Minority Science and Engineering Improvement Program (co-PI) and a grant from the North Slope Borough (PI).

Undergraduate Students and Their Research:

- Christina Tran Christina joined the lab in Spring 2013 and recently completed a phylogeographic study of Hawaiian Hoary bats. She has also worked on population genetics of bowhead whales.
- Alesha Rimmelin Alesha joined the lab in Fall 2013 and has worked on a phylogeographic study of turtles in the genus *Rhinoclemmys* as well as population genetics of bowhead whales.
- Kenny Nguyen Kenny joined the lab in Spring 2014 and is working on sequencing mtDNA and nuclear genes from *Geomys bursarius*.
- Praise Anene Praise joined the lab in Spring 2014 and is conducting a phylogenetic analysis of *Geomys personatus* subspecies in Texas.

West Texas A&M University

West Texas A&M University, 2403 Russell Long Blvd, Canyon, Texas



Rocky Ward

Phone: 806-651-2283 Email: rward@wtamu.edu

<u>Research Interests</u>, <u>Projects</u>, and <u>Grants</u>: Conservation genetics.

Minutes of the 2014 Business Meeting

Texas Society of Mammalogists General Business Meeting Texas Tech University Center, Junction, Texas 15 February 2014

The meeting was called to order by President Michelle Haynie at 3:20 p.m. in the Packard Building of the Texas Tech University Center at Junction. The minutes of the 2013 Annual Business Meeting as written in the 2014 annual meeting program for the Texas Society of Mammalogists (TSM) were approved.

Officers' Reports

Secretary-Treasurer, Loren K. Ammerman, announced that there were 132 people registered for the meeting this year, representing 39 institutions from 7 states. Ammerman also reported that 47 new members paid dues this year, and the new members were approved by the Executive Committee.

Ammerman recognized and thanked the students who helped her with registration, the poster session, and many other logistics for the meeting.

Ammerman reported income and expenses for the 2013 calendar year as printed in the 2014 meeting program. Total assets at the end of 2013 were \$84,384.81. In 2013, total income was \$14,688.95 and total expenses were \$12,115.15. The checking account ended the year with a balance of \$12,905.58. The investment fund (initially with Guggenheim but transferred to Morgan Stanley in May 2013) increased in value by \$7,176.19, giving us a balance of \$71,479.23 at the end of 2013. Ammerman reported that \$10,000 of the checking account funds would be transferred to the Morgan Stanley investment fund shortly after the 2014 meeting.

Permanent Secretary Lisa Bradley reported that she continues to maintain the archives of the society at Texas Tech to document the history of the society (copies in both her office and the Southwest Collection). She takes photos of all presenters, award winners, and otherwise documents the meeting with photographs. She also announced that she keeps track of all official correspondence of the society and all Committee Reports should be forwarded or Cc'd to her for the permanent archives. Also, if any members have photos or correspondence to be added to the archives they can send it to her.

Editor Russell Pfau explained that his duties are to maintain the website of the Society and to produce the annual Newsletter that is printed in the back of the program. He pointed out to the membership that the Newsletter summarizes the research of the various members of the Society and encouraged the students to take a look at that information.

Reports of Committees

Phil Sudman, Chair of the Committee for Honorary Members, reported that 2013 Honorary Member Fred Stangl would receive his award at the banquet. He mentioned that no new Honorary Members had been nominated this year. Sudman announced that nominations for Honorary Members should be forwarded to him or to any member of the Executive Committee.

Michael Tewes, Chair of the Committee on Conservation, updated the membership on the 2013 Resolution by the Texas Society of Mammalogists regarding the draft recovery plan for the Gulf Coast jaguarondi. The TSM Resolution, which suggested that the possibility of translocation of jaguarondis into South Texas be included in the recovery plan, was forwarded by President Haynie to the USFWS shortly after the 2013 meeting. The USFWS apparently has adopted that resolution into their recovery plan and does hope to translocate jaguarondis into South Texas in the future. Thus it appears that the TSM Resolution did have a direct impact on the USFWS Recovery Plan for the species.

President-elect Scott Chirhart, Chair of the Committee for Student Honoraria, announced that he would make his report later that evening at the banquet. After the banquet dinner, Chirhart announced the winners of the presentation awards. Each award winner received a cash prize (\$500 for the Packard Award and \$400 for all others).

