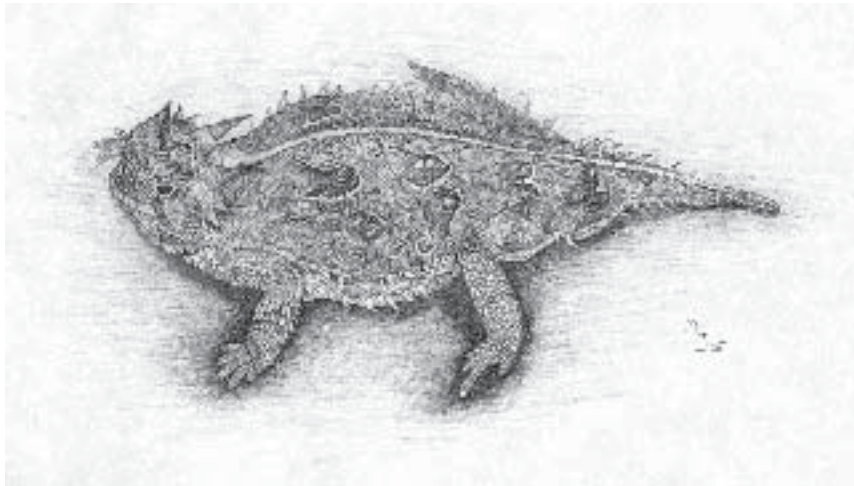


***JOURNAL OF* KANSAS HERPETOLOGY**

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Front Cover: An pencil illustration of a Texas Horned Lizard (*Phrynosoma cornutum*) by Melissa Johann, Sternberg Museum of Natural History, Hays, Kansas.

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KHS BUSINESS

KANSAS HERPETOLOGICAL SOCIETY

34th Annual Meeting
3–4 November 2007
Gary Clarke Education Center
Topeka Zoo
Topeka, Kansas

Honorary Host of the Meeting
Gary K. Clarke

Meeting Sponsors
The McPherson Family Trust
The Center for North American Herpetology
JTC Enterprises

Note to speakers: We will adhere to a strict schedule for talks. Please plan your talks for no more than 12 minutes with an additional 3 minutes for questions from the audience. The lecture room has a computer for powerpoint presentations only (if you plan to use 35mm slides, please bring your own projector). Please bring your visuals on a CD. Speakers should load their talk onto the computer no later than the break session before their talk. Any questions about equipment or meeting facilities should be emailed to jcollins@ku.edu

Venue and Lodging: All scientific paper sessions for the KHS 34th Annual Meeting will be held in the Gary K. Clarke Education Building on the grounds of the Topeka Zoo, Topeka, Kansas, on 3-4 November 2007. There are many motels in Topeka – Google them or go to the KHS web site. KHS members are encouraged to patronize the Topeka Holidome (605 SW Fairlawn Road; call 800-822-0216), which is in close proximity to the Topeka Zoo. We have arranged a room rate of \$72.00 per night at the Topeka Holidome, but you must make your reservations no later than 24 October 2007 to get that rate. Lodging arrangements will not be made by the KHS.

Registration: Register in the Gary K. Clarke Education Center at the Topeka Zoo with the KHS Treasurer on Saturday and Sunday: Students (9th Grade through 12th Grade) \$5.00 per person; all others \$10.00 per person. K through 8th Grade are admitted free.

KHS AUCTION. The annual KHS auction will be held on Saturday night (3 November) at the Gary K. Clarke Education Center in the Topeka Zoo. All proceeds from the auction go to the KHS. BEER, SOFT DRINKS, and SNACKS WILL BE FREE.

ZOO BOOK SALES. The well-known and highly esteemed book seller, Eric Thiss, will display his tremendous diversity of herpetological titles in the Gary K. Clarke Education Center in the Topeka Zoo. Buy your favorite books, new and old. Eric is a generous contributor to the KHS auction.

SPECIAL OFFER. The first 100 registrants for the KHS 34th Annual Meeting will receive a gratis set of Arkansas Reptile Trading Cards with photographs by Suzanne L. Collins & Eric Maynard, a gratis copy of the St. Vincent National Wildlife Refuge Fish, Amphibian, Reptile, and Mammal Checklist by Thomas E. Lewis, and a full-color Snakes of New Jersey brochure.

FRIDAY, 2 NOVEMBER 2007

7:00 pm to midnight: KHS SOCIAL in the Sunflower Room, Topeka Holidome, 605 SW Fairlawn Road, Topeka, Kansas 66606. Bring your ten (10) best digital images on a CD (powerpoint presentations only) of herpetofauna and/or herpetologists. Tell us about them. Drink beer. Sing. Boogie. Humor is appreciated. Larry L. Miller of Wakarusa will bring his computer loaded with an updated program entitled *Kansas Herpetology 1974-2007: An Entertaining Look at Herpetologists Engaged in Their Passion*.

SATURDAY, 3 NOVEMBER 2007

8:00 am to 4:00 pm Registration for both days: Mary Kate Baldwin (KHS Secretary) and Eric Kessler (KHS Treasurer) in the Gary K. Clarke Education Center on the Topeka Zoo grounds. Free coffee, juice, and donuts.

9:00 am Opening remarks by Ginny Weatherman, KHS President
Introduction to the Zoo by Mike Coker, Director, Topeka Zoo
Welcome by Gary K. Clarke, Director Emeritus of the Topeka Zoo

Scientific Paper Session 1 in the Gary K. Clarke Education Center, Topeka Zoo
Moderator: Larry L. Miller, Northern Hills Junior High School, Topeka, Kansas

9:10 am Introduction of Keynote Speaker by Joseph T. Collins.

9:15 am KEYNOTE SPEAKER: Dr. Emily Moriarty Lemmon, University of Texas, Austin. Topic: Speciation in Chorus Frogs (*Pseudacris*).

9:45 am to 10:15 am Presentations

Scientific Paper Session 2 in the Gary K. Clarke Education Center, Topeka Zoo
Moderator: Greg Sievert, Emporia State University, Emporia, Kansas

10:30 am to 11:45 am Presentations

LUNCH: 11:45 am to 1:00 pm (at the restaurant of your choice)

Scientific Paper Session 3 in the Gary K. Clarke Education Center, Topeka Zoo
Moderator: Richard Kazmaier, West Texas A&M University, Canyon

1:10 pm Introduction of Keynote Speaker by Ginny Weatherman (KHS President).

1:15 pm KEYNOTE SPEAKER: Dr. Jonathan A. Campbell, University of Texas, Arlington. Topic: Venomous Snakes of the New World.

1:45 pm to 2:45 pm Presentations

Scientific Paper Session 4 in the Gary K. Clarke Education Center, Topeka Zoo
Moderator: George R. Pisani, Kansas Biological Survey, Lawrence

3:00 pm to 4:15 pm Presentations

4:15 pm KHS General Business Meeting with KHS President Ginny Weatherman presiding in the Gary K. Clarke Education Center, Topeka Zoo.

Introduction of current KHS officers by Ginny Weatherman

KHS Treasurer's Report for 2007 by Eric Kessler

KHS Secretary's Report for 2007 by Mary Kate Baldwin

KHS Editor's Report for 2007 by Travis W. Taggart

KHS Historian's Report for 2007 by Suzanne L. Collins

Report on Plans for the 35th Annual KHS Meeting at Friends University, Wichita, Kansas, in 2008 by KHS President-Elect Dan Carpenter (Friends University, Wichita).

Election of KHS Officers for 2008. The KHS Nominating Committee is composed of Joseph T. Collins (Kansas Biological Survey, Lawrence), and David Oldham (Pittsburg State University), and Eva Horne (Kansas State University), and offers the following slate of candidates:

For President

Dan Carpenter, Friends University, Wichita

Serving as president-elect during 2007, and automatically assumes the KHS presidency on 1 January 2008.

For President-Elect (unopposed)

Dan Johnson, Overland Park, Kansas

For Treasurer (unopposed)

Eric Kessler, Blue Valley North High School, Overland Park

For Secretary (unopposed)

Mary Kate Baldwin, Topeka Collegiate School

Announcement of the results of the KHS election by the Elector, Mary Kate Baldwin.

