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Front Cover: The eggs of an Eastern Narrowmouth Toad *(Gastrophryne carolinensis)* from Cherokee County, Kansas. Photograph by Suzanne L. Collins, CNAH, Lawrence, Kansas.

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KHS SPRING 2008 FIELD TRIP COMPILATION

A hardy 79 KHS members and their friends, families, and colleagues drove down to Lake Parsons and the lush lowlands of southeastern Kansas to spend the weekend of 25–27 April 2008 turning rocks, lifting logs, and searching the streams for snakes, lizards, turtles, and assorted amphibians in Neosho County, Kansas. And they were a signal success, as the following list attests:

Species	Number
Amphibians	
Smallmouth Salamander	6
American Toad	7
Northern Cricket Frog	258
Bullfrog	14
Southern Leopard Frog	35
Great Plains Narrowmouth Toad	31
Reptiles	
Eastern Collared Lizard	44
Five-lined Skink	20
Great Plains Skink	75
Ground Skink	6
Six-lined Racerunner	17
Western Slender Glass Lizard	5
Eastern Racer	22
Prairie Kingsnake	18
Common Kingsnake	5
Milk Snake	5
Rough Green Snake	3
Western Rat Snake	6
Flathead Snake	26
Western Worm Snake	6
Ringneck Snake	445
Plainbelly Water Snake	29
Northern Water Snake	1
Graham's Crayfish Snake	1
Brown Snake	1
Western Ribbon Snake	29
Common Garter Snake	19
Lined Snake	2
Gopher Snake (aka Bullsnake)	1
Massasauga	1
Turtles	
Common Snapping Turtle	2
Northern Painted Turtle	12
False Map Turtle	2
Eastern Box Turtle	6
Ornate Box Turtle	9
Slider	7
Total	
36 species	1,176 specimens

Some of the nearly 80 individuals and one dog that participated in the 2008 KHS Spring field Trip to Lake Parsons in Neosho County, Kansas. Photograph by Suzanne L. Collins.

Participants for spring 2008 were: Ted Abel, Cathy Acuff, Laura Acuff, Rob Acuff, Lucia Baldwin, Mary Kate Baldwin, Andy Banks, Tom Beaver, Hillary Bernhardt, Henry R. Bishop, Miles Bishop, Ali Blanchard, Morgan Blanchard, Heidi Brown, M. C. Brown, Gerard Brungardt, Luke Brungardt, Tom Brungardt, Dan Carpenter, Shelbi Carpenter, Joseph T. Collins, Suzanne L. Collins, Andy Durbin, Dan Fogell, Spencer Gatewood, Angela Gatton, Ty Gatton, Dylan George, Nathan George, Roxie George, Eweleen H. Good, Max V. Good, Jim Gubanyi, Julian Gubanyi, Marla Gubanyi, Monica Haverkamp, Emily Hooser, David Humenczuk, Paul Ingram, David Jewell, Dan Johnson, GraceAnne Johnson, Eric Kessler, Owen Kessler, Shelby Klima, Jill Lokke, John Lokke, Brandon Low, Judy Low, Jerry Lowry, Alejandro Lozano, Ian McCloud, Ross McNearney, Rick Morrow, Bill Munholland, William Munholland, Daniel Murrow, David Oldham, Jackson Oldham, Robin Oldham, Tag Oldham, Brian Olsen, Samantha Parker, Erica Peterson, Dana Sailsbury, Derek Schmidt, Lisa Schmidt, Cady Sebilt, H. G. Spencer, Travis W. Taggart, Abby Taylor, Shireen Usman, Ginny Weatherman, Bill Welch, Eric Wenzl, Roy Wenzl, Garnett Wilkinson, Victor Wilkinson, and Brant Yeoman.

Daniel Murrow, KHS Field Trip Chairperson, 8129 Perry, No. 37, Overland Park, Kansas 66204.

At the first site visited during the KHS Spring Field Trip, Brandon Low of Topeka (above left) got to the stream first and caught a bunch of Plainbelly Water Snakes below the bridge. Brandon soon learned why he was the only one holding these exciting animals. First they tried to bite him, then they sprayed musk all over him, and then . . .

. . . all the folks gathered around to watch as the snakes got really excited and evacuated their bowels on him. This was an effective defense strategy. The snakes were turned loose shortly thereafter. Both photographs by Suzanne L. Collins.