The award winners for oral presentations were:

- 1. Rollin H. Baker Award Adrienne Wells (Cameron University)
- 2. TSM Award Karina Montero (North Dakota State University)
- 3. William B. Davis Award **Troy Maikis** (Texas State University)
- 4. Bobby Baker Award Andria Beal (Tarleton State University)
- 4. Robert L. Packard Award Courtney Thomason (Texas Tech University)

Poster presentation award winners were:

- 1. Clyde Jones Award Christina Tran (University of Houston Downtown)
- 2. Vernon Bailey Award Adrian Castellanos (Texas A&M University)

Mike Tewes, Chair of the *ad hoc* Government Relations Committee, introduced the new state mammalogist for the Texas Parks and Wildlife Department, Jonah Evans. Evans encouraged the membership to visit with him, and expressed his hope that he could contact our members with questions.

Chair of the *ad hoc* Auction Committee, Marcy Revelez, thanked the other committee members, Joel Brant, Scott Chirhart, Robert Bradley, Marie Tipps, Ann Maxwell, Amy Bishop, and Mandy Husak for soliciting contributions, setting up, and conducting the auction. She reported auction income from last year of \$2,820 from the live auction and \$1,213 from the silent auction. Since the first auction in 2005, \$31,500 has been raised for student awards. She explained that jewelry, field gear (both new and historic), and original artwork were popular auction items, and she would especially appreciate donations of items in those categories.

Phil Sudman, Chairman of the *ad hoc* Financial Advisory Committee, updated the membership regarding the investment fund of the society. In May, the money was transferred from the former Guggenheim account to a new, managed account with Morgan Stanley, with Darla Cannon as our financial advisor. This is a diverse portfolio and will be carefully managed to maximize growth while limiting risk. He mentioned that the goal of the society is to reach \$100,000 and at that point to begin using the interest to further support students.

Election of Officers

President Haynie announced that the Executive Committee wished to nominate Monte Thies of Sam Houston State University for President-Elect. The floor was opened for additional nominations. There were none. Thies was approved by acclamation.

President Haynie announced that the Executive Committee wished to nominate Russell Pfau of Tarleton State University for Editor. The floor was opened for additional nominations. There were none. Pfau was approved by acclamation.

Old Business.

Elevation of the *ad hoc* Financial Advisory Committee to a standing committee.

President Haynie reported that this proposal was tabled, and she had charged Ira Greenbaum, Robert Baker, and David Schmidly to come forward next year with a proposal that more fully outlines the duties and responsibilities of that committee.

Elevation of the *ad hoc* Auction Committee to a standing committee.

President Haynie reported that this proposal failed. Although the Executive Committee recognized that the Auction Committee was a very important and valuable committee for the society in raising funds for student awards, it was decided that the committee was functioning well as an *ad hoc* committee and did not need to be elevated to a standing committee.

New business.

Formation of an *ad hoc* Financial Allocation Committee.

President Haynie reported that an *ad hoc* Financial Allocation Committee had been formed, with the charge of preparing a written statement that defines the Society's financial goals and plans for the responsible allocation of its funds. The Committee will bring forth a proposal for consideration at the 2015 meeting. Russell Pfau (chair), Joel Brant, Tom Lee, Robert Bradley, and John Leonard were assigned as members of that committee.

Selection of the site for the 2015 TSM meeting

The next item of New Business was the selection of a site for the 2015 meeting. It was moved and seconded to hold the meeting at TTU Center at Junction. Motion passed. The dates of February 13-15 were selected, if the TTU Center was available.

Other new business.

President Haynie opened the floor for discussion of any additional new business.

wildlife_diversity/txndd/). He also encouraged members to report observations of rare mammals via the "Mammals of Texas" page at *inaturalist.org*.

President Haynie closed the meeting by thanking the officers, committee chairs, and committee members for their help, and wished Scott Chirhart good luck as President next year.

The meeting was adjourned at 3:45 p.m.

Respectfully submitted, Lisa Bradley Permanent Secretary

STUDENT AWARDS

These awards are made possible by the generous donations of the Society's members and by fundraising activities.

<u>Robert L Packard Award</u> – The Robert L. Packard Award is presented for the Best Overall oral presentation. Eligibility is open to any student who has not previously received this award. This award currently includes an honorarium of \$500.

The Robert L. Packard Award was first awarded in 1985 for the best student presentation. In 1990, when the TSM Award was established, the Packard Award was designated for the best presentation in classical mammalogy. Since 1998, the Packard Award has been designated for the Best Overall oral presentation. The award was named in honor of Robert L. Packard (1928-1979), the founder of the Texas Society of Mammalogists.