KHS Business Meeting adjourns sometime between 4:30 and 5:00 pm. Take a dinner break at the restaurant of your choice. Then return to the Gary K. Clarke Education Center in the Topeka Zoo (no later than 6:15 pm) where the kegs of free beer will be tapped.

SATURDAY EVENING, 3 NOVEMBER 2007

Gary K. Clarke Education Center, Topeka Zoo

6:30 pm KHS Awards Ceremony

Presentation of the Howard Kay Gloyd-Edward Harrison Taylor Scholarship for 2007 by Ginny Weatherman (KHS President).

Presentation of the Alan H. Kamb Grant for Research on Kansas Snakes for 2007 by Ginny Weatherman (KHS President).

Presentation of second and third place recipients for The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology for 2007.

Presentation of The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology for 2007 by Daniel D. Fogell (KHS Awards Committee). The recipient of The Collins Award receives a commemorative certificate and a check for \$1000.00.

Announcement of a new KHS Distinguished Life Member by Joseph T. Collins (Kansas Biological Survey).

7:00 pm, the KHS Auction will be conducted at the Gary K. Clarke Education Center in the Topeka Zoo by Joseph T. Collins, ably assisted by KHS Secretary Mary Kate Baldwin and KHS Treasurer Eric Kessler, and featuring many breath-taking books and other items (of questionable value). The KHS takes cash, credit cards, and checks. Be sure and get a bidding number before the auction commences. Bid vigorously, and support the KHS.

SUNDAY, 4 NOVEMBER 2007

8:00 am Registration for participants that did not register on Saturday: Mary Kate Baldwin (KHS Secretary) and Eric Kessler (KHS Treasurer) in the Gary K. Clarke Education Center, Topeka Zoo, Topeka, Kansas. Free coffee, juice, and donuts will be available.

Scientific Paper Session 5 in the Gary K. Clarke Education Center, Topeka Zoo
Moderator: Chad Whitney, Fort Hays State University, Hays, Kansas

8:30 am Presentations

Break 10:15 am

Scientific Paper Session 6 in the Gary K. Clarke Education Center, Topeka Zoo
Moderator: Mark Ellis, Topeka, Kansas

10:30 am Presentations

ADJOURNMENT

Have a safe trip home. See you on 8-9 November 2008 at Friends University in Wichita, Kansas, for the 35th Annual KHS Meeting.

34TH ANNUAL MEETING COMMITTEE

Ginny Weatherman (Chairperson)

Suzanne L. Collins, Joseph T. Collins, Chad Whitney, Jacobo Reyes Velasco & Jordan Johnson

Note: The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology will be given at this KHS 34th Annual Meeting at the Topeka Zoo in Topeka, Kansas, to the KHS member judged to have taken the best photograph of a native species of Kansas herpetofauna. The KHS Awards Committee, composed of Daniel D. Fogell, Travis W. Taggart & Walter E. Meshaka, Jr., will select the recipient from photographic prints on display in the Gary K. Clarke Education Center, Topeka Zoo, from 10:00 am to 2:00 pm on Saturday, 3 November 2007, at the KHS meeting. During odd-numbered years (photography competition), only KHS members are eligible. During even-numbered years (scientific presentations or publications), candidates are encouraged to join the KHS.

OF INTEREST

HOW AND WHEN DID OLD WORLD RAT SNAKES DISPERSE INTO THE NEW WORLD?

Frank T. Burbrink and Robin Lawson
2007. *Molecular Phylogenetics and Evolution* 43: 173–189

Abstract: To examine Holarctic snake dispersal, we inferred a phylogenetic tree from four mtDNA genes and one scnDNA gene for most species of the Old World (OW) and New World (NW) colubrid group known as rat snakes. Ancestral area distributions are estimated for various clades using divergence–vicariance analysis and maximum likelihood on trees produced using Bayesian inference. Dates of divergence for the same clades are estimated using penalized likelihood with statistically crosschecked calibration references obtained from the Miocene fossil record. With ancestral areas and associated dates estimated, various hypotheses concerning the age and environment associated with the origin of rat snakes and the dispersal of NW taxa from OW ancestors were tested. Results suggest that the rat snakes originated in tropical Asia in the late Eocene and subsequently dispersed to the Western and Eastern Palearctic by the early Oligocene. These analyses also suggest that the monophyletic NW rat snakes (the Lampropeltini) diverged from OW rat snakes and dispersed through Beringia in the late Oligocene/early Miocene when this land bridge was mostly composed of deciduous and coniferous forests.

Available as a download from the CNAH PDF Library at

http://www.cnah.org/cnah_pdf.asp

PHYLOGENY-BASED DELIMITATION OF SPECIES BOUNDARIES AND CONTACT ZONES IN THE TRILLING CHORUS FROGS (*PSEUDACRIS*)

Emily Moriarty Lemmon, Alan R. Lemmon, Joseph T. Collins, Julie A. Lee-Yaw, and David C. Cannatella

2007. *Molecular Phylogenetics and Evolution* 44: 1068–1082

Abstract: Although the trilling chorus frogs (subclade within *Pseudacris*: Hylidae) have been important in studies of speciation, continental patterns of genetic diversity within and among species have not been elucidated. As a result, this North American clade has been the subject of substantial taxonomic debate. In this study, we examined the phylogenetic relationships among the trilling *Pseudacris* and tested previously hypothesized scenarios for speciation using

2.4 kb of mitochondrial 12S and 16S rRNA from 253 populations. Bayesian phylogenetic analyses, in combination with published morphological and behavioral data, support recognition of at least nine species, including an undescribed species from the south-central United States. Evidence is presented for substantial geographic subdivision within *P. brachyphona* (northern and southern clades) and *P. feriarum* (coastal and inland clades). Discordance between morphology/behavior and molecular data in several individuals suggests occasional hybridization between sympatric species. These results require major revision of range limits for several taxa, in particular, *P. maculata*, *P. triseriata*, and *P. feriarum*. Hypothesis tests using parametric bootstrapping strongly reject previously proposed scenarios for speciation in the group. The tests also support recognition of the geographically restricted taxon *P. kalmi* as a distinct species. Results of this study provide both a firm phylogenetic basis for future studies of speciation in the trilling *Pseudacris* and a taxonomic framework for conservation efforts.

A gratis PDF of this article is available from the CNAH PDF Library at

http://www.cnah.org/cnah_pdf.asp

GEOLOGICAL AND CLIMATIC FORCES DRIVING SPECIATION IN THE CONTINENTALLY DISTRIBUTED TRILLING CHORUS FROGS (*PSEUDACRIS*)

Emily Moriarty Lemmon, Alan R. Lemmon, and David C. Cannatella

2007. *Evolution* 61(9): 2086–2103

Abstract: Tertiary geological events and Quaternary climatic fluctuations have been proposed as important factors of speciation in the North American flora and fauna. Few studies, however, have rigorously tested hypotheses regarding the specific factors driving divergence of taxa. Here, we test explicit speciation hypotheses by correlating geologic events with divergence times among species in the continentally distributed trilling chorus frogs (*Pseudacris*). In particular, we ask whether marine inundation of the Mississippi Embayment, uplift of the Appalachian Mountains, or modification of the ancient Teays-Mahomet River system contributed to speciation. To examine the plausibility of ancient rivers causing divergence, we tested whether modern river systems inhibit gene flow. Additionally, we compared the effects of Quaternary climatic factors (glaciation and aridification) on levels of genetic variation. Divergence time estimates using penalized likelihood and coalescent approaches

indicate that the major lineages of chorus frogs diversified during the Tertiary, and also exclude Quaternary climate change as a factor in speciation of chorus frogs. We show the first evidence that inundation of the Mississippi Embayment contributed to speciation. We reject the hypotheses that Cenozoic uplift of the Appalachians and that diversion of the Teays-Mahomet River contributed to speciation in this clade. We find that by reducing gene flow, rivers have the potential to cause divergence of lineages. Finally, we demonstrate that populations in areas affected by Quaternary glaciation and aridification have reduced levels of genetic variation compared to those from more equable regions, suggesting recent colonization.