A half dozen Eastern Box Turtles were found during the KHS Spring Field Trip to Neosho County, Kansas. This male had recently emerged from its winter den. Photograph by Suzanne L. Collins.

During the KHS Spring Field Trip to Neosho County, Kansas, Eric Kessler's Blue Valley North students chose a luncheon site atop this snake den. The creatures underneath waited for leftovers. Photograph by Suzanne L. Collins.

Daniel Murrow, Field Trip Chairperson from Overland Park, dips for delicate tadpoles in a gurgling creek during the KHS spring soiree to Neosho County, Kansas. Photograph by Suzanne L. Collins.

Jill Lokke and former KHS President John Lokke of Wichita relax during the KHS Spring Field Trip to Neosho County, Kansas. John, an accomplished and well-known artist, hones his talent amidst the spring green-up. Photograph by Suzanne L. Collins.

Nearly three dozen Southern Leopard Frogs were found during the KHS Spring Field Trip to Neosho County, Kansas. This anuran was found hopping across the entrance road to Lake Parsons. Photograph by Suzanne L. Collins.

The Sunday morning KHS Field Trip crew awakened after a sound sleep. The previous Saturday night had been spent in good fellowship around the roaring campfire, drinking lots of lemonade. Excessive lemonade can be very debilitating. Photograph by Suzanne L. Collins.

IN MEMORIAM ROBERT F. CLARKE (1919–2008)

Dr. Robert F. Clarke, Emporia, Kansas, passed away on Wednesday, 2 April 2008, at Newman Regional Health in Emporia, Kansas. He was born 18 October 1919 in Portsmouth, Virginia. He married Elaine McNabb of Melvern, Kansas, in 1947. In 1948, he and Elaine moved to Emporia, Kansas, where he was a stationary engineer for the Santa Fe Railroad and a freelance illustrator.

Bob always had a passion for reptiles, turtles, and amphibians, and had amassed a large collection of them. After a rain, one of the biology professors from Kansas State Teachers College (now Emporia State University) found him collecting frogs in a ditch and encouraged him to begin college to pursue his passion, which he did in 1952 at the age of 33. He completed his Bachelors Degree in 1955 and Masters Degree in Biology in 1957 at Emporia State University. He received a prestigious National Academy of Science Fellowship to complete his Doctorate in Zoology at the University of Oklahoma in 1963. The family returned to Emporia and he taught at Roosevelt High School on the Emporia State University campus, then became a Biology Department faculty member at Emporia State University in 1968. He was Chairman of the Department of Biology at Emporia State University from 1972 to 1979.

KHS Distinguished Life Member Robert F. Clarke (1919–2008). He had a smile for us all and told wonderful stories of herpetological field trips to far away places. Everyone will miss Bob. He was a kind and gentle person. Photograph by Larry L. Miller.

As a naturalist/educator, Robert Clarke taught several areas of biology for more than 30 years, published over 50 works on herpetology, was instrumental in starting the Chickadee Check-Off Program to assist non-game research in Kansas, was a frequent speaker at colleges and universities as part of the American Institute of Biological Scientists, and was the editor, and editor emeritus, and one of the creators of the Kansas School Naturalist.

Robert was president of the Kansas Herpetological Society in 1972 and Kansas Academy of Science in 1981. He received the following awards: The Robert L. Packard Outstanding Educator Award by the Southwestern Association of Naturalists (1989), Kansas Wildlife Federation Conservation Communicator Award (1991), The Governor's Kansas Conservationist of the Year Award (1982). In his primary profession of herpetology, the pinnacle of his long and productive career was being invested as a *Distinguished Life Member* of the Kansas Herpetological Society.

Robert Clarke is survived by a daughter, Linda Clarke (Emporia), son, John Clarke (Wichita), and four granddaughters, Jessica, Lacy, Tara, and Kristi Clarke (Wichita). His wife, Elaine preceded him in death. He loved his family, lizards and nature, his art and friends, his Model A, making jokes and laughter. His smile and Virginia accent will be missed.

—Joseph T. Collins, Kansas Biological Survey, Lawrence, Kansas 66047.