<u>TSM Award</u> – The TSM Award is presented for the best oral presentation in mammalian molecular biology, evolution, and systematics by a graduate student. Eligibility is open to any graduate student who has not previously received this award. This award currently includes an honorarium of \$400.

The TSM Award was established in 1990.

<u>William B. Davis Award</u> – The William B. Davis Award is presented for the best oral presentation in classical mammalogy at the organismal level by a graduate student. Eligibility is open to any graduate student who has not previously received this award. This award currently includes an honorarium of \$400.

The William B. Davis Award was established in 1998 in honor of William B. Davis (1902-1995), a leading mammalogist in Texas and the first Head of the Department of Wildlife and Fisheries Sciences at Texas A&M University. Davis authored or co-authored five editions of "Mammals of Texas" (1947, 1960, 1966, 1974, 1994).

<u>Bobby Baker Award</u> – The Bobby Baker Award is presented for the best oral presentation in mammalian molecular biology, evolution and systematics by an undergraduate student. Eligibility is open to any undergraduate student who has not previously received this award. This award currently includes an honorarium of \$400.

The Bobby Baker Award was established in 2013 in honor of Bobby Baker (1986-2012), who was an active and award-winning undergraduate member of the Texas Society of Mammalogists.

<u>Rollin H. Baker Award</u> – The Rollin H. Baker Award is presented for the best oral presentation in classical mammalogy at the organismal level by an undergraduate student. Eligibility is open to any undergraduate student who has not previously received this award. This award currently includes an honorarium of \$400.

The Rollin H. Baker Award was established in 2002 in honor of Rollin H. Baker (1916-2007), president of the Society in 1984-85 and an active member of TSM from 1984 until his death in 2007.

<u>Clyde Jones Award</u> – The Clyde Jones Award is presented for the best poster presentation in mammalian molecular biology, evolution, and systematics. Eligibility is open to any student who has not previously received this award. This award currently includes an honorarium of \$400.

The Clyde Jones Award was established in 2004 in honor of Clyde Jones, who is currently Horn Professor Emeritus at Texas Tech University. Jones has been an active member of TSM since its inception in 1983 and was President of the Society in 1987-88.

<u>Vernon Bailey Award</u> – The Vernon Bailey Award is presented for the best poster presentation in classical mammalogy at the organismal level. Eligibility is open to any student who has not previously received this award. This award currently includes an honorarium of \$400.

The Vernon Bailey Award was established in 2004 in honor of Vernon Bailey (1864-1942), Chief Field Naturalist and Senior Biologist for the Department of Agriculture's Bureau of Biological Survey from 1897 to 1933. Bailey conducted the first and most complete biological survey of Texas, from 1889 to 1905.

TEXAS SOCIETY OF MAMMALOGISTS

Honorary Members

Class of 1985 W. Frank Blair (D) Walter W. Dalquest (D) William B. Davis (D) Robert L. Packard (D) Class of 1986 Rollin H. Baker (D) Class of 1991 Howard McCarley (D) Class of 1992 J. Knox Jones, Jr. (D)

Class of 1995 Clyde Jones Class of 1997 Robert J. Baker Class of 1998 James Scudday (D) Herschel Garner Class of 1999 David J. Schmidly Class of 2002 Art Harris

Class of 2003 Arthur G. Cleveland Class of 2004 Ira F. Greenbaum Robert E. Martin Class of 2006 Ann Maxwell Terry Maxwell Class of 2007 Guy Cameron Earl Zimmerman

Class of 2008 John Bickham Class of 2010 Robert Dowler Class of 2011 Ron Pine Class of 2013 Fred Stangl

Patron Members

Jo Actkinson Loren K. Ammerman Amy Baird Robert Baker Rollin Baker (D) John Bickham Lisa Bradley Robert Bradley Joel Brant Guy Cameron Darin Carroll Ron Chesser Scott Chirhart Arthur G. Cleveland Michael Dixon Robert C. Dowler Cathy Early Herschel Garner Jim Goetze Ira F. Greenbaum Meredith Hamilton John Hanson Michelle Haynie Steve Hoofer Mandy Husak Michael Husak Clyde Jones Stephen Kasper Thomas E. Lee Jessica Light Robert E. Martin Ann Maxwell Kevin McKinney Steve McReynolds Anne Merchant Chris Montag Jim Patton Russell Pfau Carl Phillips Brenda Rodgers Duke Rogers David J. Schmidly Steve Smith Phil Sudman Michael Tewes Ron Van Den Bussche Christopher Walker Kenneth T. Wilkins Don Wilson Bernd Wursig Earl Zimmerman