A gratis PDF of this article is available from the CNAH PDF Library at

http://www.cnah.org/cnah_pdf.asp

THE SLOWINSKI AWARD FOR 2007

The Center for North American Herpetology is pleased to announce that the recipient of

THE JOSEPH B. SLOWINSKI AWARD FOR EXCELLENCE IN SNAKE SYSTEMATICS

for 2007 is

BRICE P. NOONAN
Department of Integrative Biology
Brigham Young University
Provo, Utah

On September 12th 2001, the world lost one of its premier biologists, a loss that went virtually unnoticed in the wake of the tragedy that befell the United States the previous day. Joseph Bruno Slowinski, the 38-year old curator of amphibians, turtles, reptiles, and crocodilians at the California Academy of Sciences in San Francisco (and former KHS member), died in the jungles of Burma from the bite of a venomous snake. Joe was bitten on September 11th and succumbed to the effects of the bite the next day. Eventually, the world took notice and media outlets throughout the U.S. and beyond chronicled Joe Slowinski's exemplary career, cut so tragically short.

Memories of Joe Slowinski may dim through time, both among the public and his fellow biologists. Thus, The Center for North American Herpetology was honored to establish a permanent endowment in 2002 entitled

THE JOSEPH B. SLOWINSKI AWARD FOR EXCELLENCE IN SNAKE SYSTEMATICS

This fitting and everlasting tribute, brought about through the generous contributions of Joe's friends and colleagues as well as a significant gift from Deutsche Bank of New York, was created as a trust in perpetu-

ity, with the commitment to award it annually, beginning in 2003, to the biologist that published in the previous calendar year the premier scientific paper on snake systematics, an area of research to which Joe Slowinski was deeply committed.

A distinguished committee, comprised of Dr. Simon Creer (University of Wales, Bangor), Dr. Hussam Zacher (Museu de Zoologia da Universidade de Sao Paulo, Brasil) and Dr. Christopher L. Parkinson (committee chairperson, University of Central Florida, Orlando), has deemed the paper entitled

DISPERSAL AND VICARIANCE: THE COMPLEX EVOLUTIONARY HISTORY OF BOID SNAKES

published in volume 40 of the journal, *Molecular Phylogenetics and Evolution*, as the most distinguished paper on snake systematics to appear worldwide during 2006. The paper was co-authored with Dr. Paul T. Chippindale (University of Texas, Arlington).

As senior author of the paper, Dr. Noonan becomes the fifth recipient of The Slowinski Award, and will receive a check from The Center for North American Herpetology for \$500 along with a commemorative memento in recognition of his achievement.

More information about *The Slowinski Award* can be accessed at

<http://www.cnah.org/slowinskiaward.asp>

A pdf of the article by Noonan and Chippindale is available from the CNAH PDF Library at

http://www.cnah.org/cnah_pdf.asp

KHS DUES REMINDER

If you have not already done so, send your calendar 2007 and 2008 dues (\$15.00 regular per year, \$20.00 contributing per year) to:

Mary Kate Baldwin
KHS Secretary
5438 SW 12th Terrace Apt. 4
Topeka, Kansas 66604

Your attention to this matter will ensure that delivery of the *Journal of Kansas Herpetology* will be uninterrupted.

FIELD NOTES

GRAY FOX PREDATION OF NESTS AS A POTENTIAL LIMITING FACTOR IN THE COLONIZATION SUCCESS OF THE GREEN IGUANA IN SOUTHERN FLORIDA

The Green Iguana (*Iguana iguana*) is a well established exotic reptile in Southern Florida and its geographic range is expanding in the state (Meshaka et al. 2004a. The Exotic Amphibians and Reptiles of Florida, Krieger Publ. Co., Malabar, Florida. 155 pp.; Meshaka et al. 2004b. *Iguana* 11:154-161; Smith et al. 2006. *Journ. Kansas Herp.* 20:7-8; Smith et al. 2007. *Journ. Kansas Herp.* 21:19-20; Smith et al. In press. *Journ. Kansas Herp.*). Population density in a managed natural area has been estimated to be 626 individuals/km² (Smith et al. 2007 op. cit.), and this value is not thought to be an endpoint for populations lacking various controls.

One potential limiting factor of the Green Iguana in Florida is predators, and five Florida vertebrate species are documented as predators of post-hatched individuals: the Raccoon (*Procyon lotor*) (Smith et al. 2006 op. cit.), domestic dog (*Canis familiaris*) (Meshaka et al. 2004a op. cit.), Yellow-crowned Night-heron (*Nyctanassa violacea*) (Engeman et al. 2005. *Herpetol. Rev.* 36:320), Florida Burrowing Owl (*Athene cunicularia floridana*) (McKie et al. 2005. *Florida Field Nat.* 33:125-127), and an unidentified species of buteo hawk (Smith et al. 2006 op. cit.).

Negative impacts by the Raccoon, confirmed as a predator of juveniles, and suspected as predators of eggs, are thought to affect population size and structure of the Green Iguana (Meshaka and Smith 2005. IUCN Invasive Species Specialist Group "Aliens" Newsletter 22:1-3; Smith et al. 2006 op. cit.; Meshaka et al. In prep.). Here, we report the first documented predation of a Green Iguana nest by a native mammal, Gray Fox (*Urocyon cinereoargenteus*), in a southern Florida state park.

Gray Foxes are perhaps the most omnivorous of the fox species of North America (Cypher 2003. *Foxes*. Pp. 511-546 in *Wild Mammals of North America: Biology, Management and Conservation* [G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, eds.]. John Hopkins Univ. Press, Baltimore, Maryland. 1216 pp.). In Florida, they prey heavily on rabbits, rodents, and also consume birds, insects, mast, fruits, and eggs (Brown 1997. *Mammals of Florida*, Windward Publishing, Inc., Miami, Florida. 224 pp.; Cryer and Mazzotti 2002. *Gray Fox*. Report WEC-31. Fl. Coop. Ext. Serv., IFAS, Univ. of Fla. 2 pp.; HTS pers. obs.).

Hugh Taylor Birch State Park (HTBSP) is a small (70.9 ha), urban park located in Ft. Lauderdale, Broward County, Florida, USA. It is completely encapsulated by urban infrastructure with the Intracoastal Waterway (a large bulkheaded canal) truncating the entire western boundary, and has been previously well described (see descriptions in Smith and Engeman



Figure 1. A Gray Fox (*Urocyon cinereoargenteus*) excavating a Green Iguana (*Iguana iguana*) nest, and eating the eggs, at Hugh Taylor Birch State Park in Broward County, Florida, on 29 March 2007. Photograph by Gary H. Busch.

2002. *Canadian Field-Nat.* 116:636-639; Smith et al. 2006 op. cit.). The Green Iguana was first observed in HTBSP by HTS in 1994, and as of 2006, just a few years after an intense nuisance Raccoon removal program, mixed size-classes of the Green Iguana are now readily seen in all ground, arboreal, and ruderal habitats (Smith et al. 2006 op. cit.).

At ca. 1800 h on 29 March 2007, an early sunny evening, temperature ca. 80°F, GHB and park volunteer Sue Bourdages (SB) observed a Gray Fox digging in the ground and eating something at the park volunteer's utility trailer site (Figure 1). Closer inspection revealed the Gray Fox to be excavating a Green Iguana nest and consuming the eggs. Some eggs still remained. Two other Green Iguana nests also were in the immediate area, as well as a third uncompleted nest cavity start. SB had observed a Gray Fox in this area, each evening, for several days, at about the same time. On the previous early evening of 28 March ca. 1745 h, both SB and Renaud Bourdages watched from their trailer home window at this same site as a Green Iguana was grabbed by its tail by a fox and dragged out of a hole as it was excavating a nest cavity. The Green Iguana escaped with tail intact, and then used aggressive assertion displays to startle the Gray Fox into retreat and finally breaking off its attack.

These observations corroborate the notion that certain mid-level mammalian predators cannot be ignored as potential limiting factors in the colonization patterns of the Green Iguana by impacting its various life history stages; juvenile and probably egg stage by the Raccoon (Smith et al. 2006 op. cit.), and egg stage and probably juvenile stage by the Gray Fox (this study). For both of these predators, attacks on large adult iguanas (Smith et al. 2006 op. cit.; this

study), can be successfully fended off, at least during the day. The degree to which and rate at which Green Iguana population size and structure are altered by these two predators are all the more important in light of urban tolerance by all three species involved and the placement of many southern Florida state parks in urban situations.