KHS FALL FIELD TRIP TO SMITH COUNTY IN OCTOBER

The 2008 Annual Fall KHS Field Trip will be held in Smith County, Kansas. KHS members and any other interested individuals will gather as early as Friday evening, 3 October 2008, at Glen Elder Lake in adjacent Mitchell County, ca. 13 miles from the southeastern corner of Smith County. Daily vehicle permits at Glen Elder Lake cost $3.70; camping permits are $7.50 per night. Modern restrooms and showers are available to campers. Participation in KHS field trips is free to anyone interested in amphibians, reptiles, and turtles.

Most KHS members and their friends typically want to camp. However, lodging is available in Smith Center as well as Cawker City and the town of Downs (see the KHS web site for camping, lodging, and restaurants). When arriving, look for the large KHS sign at Glen Elder Lake. Herpetofaunal counts begin at 9:00 am at the designated campsite on Saturday and Sunday, 4-5 October 2008. The field trip adjourns at noon on Sunday, 5 October 2008.

More information will be posted, as it becomes available, on the KHS web site at

http://www.cnah.org/khs/FieldTripInfoFall.html

For more details, contact:

Daniel G. Murrow, KHS Field Trip Chairperson
(see inside front cover)

KHS ANNUAL MEETING CALL FOR PAPERS

The program for the KHS 35th Annual Meeting will be held at Friends University, Wichita, Kansas, on 7–9 November 2008. Participants wishing to present a talk should contact Dan Carpenter with their title, institutional address, and abstract at dc1221@sbcglobal.net no later than 1 October 2008. Copies of the title and institutional address should also be sent to Joe Collins (jcollins@ku.edu) for posting on the KHS web site meeting program. Individuals using US mail should send this information to both Carpenter and Collins (see inside front cover). Presenters wishing to be considered for *The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology* should so indicate with their submission. Lodging arrangements will not be made by the KHS; program and motels will soon be listed on the KHS web site.

KHS 2008 HERPETOFAUNAL COUNTS

KHS members are reminded to send their spring and summer (1 April to 30 June) 2008 herpetofaunal counts to the associate editor (see below) as soon as possible. All such counts will be published in the September issue of the *Journal of Kansas Herpetology.* Counts must have been conducted during April, May, and June of 2008 only, and must list locality, date, participants, and complete address of the author. Additional data such as time span and weather can be submitted, and will be included as space permits. Counts can be sent as email text to

jcollins@ku.edu

KHS SCHOLARSHIP & GRANT DEADLINES

Members are reminded that the deadline is 15 September 2008 for submission of applications for the *Howard K. Gloyd-Edward H. Taylor Scholarship* and the *Alan H. Kamb Grant for Research on Kansas Snakes.* Self-nominations for the *Gloyd-Taylor Scholarship* are encouraged. Submissions for both the scholarship and grant should be sent to Dan Fogell, Chairperson of the KHS Awards Committee (see inside front cover).

GEOGRAPHIC DISTRIBUTION

GASTROPHRYNE OLIVACEA (Great Plains Narrowmouth Toad). KANSAS: Neosho Co: N°37.558260, W°95.33179. 28 April 2008. Brandon Low and Judy Low. MHP 13850. Verified by Travis W. Taggart. New county record (Collins and Collins, 1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **BRANDON LOW**, 2303 SE Libra Court, Topeka, Kansas 66605.

GASTROPHRYNE OLIVACEA (Great Plains Narrowmouth Toad) KANSAS: Osage Co: N°38.669944, W°95.618917. 13 May 2008, Nicholas Gomez. MHP 13903. Verified by Travis W. Taggart. New county record (Collins and Collins, 1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **NICHOLAS J. GOMEZ**, P. O. Box 1044, Topeka, Kansas 66601.

LITHOBATES AREOLATUS (Crawfish Frog) KANSAS: Osage Co: N°38.46151, W°95.87917. 24 March 2007. Travis W. Taggart. MHP 13400–13409. Verified by Joseph T. Collins. New county record (Collins and Collins, 1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **TRAVIS W. TAGGART**, Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

PLESTIODON OBSOLETUS (Great Plains Skink). KANSAS: Rush Co: 6 mi S & 4.5 mi W Albert. N°38.36218, W°99.07357. 16 May 2008. Zachary Mayers. MHP 13830. Verified by Brian C. Bartels and Curtis J. Schmidt. New county record (Collins and Collins 1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.)

Submitted by **ZACHARY MAYERS**, R. R. 1, Albert, Kansas 67511.