HENRY T. SMITH, Florida Department of Environmental Protection, Florida Park Service, 13798 SE Federal Highway, Hobe Sound, Florida, 33455, ***WALTER E. MESHAKA, Jr.**, Section of Zoology and Botany, The State Museum of Pennsylvania, 300 North Street, Harrisburg, Pennsylvania, 17120-0024, **GARY H. BUSCH**, Hugh Taylor Birch State Park, 3109 East Sunrise Boulevard, Ft. Lauderdale, Florida, 33304, and **ERNEST M. COWAN**, Florida Department of Environmental Protection, Florida Park Service, 13798 SE Federal Highway, Hobe Sound, Florida, 33455.

*Author to whom correspondence should be addressed (email: wmeshaka@state.pa.us).



COWLEY COUNTY HERPETOFAUNAL COUNT

An herpetofaunal survey was conducted in Cowley County, Kansas, on 21 April 2007 between 10:00 am and 3:00 pm at 37.2513°N, 96.7110°W, and primarily consisted of rock turning. The survey area had not been burned this year. Day was sunny with winds from 25–35 mph from the south. Mid-survey temperature was 28°C; water temperature was 20°C. Survey area had received significant precipitation in the past month; intermittent streams were all running and the pond was full. Participants were: Joyce Lent, Drew Strickert, Al Volkmann, Glynda Volkmann, and Stan Wiechman. Species verified by Al Volkmann and Stan Wiechman.

American Toad	1
Northern Cricket Frog.....	32
Great Plains Narrowmouth Toad.....	1
Plains Leopard Frog	1
Common Snapping Turtle.....	1
Northern Painted Turtle	2
Eastern Collared Lizard.....	5
Great Plains Skink	7
Six-lined Racerunner	2
Western Slender Glass Lizard	1
Eastern Racer	1
Common Kingsnake	2
Milk Snake.....	1
Flathead Snake	18
Ringneck Snake.....	18
Plains Garter Snake	1
Lined Snake.....	3
Northern Water Snake.....	1
Diamondback Water Snake	1
19 species	99 specimens

Submitted by **ALLAN VOLKMANN**, 1650 Melrose Lane, Wichita, Kansas 67212.

ELLIS COUNTY HERPETOFAUNAL COUNT

On 6 June 2007, a road-cruising field trip was conducted in Ellis County, Kansas, from 7:00 to 11:00 pm. Wind speed ranged from 25 to 40 mph, with gusts up to 50 mph. Participants were Joseph T. Collins, Suzanne L. Collins, Curtis J. Schmidt, Charles Stieben, and Travis W. Taggart. We observed the following taxa:

Woodhouse's Toad	3
Ornate Box Turtle	3
Texas Horned Lizard.....	2
Prairie Lizard.....	1
Western Slender Glass Lizard	36
Eastern Racer	2
Common Kingsnake	1
Great Plains Rat Snake.....	3
Gopher Snake	6
Western Ribbon Snake	1
Plains Garter Snake	5
Common Garter Snake	1
Ringneck Snake.....	2
Eastern Hognose Snake.....	1
Prairie Rattlesnake.....	1
Massasauga	1

16 species69 specimens

Verifier was Travis W. Taggart.

Submitted by **SUZANNE L. COLLINS**, The Center for North American Herpetology, 1502 Medinah Circle, Lawrence, Kansas 66047.

JEFFERSON COUNTY HERPETOFAUNAL COUNT

On 12 May 2007, five brave individuals scoured the flooded floodplain of the mighty Kansas River in Jefferson County, Kansas, from 9:00 pm until 1:00 am on 13 May, searching and listening for calling amphibians. Methods included road-cruising, dip netting, catching by hand, and listening for choruses. Participants were James Gubanyi, Marla Gubanyi, Dan Murrow, Derek Schmidt, and Lisa Schmidt. They observed or heard the following:

Plains Spadefoot.....	±50
American Toad	±50
Great Plains Toad.....	±50
Woodhouse's Toad	±50
Northern Cricket Frog.....	±50
Gray Treefrog complex	±50
Boreal Chorus Frog	±50
Plains Leopard Frog	±50
Bullfrog	3

9 species.....±403 specimens

Submitted by **DAN MURROW**, 8129 Perry Street #37, Overland Park, Kansas 66204-4785.

LINN COUNTY HERPETOFAUNAL COUNT

On 24 March 2007, the authors conducted a field trip to the Marais des Cygnes National Wildlife Refuge in Linn County, Kansas, and, in the space of two hours of searching beneath sheet metal, observed the following taxa:

Ground Skink.....	2
Ringneck Snake.....	20
Eastern Racer	5
Western Rat Snake	21
4 species.....	48 specimens

Verifier was Suzanne L. Collins.

Submitted by **SUZANNE L. COLLINS**, The Center for North American Herpetology, 1502 Medinah Circle, Lawrence, Kansas 66047, **TRAVIS W. TAGGART**, Sternberg Museum of Natural History, Fort Hays State University, Hays, 3000 Sternberg Drive, Kansas 67601, and **JOSEPH T. COLLINS**, Kansas Biological Survey, Lawrence, Kansas 66047.

RENO COUNTY HERPETOFAUNAL COUNT

Kansas: Reno Co: Sec. 4, T23S, R5W. 7 May 2007. Participants: Steve Marshall, DeAnna Marshall, Josh Marshall & Nathan Marshall.

Northern Painted Turtle	2
Slider.....	2
Gopher Snake	3
Common Garter Snake	4
4 species	11 specimens

Submitted by **STEVE MARSHALL**, 2507 North Meadowlake Drive, Hutchinson, Kansas 67502.

RUSSELL COUNTY HERPETOFAUNAL COUNT

Kansas: Russell Co: Wilson Lake. 21 April 2007. Participants: Steve Marshall, DeAnna Marshall, Josh Marshall & Nathan Marshall.

Eastern Collared Lizard.....	3
Prairie Lizard.....	2
Six-lined Racerunner.....	1
Western Slender Glass Lizard	1
Milk Snake.....	1
Great Plains Rat Snake	2
Ringneck Snake.....	15
Massasauga	1
8 species.....	26 specimens

Submitted by **STEVE MARSHALL**, 2507 North Meadowlake Drive, Hutchinson, Kansas 67502.

SHAWNEE COUNTY HERPETOFAUNAL COUNT

On 30 June 2007, Keith Coleman and James Gubanyi conducted a herpetofaunal count in Shawnee County, Kansas, from 11:00 pm until 1:00 am on 1 July, searching and listening for calling amphibians. They observed or heard the following:

Plains Spadefoot.....	2
Great Plains Toad.....	±12
Woodhouse's Toad	7
Northern Cricket Frog.....	±10
Gray Treefrog complex	±10
Boreal Chorus Frog	±16
Plains Leopard Frog	3
Bullfrog	2
Great Plains Narrowmouth Toad.....	5

9 species..... ±67 specimens

Submitted by **JAMES GUBANYI**, 2501 Burnett, Topeka, Kansas 66614.

SUMNER COUNTY HERPETOFAUNAL COUNT

The 31st annual Sumner County, Kansas, herpetofauna count was conducted on 19-21 April 2007. The count took place within a ten mile radius of Caldwell, Kansas. All specimens were found on the Kansas side of the state line. Methods of collection included turning rocks, searching wetland areas day and night, listening for frog and toad calls, road collecting, and lots of hiking. They observed the following:

Great Plains Toad.....	1
Northern Cricket Frog.....	7
Gray Treefrog complex	7
Spotted Chorus Frog	5
Plains Leopard Frog	6
Bullfrog	2
Great Plains Narrowmouth Toad.....	1

Common Snapping Turtle.....	1
Northern Painted Turtle	2
Ornate Box Turtle	5
Slider.....	3
Spiny Softshell	1

Lesser Earless Lizard.....	27
Texas Horned Lizard.....	5
Prairie Lizard.....	29
Southern Prairie Skink.....	2
Six-Lined Racerunner	13
Eastern Racer	1
Common Kingsnake	2
Milk Snake	1
Coachwhip.....	3
Western Rat Snake	2
Gopher Snake	1
Ground Snake	42
Diamondback Water Snake	1
Northern Water Snake	7

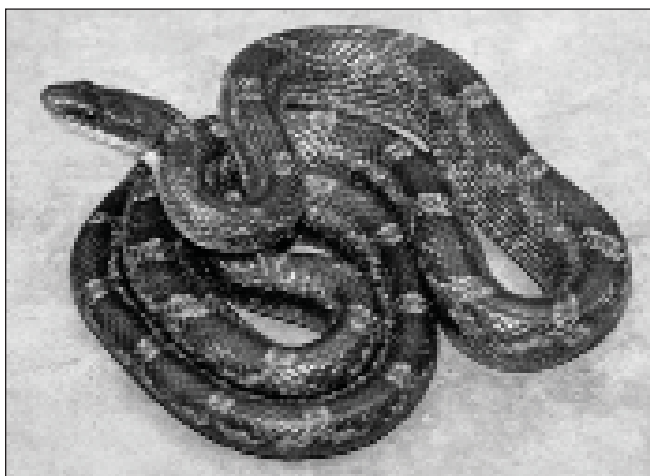


Larry L. Miller (lower right) and some of the Sumner County herpetofaunal field trip participants during April 2007. Photograph by Larry L. Miller.