THAMNOPHIS PROXIMUS (Western Ribbon Snake). KANSAS: Jackson Co: N°39.226167, W°95.998444. 21 May 2008. Nicholas Gomez. MHP 13904. Verified by Curtis J. Schmidt. New county record (Collins and Collins, 1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **NICHOLAS J. GOMEZ**, P. O. Box 1044, Topeka, Kansas 66601.

TERRAPENE ORNATA (Ornate Box Turtle). KANSAS: Neosho Co: N°37.70331, W°95.30188. 28 April 2008. Paul Ingram and Tom Beaver. MHP 13901. Verified by Daniel Murrow. New county record (Collins and Collins, 1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **TOM BEAVER**, P. O. Box 697, De Soto, Kansas 66018, and **PAUL INGRAM**, 8615 Kill Creek Road, De Soto, Kansas 66018.

OF INTEREST

KHS MEMBER TO PHILADELPHIA ZOO

KHS member Carlos C. Martínez Rivera, a graduate student finishing his doctoral degree in the Division of Biological Sciences at the University of Missouri, Columbia, has been appointed the new Curator of Amphibian Conservation at the Philadelphia Zoo in Pennsylvania. At the 33rd annual meeting of the KHS in 2006 at the Sternberg Museum of Natural History in Hays, Kansas, Carlos presented at paper on why frogs form choruses. Carlos became aware of the opening at the Philadelphia Zoo because of an announcement sent out in October 2007 by The Center for North American Herpetology, Lawrence. Congratulations to Carlos. The entire KHS membership wishes him well in his new position.

RINGNECK SNAKE REVELATIONS

Phylogeography of *Diadophis punctatus:* extensive lineage diversity and repeated patterns of historical demography in a trans-continental snake (2008. Molecular Phylogenetics and Evolution 46(3): 1049-1070). by Frank Fontanella, Chris R. Feldman, Mark E. Siddall and Frank T. Burbrink

Abstract: Dynamic climatic oscillations during the Pleistocene had profound effects on the distributions of species across North America. Although the role of historical climate change on speciation remains controversial, the impact on genetic variation within species has been well documented. We examined mtDNA sequences from the cytochrome b gene (1117 bp) and a portion of the NADH-4 gene (659 bp) for 286 individuals of *Diadophis punctatus* to infer phylogeographic patterns and population structure and to examine historical demographic patterns in both glaciated and unglaciated regions of North America. We inferred 14 lineages that replace each other geographically across the United States. Several of these lineages appear to be confined to specific habitats (floodplains, grasslands, montane environments) and traverse previously identified genetic barriers for terrestrial vertebrates including the Mississippi and Apalachicola Rivers, the Appalachian Mountains, and the western continental divide. We also observed overlapping ranges between some haplotype groups and several instances of secondary contact associated with ecological transition zones in eastern South Carolina, southern Oklahoma and central California. Within the US, diversification began during the late Miocene and continued into the mid-Pleistocene, suggesting these lineages pre-dated the last glacial maximum. Coalescent and non-coalescent demographic analyses indicate that independent lineages currently occupying previously glaciated or unsuitable areas in eastern, central and western US underwent post-glacial population expansion likely from southern refugia during the late Pleistocene/early Holocene. Conversely, southern lineages display patterns consistent with long-term population stability. Such long-term persistence of genetic structure may be due to the competitive effects between lineages or ecosystem stability in more southern latitudes.

Associate Editor's Note: Using mtDNA, Fontanella et al. (2008) identified fourteen lineages of Ringneck Snakes but declined to recognize them as distinct species, pending the acquisition of additional data from Mexican populations and the evaluation of nucleic molecular data for the entire complex.

However, based on known type localities (as they appear in Blanchard, 1942, Stejneger and Barbour, 1943, and Schmidt, 1953) for already described, published, and available taxa, minimally the following distinct species (see Figures 3 & 5 in Fontanella et al. for lineage designations) might be recognized in the future:

Diadophis acricus Paulson, 1968 (Peninsular Florida lineage of Fontanella et al. 2008).
Type locality: Big Pine Key

Diadophis amabilis Baird & Girard, 1853 (Coastal California lineage of Fontanella et al. 2008)
Type locality: San Jose, California (see Stejneger & Barbour, 1943)
Synonyms: *D. occidentalis* Blanchard, 1923 & *D. vandenburgii* Blanchard, 1923