Brown Snake	1
Western Ribbon Snake	1
Common Garter Snake	1
Ringneck Snake.....	121

30 species 301 specimens

Those participating in the annual event from the Topeka area were: Christa Hirsch, Alex Boeding, Kate Ruoff, Jayden Wodke, Nicholas Casper, Delmon Humbert, Chelsea Roberts, Vincent Smull, Brian Rhoads, Scott Stieve (All science students from Northern Hills Junior High School), Sara Matthias, (Both students at Seaman High School), Stephanie Tucker (Teacher at North Fairview Elementary School), Carolyn Steele, Larry L. Miller (verifier) (Both Teachers at Northern Hills Junior High School), Stan Williams (Seaman School District bus driver). Those participating in the annual event from the Caldwell area were: Morgan Lebeda, Joe Halling, Kaden Halling, Deb Webster, Bri-



A Western Rat Snake discovered during the Sumner County herpetofaunal field trip in April 2007. Photograph by Larry L. Miller.

an McCabe, Jesse McCabe, Brian Willis, Kaila Willis, Tegan Isaacs, Tyann Isaacs, Tim Isaacs, Jerry Allen, Kodi Allen, Grant Feely, Gail Feely, Lexie Rice, Carli Ward, Nina Ward, Layne Castillo, Hunter Stuewe, Tina Koehn, Caleb McCabe, Katie McCabe, Dalton Whaley, Mike Lebeda, Shae Lebeda, Rachel Arnold, Quinci Ward, Brett Thomas, Kambree York, Kelsi Ward, Christian Ward, Ileena Arnett, Kelie Frenette, Kaityn Dvorak, Trent Kendrick, Krissi Kendrick, Derrick Kendrick, Sam Wencel, Quinn Ward, Vicki Ward, Darin Ward, Cory Ward, Colton Ward, Nyvelle Quick Bear.

Submitted by **LARRY L. MILLER**, Biology Department,, Northern Hills Junior High School, 5620 NW Topeka Boulevard, Topeka, Kansas 66617.

WABAUNSEE COUNTY HERPETOFAUNAL COUNT

On 9 June 2007, James Gubanyi (verifier), Julian Gubanyi, Marla Gubanyi, and Dan Murrow conducted a herpetofaunal count in Wabaunsee County, Kansas, from 3:45 pm until 9:15 pm. Wind speed was up to 10 mph; temperatures ranged from 80–86F. They observed or heard the following:

Woodhouse's Toad	±10
Northern Cricket Frog.....	±30
Gray Treefrog complex	12
Plains Leopard Frog	1
Bullfrog	±17
Great Plains Narrowmouth Toad.....	1

Ornate Box Turtle

Eastern Collared Lizard.....	1
Prairie Lizard.....	6
Great Plains Skink	2
Flathead Snake	3
Common Garter Snake	1

12 species ±88 specimens

Submitted by **JAMES GUBANYI**, 2501 Burnett, Topeka, Kansas 66614.

WYANDOTTE COUNTY HERPETOFAUNAL COUNT

Kansas: Wyandotte Co: northeastern part of Kansas City. 18 April 2007 from 6:30–7:30pm. Field Methods: visual observations, road cruising, turning rocks and artificial cover. Observed the following:

Cricket Frog	9
Five-lined Skink.....	4
Western Rat Snake	1
Northern Water Snake.....	1
Brown Snake	1
Ringneck Snake.....	2

6 species18 specimens

Submitted by **DAN MURROW**, 8129 Perry Street #37, Overland Park, Kansas 66204-4785.

ARTICLES

A Biological Inventory of the Sunflower Electric Site near Holcomb, Kansas

Travis W. Taggart

Sternberg Museum of Natural History and Department of Biological Sciences
Fort Hays State University
Hays, Kansas 67601

ABSTRACT

A biological inventory was conducted on the approximately 5,000 acre Sunflower Electric Power Corporation plant (Sunflower Site) located immediately south of the Arkansas River between Holcomb and Garden City, in Finney County, Kansas. The land is largely a remnant sandsage prairie with little disturbance aside from the plant buildings, a landfill, and a network of roads.

Within the Sunflower Site, two proposed landfill sites were specifically surveyed for seven species deemed to be of ecological importance by the Kansas Department of Wildlife and Parks, Kansas Department of Health and Environment, and Sunflower Electric, Inc. These species were the Spotted Skunk, Ferruginous Hawk, Short-eared Owl, Lesser Prairie Chicken, Longnose Snake, Eastern Glossy Snake, and Western Hognose Snake.

Five of these species were found on the proposed landfill sites as well as elsewhere on the Sunflower Site. The Spotted Skunk was not observed; however, its absence was anticipated. The Lesser Prairie Chicken was also not observed, and possible explanations of its absence are discussed herein.

The current landfill has had no apparent deleterious effects on the use, distribution, or abundance of the seven target species that occur on or around it. No evidence exists to demonstrate that the proposed expansion of the current landfill and the possibility of a subsequent landfill development will create any long-term effects with respect to these seven target species.

INTRODUCTION

Sunflower Electric Power Corporation (Sunflower) operates a coal-fired, electric generating plant approximately four miles south of Holcomb, Kansas. The plant sits near the southern end of eight sections (ca. 5,000 acres) of native sandsage prairie (Sunflower Site; Figure 1).

Prior to the construction of the plant in 1981, Sunflower commissioned a biological inventory (Choate, et al., 1981) to gather data on the vegetation and vertebrates of the proposed site. The Biological Inventory was conducted between May and September, 1980, to provide a baseline for future comparisons, such that subsequent impacts from the plant's construction and continued operations could be identified. The inventory provided general soil and floristic descriptions of the Sunflower Site, as well as data on the relative abundance and diversity of terrestrial vertebrates.

At the request of Sunflower Electric Power Cooperative, an addendum survey was initiated to update the previous Biological Inventory, with particular focus on two proposed landfills (Areas A and B, Figure 2) within the boundary of the original survey, and of seven vertebrate species (Table 1). The first area (Area A) is currently occupied by a flyash and bottomash landfill scheduled for expansion. The second area (Area B) currently consists of a 60 acre sand pit surrounded by sandsage prairie and is being evaluated for future development as a landfill. These Areas consist roughly

of the eastern three-quarters of the southern half of section 20 and eastern three-quarters of the northern half of adjacent section 29. One hundred-twelve (112) acres of Area A are currently being used as a coal ash landfill and will be expanded to 188 acres. Area B comprises the SE 1/4 of section 32 in the extreme southeastern corner of the Sunflower Site.

The Kansas Department of Wildlife and Parks, Kansas Department of Health and Environment, and Sunflower; identified seven sensitive vertebrate taxa (Table 1) that could be impacted by expansion of Area A or development of Area B.

The objectives of this study are:

1. a) Surveys of Areas A and B with respect to the seven target taxa. b) Should the target species be located within either Area, their occurrence within that Area is to be mapped in detail.

2. Surveys for the seven target taxa on the remainder of the Sunflower Site, outside of Areas A and B.

This study hoped to update the initial Biological Inventory to determine if the species that were originally present are still present within the boundary proposed for the expanded landfill. Based on those findings, conclusions could be made about the potential effect(s) the landfill operation has had on the local fauna and extrapolate those conclusions to potential project effects on the respective species by taking 76 additional acres of landfill space.

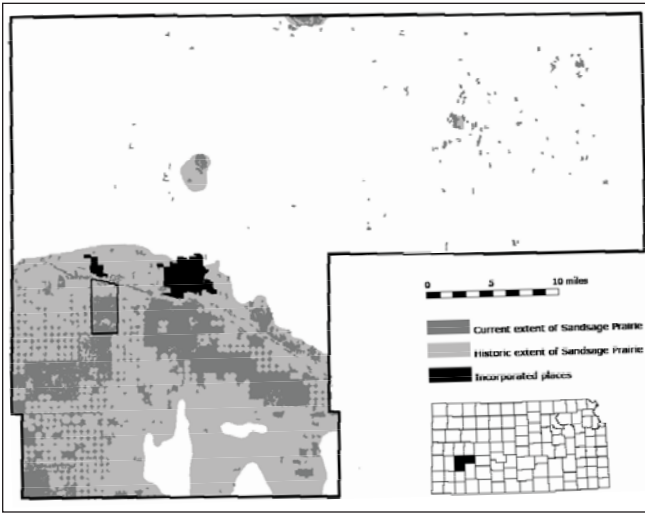


Figure 1. Map of Finney County showing the incorporated places (Holcomb [west] and Garden City) in black, the historic extent of Sandsage Prairie in light gray shading, and the current extent of Sandsage Prairie in the dark gray shading. The boundaries of the Sunflower Site are depicted by the vertical rectangle south of Arkansas River near Holcomb.

MATERIALS AND METHODS

Whenever possible, the sampling methodologies and sites used by Choate et al. (1981) were duplicated to better facilitate comparisons between the two inventories. All sampling took place from May through August 2006.

Amphibians, Reptiles, and Turtles

Amphibians, reptiles, and turtles were surveyed on 9–12 and 26–30 May, 25–30 June, 23–28 July, and 22–26 August. Survey methods included driving roads both day and night, walking transects by day as well as passive techniques such as trapping (pitfall traps, drift-fence/pitfall/funnel traps, and turtle traps), lifting artificial cover boards, and turning natural cover (logs and brush).

Roads were driven during every day and night that herpetofaunal surveys took place and amounted to approximately 225 person-hours of time spent.

Transects were walked through both Area A and B as well as in the outlying five sections. Walking transects was conducted in the mornings and evenings to avoid the hottest parts of the day. Approximately 80 per-

son-hours were spent walking transects.

Pitfall/funnel/drift fence arrays were constructed at six sites. Each array consisted of a 50 yard silt fence with 1/8 inch hardware cloth funnel traps on each end. Midway along each side of the fence a 24" deep plastic trash can was buried flush with the surface to serve as a pitfall. All arrays were in operation during each survey. Array one was located in Area A, just south of the existing ash pile in the NE 1/4 of the NW 1/4 of Section 29; array two was on the western edge of Area A in the SE 1/4 of the SW 1/4 of Section 20; array three was located in Area A in the SW 1/4 of the NE 1/4 of Section 29; and array four was located in Area B, in the NW 1/4 of the SE 1/4 of section 32.

Additionally, two artificial cover boards (3'x2' 3/4" plywood sheets) were laid out on either side of each drift fence array. Twenty artificial cover boards were laid out singly (not in association with a drift fence array) along the northern and western rims of the sandpit in western half of Area B.



Figure 2. Digital orthophoto and map of the Sunflower Electric Site taken during 2006 and showing features and locations discussed in the text. The Sunflower Site is 2 miles wide by 3.8 mile tall and bordered on the north by the Arkansas River, on the east and west by center-pivot irrigation, and on the south by sandsage prairie. The expanded and potential landfill sites are designated sites A and B, respectively.

Table 1. Seven target species for this study.

Mammalia

Spotted Skunk, *Spilogale putorius*

Aves

Ferruginous Hawk, *Buteo regalis*

Short-eared Owl, *Asio flammeus*

Lesser Prairie Chicken, *Tympanuchus pallidicinctus*

Reptilia

Longnose Snake, *Rhinocheilus lecontei*

Eastern Glossy Snake, *Arizona elegans*

Western Hognose Snake, *Heterodon nasicus*

Table 2. Comparison of mammal species collected in 1980 and 2006. Estimates for 1980 are based on the species accounts provided by Choate (1981) because numerical abundances of mammals were not given. The 1980 data should be viewed as the minimal number observed.

Species	1980	2006
Virginia Opossum, <i>Didelphis virginiana</i>	0	1
Least Shrew, <i>Cryptotis parva</i>	5	0
Desert Cottontail, <i>Sylvilagus audubonii</i>	4	23
Eastern Cottontail, <i>S. floridanus</i>	2	7
Black-tailed Jack Rabbit, <i>Lepus californicus</i>	^a 400	^c 800
Spotted Ground Squirrel, <i>Spermophilus spilosoma</i>	7	13
Thirteen-lined Ground Squirrel, <i>S. tridecemlineatus</i>	3	0
Black-tailed Prairie Dog, <i>Cynomys ludovicianus</i>	^b 3	0
Plains Pocket Gopher, <i>Geomys bursarius</i>	9	12
Plains Pocket Mouse, <i>Perognathus flavescens</i>	12	0
Hispid Pocket Mouse, <i>Chaetodipus hispidus</i>	3	1
Ord's Kangaroo Rat, <i>Dipodomys ordii</i>	42	92
Western Harvest Mouse, <i>Reithrodontomys megalotis</i>	11	0
Plains Harvest Mouse, <i>R. montanus</i>	13	0
White-footed Mouse, <i>Peromyscus leucopus</i>	28	1
Deer Mouse, <i>Peromyscus maniculatus</i>	22	1
Raccoon, <i>Procyon lotor</i>	0	2
Northern Grasshopper Mouse, <i>Onychomys leucogaster</i>	76	5
Cotton Rat, <i>Sigmodon hispidus</i>	7	4
Souther Plains Woodrat, <i>Neotoma micropus</i>	0	24
Prairie Vole, <i>Microtus ochrogaster</i>	1	1
House Mouse, <i>Mus musculus</i>	3	0
Coyote, <i>Canis latrans</i>	22	3
Striped Skunk, <i>Mephitis mephitis</i>	2	2
Mule Deer, <i>Odocoileus hemionus</i>	^c 1	1
White-tailed Deer, <i>O. virginianus</i>	^c 1	3
Badger, <i>Taxidea taxus</i>	2	1

a - conservative estimate of 50 per sq mile
b - only those above ground at one time were counted
c - extrapolation

Turtle traps were employed from 22–26 August in the sand pit in the NW 1/4 of Section 18. The traps consisted of three metal hoops 3 foot in diameter connected by 1/2 inch netting. The traps had a netting funnel on one end allowing the turtles to enter. The end opposite the funnel was closed with netting. All the turtle traps were baited with chicken liver.

Birds

Surveys for birds took place on 23–24 May, 27–28 June, and 28–29 July. Birds were surveyed from sunrise until 1430 CDT by walking transects through the site with stops spaced approximately 0.5 miles apart. At each stop the birds observed (heard or seen) were counted over a three minute interval.

Mammals

The mammals were surveyed on 6–10, 17, and 22–29 May and on 20–28 August. Mammals were surveyed by walking transects, driving roads, and setting transects of Museum Special snap traps (22–29 May) and Sherman live-catch traps (20–28 August). Tomahawk model 103 live-catch traps were used to survey for Spotted Skunks. The Tomahawk traps were covered in burlap and baited with commercial cat food.

COMMUNITY ANALYSIS

This Section attempts to contrast the results of the initial and current survey. When possible (and reason-

able to do so), comparisons have been made between the 1980 survey and this survey, however for various reasons, direct comparisons are not always possible, nor are they biologically significant.

Amphibians, Reptiles, and Turtles

Table 5 summarizes those herpetofaunal taxa encountered during this survey. The three target snakes *Arizona elegans*, *Rhinocheilus lecontei*, and *Heterodon nasicus* were all observed during the survey. *Lithobates catesbeianus*, *Trachemys scripta*, *Chrysemys picta*, and *Chelydra serpentina* were observed during this study, but were absent during the 1980 survey. Conversely, *Ambystoma mavortium*, *Kinosternon flavescens*, *Holbrookia maculata*, and *Tantilla nigriceps* were observed during the 1980 survey but were absent during this survey.