Diadophis arnyi Kennicott, 1858 (Great Plains lineage of Fontanella et al. 2008)
Type locality: Hyatt, Anderson County, Kansas

Diadophis docilis Baird & Girard, 1853 (North Texas lineage of Fontanella et al. 2008)
Type locality: between Rio San Pedro or Devil's River and Comanche Spring, Texas
Synonym: *D. blanchardi* Schmidt & Smith, 1944

Diadophis edwardsii (Merrem, 1820) (Northeastern lineage of Fontanella et al. 2008)
Type locality: Pennsylvania
Synonym: *D. torquatus* (Shaw, 1802) (preoccupied)

Diadophis modestus Bocourt, 1886 (Southern California lineage of Fontanella et al. 2008)
Type locality: California (see Stejneger & Barbour, 1943)
Synonyms: *D. anthonyi* Van Denburgh & Slevin, 1923 & *D. similis* Blanchard, 1923

Diadophis occipitalis (Gunther, 1858) (Mid-Atlantic lineage of Fontanella et al. 2008)
Type locality: designated as "Charleston, South Carolina" (see Schmidt, 1953)
Synonym: *D. pallidus* Cope, 1860

Diadophis pulchellus Baird & Girard, 1853 (Eastern California lineage of Fontanella et al. 2008)
Type locality: El Dorado County, California (see Stejneger & Barbour, 1943)

Diadophis punctatus (Linnaeus, 1766) (Piedmont lineage of Fontanella et al. 2008)
Type locality: Carolina (in Linnaeus, 1766), but given as "Carolina and Eastern Gulf States" by Stejneger & Barbour (1943), and restricted to "Charleston, South Carolina" by Schmidt (1953)

Diadophis regalis Baird & Girard, 1853 (Great Basin lineage of Fontanella et al. 2008)
Type locality: Sonora, Mexico
Synonyms: *D. arizonae* Blanchard, 1923 & *D. laetus* Jan, 1863

Diadophis stictogenys Cope, 1860 (Mississippi River Valley lineage of Fontanella et al. 2008)
Type locality: designated as "southern Illinois" (see Schmidt, 1953: 183)

Diadophis texensis Kennicott, 1860 (Southeastern Louisiana lineage of Fontanella et al. 2008)
Type locality: "New Orleans to Galveston"

Names for the Cumberland and Western Louisiana lineages of Fontanella et al. (2008) are not evident; diligent research may reveal them. *Diadophis dysopes* Cope, 1860, might be an available name, provided the type specimen can be associated with either population; although its type locality has been designated as "vicinity of Philadelphia" (see Schmidt, 1953) and this would place it in the synonymy of *D. edwardsii,* this restriction of the type locality may not stand.

Some of these names could be replaced by others, depending on the results of molecular analysis of Mexican populations by Fontanella and his colleagues along with research that establishes more precise type localities for some of the available names. The above list of name combinations is presented here merely as advance information of possible future changes in the taxonomy of the (currently monotypic) Ringneck Snake, *Diadophis punctatus.* Under no circumstances should the above list be adopted as a taxonomy for the group. Too much work remains to be done.

Acknowledgements: Much information for the above list was generously provided by Van Wallach, Walter E. Meshaka, Jr., James N. Layne, Travis W. Taggart, and Curtis J. Schmidt.

References

Blanchard, F. N. 1942. The ringneck snakes, genus *Diadophis*. Bull. Chicago Acad. Sci. 7(1): 1–144.

Schmidt, K. P. 1953. A check list of North American amphibians and reptiles. Sixth Ed. Publ. American Soc. Ich. Herp., viii + 280 pp.

Stejneger, L. & T. Barbour. 1943. A check list of North American amphibians and reptiles. Fifth Ed. Harvard University Bulletin of the Museum of Comparative Zoology 93(1): xix + 260 pp.

RACER RE-ARRANGEMENT REVEALED

Phylogeography across a continent: The evolutionary and demographic history of the North American Racer (Serpentes: Colubridae: *Coluber constrictor*) (2008. Molecular Phylogenetics and Evolution 47(1): 274-288) by Frank T. Burbrink, Frank Fontanella, R. Alexander Pyron, Timothy J. Guiher and Cynthia Jimenez

Abstract: Most phylogeographic studies examine organisms that do not have transcontinental distributions and therefore the genetic and temporal effects of barriers across an entire continent cannot be assessed with respect to a single species. We examined the phylogeographic structure, lineage age, and historical demography using sequences from the mtDNA cytochrome b gene of the widespread North American Racer *(Coluber constrictor),* one of the few abundant transcontinental snakes that occurs throughout many diverse biomes. Our results indicate that this complex is comprised of six lineages differing greatly in geographic extent, with the largest (a central US clade) being 26 times greater than the smallest (a lineage restricted to the Florida Panhandle and nearby portions of adjacent States). Most of the six lineages appear to be separated at previously identified genetic barriers for several vertebrates with similar ranges. Lineage diversification in this species began in the late Miocene, separating populations in the Florida Peninsula from the remainder of the US. Diversification of lineages continued throughout the Pliocene and early Pleistocene. Four of the six lineages occur east of the Mississippi River, with only two distinctly young (1.5 mya) lineages found west of the Mississippi River (one occurs west of Continental Divide). All methods of demographic inference, including the mismatch distribution, Fu and Li's D* and Tajima's D*, and Bayesian skyline plots revealed population expansion occurring in the mid-to-late Pleistocene for every lineage, regardless of size or proximity to formerly glaciated areas. Population expansion for lineages found east of the Mississippi River occurred earlier and was much greater than those found west of the River.

Associate Editor's Note: Using mtDNA, Burbrink et al. (2008) identified six lineages of *Coluber constrictor* in this excellent paper, but did not name them as distinct species, presumably until future results of nucleic DNA evidence along with southwestern U.S. and Mexican samples are assessed and integrated into the analysis. However, based on known type localities (as they appear in Auffenberg, 1955, Stejneger and Barbour, 1943, Schmidt, 1953, and Wilson, 1970) for already described, published, and available names, minimally the following distinct species (see Figure 1 on page 275 in Burbrink et al. for lineage designations) might be recognized in the future:

Coluber constrictor Linnaeus, 1758 (Eastern lineage of Burbrink et al. 2008)
Type locality: vicinity of Philadelphia (see Dunn & Wood, 1939)
Standard common name would remain: Eastern Racer

Coluber priapus Dunn & Wood, 1939 (Peninsular Florida lineage of Burbrink et al. 2008)
Type locality: West Palm Beach, Florida
Standard common name would become: Florida Racer
Synonym: *Coluber haasti* Bell, 1952, *Coluber c. paludicolus* Auffenberg & Babbitt, 1953

Coluber helvigularis Auffenberg, 1955 (Florida Panhandle lineage of Burbrink et al. 2008)
Type locality: Gulf County, Florida
Standard common name would remain: Brownchin Racer

Coluber flaviventris Say, 1823 (Central lineage of Burbrink et al. 2008)
Type locality: Pottawattamie County, Iowa
Standard common name would probably become: Prairie Racer, Plains Racer, or Midland Racer (Yellowbelly Racer is not appropriate because the belly is white throughout much of the newly configured range of this taxon)
Synonyms: *Coluber anthicus* (Cope 1862), *Coluber c. etheridgei* Wilson, 1970, *Coluber c. foxii* (Baird & Girard, 1853), *Coluber c. latrunculus* Wilson, 1970

Coluber mormon Baird & Girard, 1852 (Western lineage of Burbrink et al. 2008)
Type locality: Valley of the Great Salt Lake, Utah
Standard common name would remain: Western Racer
Synonym: *Coluber vetustus* (Baird & Girard, 1853)
Possible synonyms: *Coluber oaxaca* Jan, 1863, *Coluber stejnegerianus* (Cope, 1895)

The Gulf Coast lineage of Burbrink et al. (2008) may require a new specific epithet. The western border of this lineage is the Mississippi River. The type locality of *Coluber c. latrunculus* Wilson, 1970 is St. James Parish, Louisiana (west of the Mississippi River) and very close to the range of the Gulf Coast lineage of Burbrink et al. (2008); additional sampling may demonstrate that the name *C. c. latrunculus* applies to it.

The above list of name combinations is presented here merely as advance information of possible future changes in the taxonomy of the polytypic North American Racers (genus *Coluber*). Under no circumstances should the above list be adopted as a taxonomy for the group (except for recognition of *C. mormon* as a distinct species, an arrangement already well-documented long ago by Fitch et al., 1981, and Collins, 1991). Additional work on the systematics of this serpent remains to be done.