The most notable herpetological finding of the survey was the absence of *Holbrookia maculata*. The 1980 survey listed this taxon as the most observably abundant vertebrate on the site, while this recent survey effort failed to discover any examples. Their recent apparent rarity isn't limited to the Sunflower Site. The species once occurred in Kansas from the Flint Hills west and is now only recently confirmed from two populations along the Colorado border and one population in southwest Sumner County (Taggart, 2006).

Table 3. Results of target bird surveys.

Species	Number Observed
Ferruginous Hawk.....	a6
Short-eared Owl.....	2
Lesser Prairie Chicken.....	b0

a - 2-4 pairs were observed

b - leks in April; no surveys done at that time

Birds

Table 3 summarizes those avian target species, which were encountered during this survey. Both, the Ferruginous Hawk and Long-eared Owl were observed during this survey; however, no Lesser Prairie Chickens were observed (Table 4).

Mammals

Table 2 summarizes those mammalian taxa encountered during this survey. Eighteen species of mammals were observed during the survey. *Didelphis virginina*, *Neotoma micropus*, and *Procyon lotor* were observed, but not during the 1980 survey. Conversely, *Cryptotis parva*, *Spermophilus tridecemlineatus*, *Cynomys ludovicianus*, *Perognathus flavescens*, *Reithrodontomys megalotis*, *Reithrodontomys montanus*, and *Mus musculus* were observed during the 1980 survey but were not recorded during this survey effort.

Several species of small mammals were not reported during this study, but were well-represented during the 1980 study. Further studies may be considered to assess the status of the *Cryptotis parva*, *Spermophilus tridecemlineatus*, *Perognathus flavescens*, *Reithrodontomys megalotis*, and *Reithrodontomys montanus* on the Sunflower Site. Jerry Choate (pers. comm.) stated that these species are not especially abundant in the area, and typically inhabit more compacted soils. He further stated that each of them undoubtedly occur on the site, but could easily be missed in sampling. Based on Choate's comments, further sampling is warranted but not a high priority.

ACCOUNTS OF SPECIES

The following seven species accounts focus on those taxa of greatest biological interest on the site (Table 1). Additionally, comments are generally limited to observations in the proposed landfill areas of interest (Areas A and B). When pertinent, references are made to observations that took place outside of the proposed landfill sites but within the Sunflower Site, as well observations occurring elsewhere within the range of a particular species. This study was successful in documenting five of the seven target species.

Spotted Skunk, *Spilogale putorius*

The Spotted Skunk was not observed during the initial survey of Choate et al. (1981), nor were any located during this study. Choate et al. (1974) summarized the historical distribution and abundance of this species in the state. They noted that the Spotted Skunk was probably not common in Kansas until

settlement, and that the recent trend from rural to urban population centers has caused their decline in numbers and range throughout the state. The Sunflower Site (and the surrounding area) does not provide adequate habitat to support a substantial population of this species. Marginal habitat does exist along the Arkansas River riparian corridor on the northern edge of the property.

Ferruginous Hawk, *Buteo regalis*

The Ferruginous Hawk was observed on the Sunflower Site during this survey. It is unlikely that it nests on the site; however it uses the Sunflower Site (and surrounding areas) to forage. The high concentration of small mammals and reptiles on the Site, (relative to adjacent irrigated cropland) represents an important food source for this species.

Short-eared Owl, *Asio flammeus*

A single Short-eared Owl was observed on the Sunflower Site during this survey. Like the Ferruginous Hawk, it is unlikely that this species nests on the Sunflower Site, and that it is intermittently present while foraging.

Lesser Prairie Chicken, *Tympanuchus pallidicinctus*

No Lesser Prairie Chickens were observed during this study. Choate et al. (1981) found the Lesser Prairie Chicken to be a common permanent inhabitant of the Sunflower Site, although they further state that Lesser Prairie Chicken numbers might be unusually high due to the lack of habitat adjacent to the study area. Elmer Finck, Fort Hays State University, conducted the targeted avian surveys during this study, and despite not observing them during this work on the site, he is certain that Lesser Prairie Chickens persist there, but were missed because the surveys began after the birds had finished "booming," making them more difficult to locate.

Conversely, much of the habitat surrounding the Sunflower Site has been rendered unsuitable to Lesser Prairie Chickens due to anthropogenic effects associated with agriculture and urbanization. Lesser Prairie Chickens favor native prairies and are adversely affected by their conversion to other uses. Even in areas that remain largely intact and apparently suit-

Table 4. Bird records for the three target species during 2006: Ferruginous Hawk (*Buteo regalis*)—FEHA, Short-eared Owl (*Asio flammeus*)—SHOW, and Lesser Prairie-chicken (*Tympanuchus pallidicinctus*)—LEPC. Locations are given in decimal degrees (lat/long).

Date	Species	#	Location
5/24	FEHA	2	37.916850°/-100.965549°
5/24	SHOW	2	37.953007°/-100.990628°
5/24	LEPC	0	-/-
6/28	FEHA	2	37.924818°/-100.984794°
6/28	SHOW	0	-/-
6/28	LEPC	0	-/-
7/29	FEHA	1	37.955024°/-100.984821°
7/29	FEHA	1	37.967818°/-100.982297°
7/29	SHOW	0	-/-
7/29	LEPC	0	-/-

Table 5. Comparison of amphibian, reptile, and turtle species collected in 1980 and 2006.

Taxon	1980	2006
Amphibians		
Barred Tiger Salamander, <i>Ambystoma mavortium</i>	1	0
Bullfrog, <i>Lithobates catesbeianus</i>	0	6
Plains Spadefoot, <i>Spea bombifrons</i>	53	21
Great Plains Toad, <i>Anaxyrus cognatus</i>	2	4
Woodhouse's Toad, <i>Anaxyrus woodhousii</i>	9	26
Turtles		
Ornate Box Turtle, <i>Terrapene ornata</i>	22	134
Yellow Mud Turtle, <i>Kinosternon flavescens</i>	2	0
Slider, <i>Trachemys scripta</i>	0	5
Northern Painted Turtle, <i>Chrysemys picta</i>	0	4
Common Snapping Turtle, <i>Chelydra serpentina</i>	0	1
Reptiles		
Lesser Earless Lizard, <i>Holbrookia maculata</i>	544	0
Great Plains Skink, <i>Plestiodon obsoletus</i>	73	11
Six-lined Racerunner, <i>Aspidoscelis sexlineata</i>	204	25
Western Hognose Snake, <i>Heterodon nasicus</i>	8	8
Eastern Racer, <i>Coluber constrictor</i>	5	4
Coachwhip, <i>Masticophis flagellum</i>	4	14
Eastern Glossy Snake, <i>Arizona elegans</i>	25	24
Bullsnake, <i>Pituophis catenifer</i>	16	66
Longnose Snake, <i>Rhinocheilus lecontei</i>	3	9
Plains Blackhead Snake, <i>Tantilla nigriceps</i>	4	0
Prairie Rattlesnake, <i>Crotalus viridis</i>	3	12

able, Lesser Prairie Chickens may exhibit behavioral avoidance or abandonment of areas near roads, power lines, compressor stations, agricultural fields, and inhabited dwellings (Robel et al., 2004). Lesser Prairie Chickens avoid nesting within 300-400 yards of fields with center-pivot irrigation, 200 yards of oil or gas wellheads, 400 yards of power lines, 860 yards of improved roads, and 1,370 yards of large structures (Robel et al. 1994). The introduction of such features into prairie landscapes has been hypothesized to increase predation rates, and also cause habitat avoidance (Bidwell et al. 2001, Robel, 1970, Robel et al. 2004). Regardless, the absence of the birds effectively increases the impact footprint of these areas. While the continued periodic monitoring of all taxa is desirable, a follow-up study of the distribution and relative abundance of the Lesser Prairie Chicken is certainly the most pressing.

Longnose Snake, Rhinocheilus lecontei

Eight Longnose Snakes were observed during this study. The Longnose Snake is a highly secretive species and despite its reasonable size (up to 3 feet in length) very few specimens from Kansas have been observed. The eight collected during this study is three more than the author had observed while conducting studies statewide over the past twenty years. Large adults, juveniles, and hatchlings were observed on the Sunflower Site during this study. Choate et al. (1981) reported three observations of this species. Longnose Snakes were observed throughout the Sunflower Site. Two Longnose Snakes were observed on the existing landfill in Area A. One was observed on the southern end of Area B.