References

Auffenberg, W. 1955. A reconsideration of the racer, *Coluber constrictor,* in eastern United States. Tulane Stud. Zool. 2(6): 89-155.

Collins, J. T. 1991. Viewpoint: A new taxonomic arrangement for some North American amphibians and reptiles. Herpetol. Review 22(2): 42-43.

Fitch, H. S., W. S. Brown, and W. S. Parker. 1981. *Coluber mormon,* a species distinct from C. constrictor. Trans. Kansas Acad. Sci. 84(4): 196-203.

KHS DONORS

Few tributes are so lasting or honor individuals so well as donations. The Kansas Herpetological Society is privileged to carry on the aims and goals of the Society through its grants and scholarships. This list recognizes donations received through 1 June 2008.

The Alan H. Kamb Grant for Research on Kansas Snakes

Suzanne L. & Joseph T. Collins

In Memory of

Jeffrey George Collins
(1956–2008)
&
Robert F. Clarke
(1919–2008)

REPORTS

[A BIOLOGICAL SURVEY OF] CHEYENNE BOTTOMS, BARTON COUNTY, KANSAS

Surveyed by F. M. Uhler and F. A. Warren, June 3, 4, and 6, 1929

The Cheyenne Bottoms lie in a roughly oval basin with an area of about sixty-four square miles in Barton County, Kansas. They are situated in almost the center of the United States in a prairie, agricultural region with an average annual rainfall of about twenty-one inches, and are surrounded by sloping hills varying from thirty to sixty feet in height.

Two "wet weather" streams, Deception Creek and Blood Creek, which drain into this basin from the North and Northwest, supply most of the water and (together with the slopes surrounding the bottoms) drain about two hundred and thirty-five square miles. The lower part of the bottoms contains several intermittent "lakes" which rarely are entirely dry. During seasons of abnormally heavy rainfall such as occurred in 1902, 1912, and l927, large lakes were created in this basin. Mr. Murray Wilson, an engineer who made a study of this area for the Kansas Forestry, Fish and Game Department, reported that an area of about 35, 400 acres lies below the 1800 foot contour. This area is very flat, but has several shallow depressions, most of which are less than three feet in depth. It is covered by a nearly impervious layer of dark gray, clayey silt which is reported to vary from two to six feet in depth, over deep sand that contains salt water at an elevation of 1,780 feet. The basin has been drilled in an attempt to discover oil and some indications were found but none in valuable quantities. A definite ledge of sandstone surrounds much of the basin.

Great numbers of waterfowl pass over this region during migration and when the Cheyenne Bottoms are supplied with water, they serve as a virtual oasis in a region that has very little attractive waterfowl territory for several hundred miles in any direction. This has been graphically shown by the results of the bird banding which has been done by Mr. Frank Robl, his father and brothers, in cooperation with our Bureau, on the east side of these bottoms. At the time of our investigation, Mr. Robl had fifteen species of ducks, three species of geese, and a sandhill crane taken in connection with banding operations in this basin. An excellent variety of waterfowl were noted in the bottoms, and will be listed later in this report.

The Arkansas River flows in an easterly direction, about five miles south of the southern rim. On the west side of the bottoms, an extensive plain gradually rises to the foothills of the Rocky Mountains To the East another plains region slopes southward to the Arkansas River; and on the North arise the hills which border the Smoky Hill River. The city of Great Bend is located about five or six miles south of the southwest rim and the village of Claflin is slightly nearer to the northeast rim The city of Hoisington lies on the northwest slope of the basin. It is connected with Great Bend by a branch of the Missouri Pacific Railroad, which passes the western rim of the basin. Walnut Creek, a stream with a drainage area of about 1,700 square miles, which arises more an a hundred miles west of the Cheyenne Bottoms, empties into the Arkansas River due south of the bottoms. At one point it flows within less than three miles of the rim of the basin.