Eastern Glossy Snake, Arizona elegans

The Eastern Glossy Snake was the second most commonly observed snake during the study behind the Bullsnake. Twenty-four were observed (all at night). This species is secretive and due to its nocturnal habits and overall similarity to the Bullsnake, the Eastern Glossy Snake is often overlooked, thereby contributing to its perception as rare. All size classes were observed, from large adults (> 4 feet in length) to many hatchlings. Choate et al. (1981) reported twenty-five observations of this species. The Eastern Glossy Snake was found in all habitat types, but was less commonly reported from the floodplain. One Eastern Glossy Snake was observed on the existing landfill in Area A. Another was found on the eastern edge of Area A and one was also observed within Area B.

Western Hognose Snake, Heterodon nasicus

Eight Western Hognose Snakes were recorded during the survey, the same number reported by Choate et al. (1981). Adults, juveniles, and hatchlings (from 2005) were observed in equal proportion. All of the observations were made off the floodplain; however they undoubtedly utilize this habitat as well. One Western Hognose Snake was observed on the existing landfill in Area A. And another was found just south of the existing landfill in Area A. One was observed on the southern edge of Area B.

ANTICIPATED EFFECTS OF LANDFILL EXPANSION

Across the Sunflower Site (and as Choate et al., 1981 predicted), the maintenance of the large native sandsage prairie ecosystem has served as a refuge from the agricultural conversion and practices that

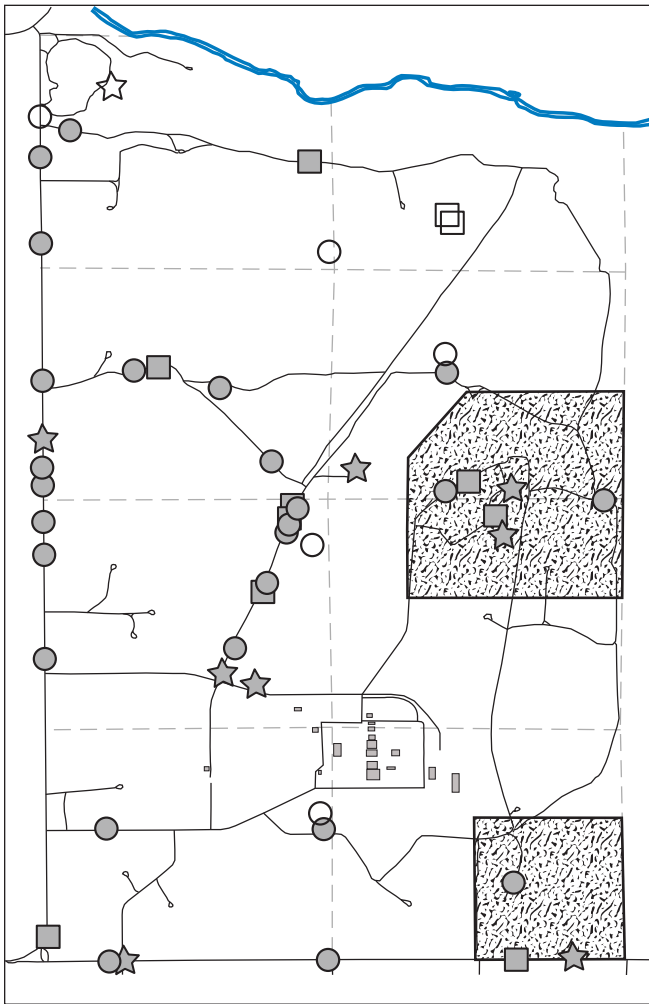


Figure 3. Distribution of the three target snake species on the Sunflower Site. Circles represent the Eastern Glossy Snake (*Arizona elegans*), stars the Western Hognose Snake (*Heterodong nasicus*), and squares the Longnose Snake (*Rhinocheilus lecontei*). Shaded symbols depict observations obtained during this study; open circles designate historic records.

have taken place on adjacent properties. Specifically, areas that contain center-pivot irrigation and crop/forage production represent critically altered landscapes with a greatly diminished faunistic composition.

The construction and use of the current landfill in Area A has not adversely affected the distribution or abundance of the seven targeted species. In fact, all three of the target species of snakes were observed on the present landfill. Human activities associated with the landfill construction will pose an immediate detrimental effect to most species present in those areas. This effect will be short-lived and only over a small area at any one time. There is no evidence to suggest

that the 76 acre expansion of the current landfill over the next 40 years will adversely affect these species.

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BIBLIOGRAPHY

- Bidwell, T., S. Fuhlendorf, B. Gillen, S. Harmon, R. Horton, R. Manes, R. Rodgers, S. Sherrod, D. Wolfe. 2001. Ecology and Management of the Lesser Prairie-Chicken. E-970. Oklahoma Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources, Oklahoma State University.
- Choate, Jerry R., Charles A. Ely, Eugene D. Fleharty, and Gary K. Hulett. 1981. Biological Inventory of the Sandsage Prairie Near Holcomb, Kansas. Final Report. Sunflower Electric Cooperative, Inc. 170 pp.
- Jensen, William E., Douglas A. Robinson, Jr., and Roger D. Applegate. 2000. Distribution and population trend of lesser prairie-chicken in Kansas. *The Prairie Naturalist* 32(3): 169-176.
- Robel, R. J., J. N. Briggs, A. D. Dayton, and L. C. Hulbert. 1970. Relationships between visual obstruction measurements and the weight of grassland vegetation. *Journal of Range Management* 23:295-297.
- Robel, R. J., J. A. Harrington, Jr., C. A. Hagen, J. C. Pitman, and R. R. Reker. 2004. Effect of energy development and human activity on the use of Sandsagebrush habitat by Lesser Prairie-Chickens in southwest Kansas. *Transactions of the North American Wildlife and Natural Resources Conference* 68:
- Taggart, Travis W. 2006. Where have the *Holbrookia* gone? *Journal of Kansas Herpetology* 19: 10.
- Walker, Thomas L. Jr. 2000. Final report: movements and productivity of lesser prairie chickens in southwestern Kansas. Report to Kansas Department of Wildlife and Parks. July 1, 2000.
- Woodward, A.J.W., S.D. Fuhlendorf, D.M. Leslie, Jr., and J. Shackford. 2001. Influence of landscape composition and change on Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*). *The American Midland Naturalist* 145: 261-274.

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The KHS is a non-profit organization established in 1974 and designed to encourage education and dissemination of scientific information through the facilities of the Society; to encourage conservation of wildlife in general and of the herpetofauna of Kansas in particular; and to achieve closer cooperation and understanding between herpetologists, so that they may work together in common cause. All interested persons are invited to become members in the Society. Membership dues per calendar year are \$15.00 (U.S., Regular), \$20.00 (outside North America, Regular), and \$20.00 (Contributing) payable to the KHS. Send all dues to: KHS Secretary, 5438 SW 12th Terrace Apt. 4, Topeka, Kansas 66604, USA.

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The KHS hosts two or more field trips each year, one in the spring and one in the fall. Field trips are an enjoyable educational experience for everyone, and also serve to broaden our collective understanding of the distribution and abundance the amphibians, reptiles, and turtles in Kansas. All interested persons are invited to attend.

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The Journal of Kansas Herpetology, issued quarterly (March, June, September, and December), publishes all society business.

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As space allows, *JKH* publishes all manner of news, notes, and articles. Priority of publishing is given to submissions of Kansas herpetological subjects and by KHS members, however all submissions are welcome. The ultimate decision concerning the publication of a manuscript is at the discretion of the Editor. Manuscripts should be submitted to the Editor in an electronic format whenever possible. Those manuscripts submitted in hard copy may be delayed in date of publication. Manuscripts should be submitted to the Editor no later than the 10th of the month prior to the month of issuance. All manuscripts become the sole possession of the Society, and will not be returned unless arrangements are made with the Editor. In the interest of consistency and clarity the common names used in *JKH* will follow the latest edition of standardized common names as organized by CNAH (www.cnah.org), which are also used in the prior, current and subsequent editions of *Amphibians and Reptiles in Kansas* (currently Collins and Collins, 1993).

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