During August 1927 Barton County had heavier rains than had been know in this region for more than fifty years. (A greater amount of rain fell during August 1927 than normally falls in an entire year. About ten inches fell in one night.) The resulting runoff from Blood and Deception Creeks and the surrounding slopes created a lake about five miles wide and seven mils long with an area of about 16,000 acres, known Lake Cheyenne. In the lowlands on the northwest side of the bottoms, several marshes were flooded, creating smaller lakes, including Rush, Clear, McLain, and Pfister Lakes. These lakes were connected with Lake Cheyenne at its highest stages. During the following fall and winter, the level receded less than two feet, and heavy rains during the summer of l9288 are reported to have increased the area of Lake Cheyenne to nearly 20,000 acres. At one time in 1928 the water level was reported to have been about eighteen inches higher than at any time during 1927. At the time of our examination in early June 1929, the area of Lake Cheyenne had receded to possibly 15,000 or 16,000 acres and the depth averaged about three feet. The deepest point measured was three feet, eight inches in depth. The bed of the lake is so level that a strong wind would frequently blow the water back nearly a quarter of a mile on the very flat margins. The basin has no outlet at present, but a strip of lowland extends from the southeast side to Cow Creek, which drains into the Arkansas River. This low strip is the site of a proposed drainage ditch which certain interested individuals are attempting to have constructed upon the assumption that Cheyenne Bottoms can be made valuable for agriculture by this procedure. This ditch would be started near the southeast corner of Section 27 – T.18N., R.12W. and extend southeastward to a point three miles North and one and one-half miles East of Ellinwood, and then South to the Arkansas River. It is reported to require a bond issue of $210,000. The soil obviously contains considerable alkali or sodium chloride, judging by the character of the marginal vegetation. However, what has been grown successfully in the

higher parts of the west side of the basin, and most of the lower portion was used for pasture or hay.

In about 1896 a group of men (reported to have been either schemers or dreamers) organized the "Lake Koen Navigation, Reservoir and Irrigation Company," in an effort to create a permanent lake in the Cheyenne Bottoms. It has been claimed that the company was organized, principally, as a stock selling scheme, but they did dig a serpentine ditch, twelve or thirteen miles long, to bring in water from the Arkansas River (west of Great Bend), Little Walnut and Walnut Creeks. Much of this ditch still exists, and parts are in a good state of preservation, although at least a quarter of a mile of the end which drained Walnut Creek has been filled in; in the last mile, as it enters the basin, there is reported to be a drop of sixty feet, and it was planned to develop water power at this end. In 1896 water was actually run into the bottoms for one hundred days, but floods at the intake washed out the temporary diversion dams and overflowed the ditch in many places, which resulted in the failure of this project.

Following the running of this water into the bottoms myriads of waterfowl flocked to this area, and the greatest slaughter of ducks in the history of that region occurred there when hunters flocked to this flooded area and shot them for the market. These ducks were shipped to eastern markets in refrigerator cars from Hoisington, Great Bend and Ellinwood.

After the recent flooding of this area by the heavy rains of 1927 and 1928, waterfowl again flocked to this area, and once more it became widely known as a hunting grounds. Many of the waterfowl began to breed here as indicated by our studies in early June 1929 when the following birds were recorded here and in the Little Salt Marsh, about twenty-five miles southeast of here, in Stafford County:

Waterfowl:

1. shoveller or spoonbill – abundant
2. common mallard – common
3. gadwall – common
4. pintail or sprig (with eggs) – common
5. widgeon or baldpate – common
6. blue-winged teal – common
7. green-winged teal – several on Little Salt Marsh
8. ruddy duck – common
9. redhead – six noted
10. canvas-back – four reported on June 2 on west side
11. hooded merganser – two noted on Little Salt Marsh
12. pied-billed grebe – common
13. eared grebe – common
14. American coot – abundant
15. White pelican – twenty-six noted on island in Little Salt Marsh
16. White-faced glossy ibis – four noted; seven reported here last fall, fifty in 1927
17. American egret – one noted
18. Great blue heron – one noted
19. Black crowned night heron – abundant
20. American bittern – common
21. Least bittern – several
22. King rail – common
23. Franklin gull – abundant
24. Black tern – abundant
25. Forster tern – common

Shore Birds:

26. Wilson phalarope – abundant
27. Avocet – several
28. Lesser yellow-legs – common on Little Salt Marsh
29. Killdeer – abundant
30. Sandpipers (sp.?) – abundant

Land Birds in or around Cheyenne Bottoms:

31. yellow-headed blackbird – abundant
32. red-winged blackbird – common
33. western meadowlark – abundant
34. Baltimore oriole – abundant
35. Orchard oriole - abundant
36. Purple (?) grackle – common
37. crow – few noted near Little Salt Marsh
38. dickcissel – abundant
39. mourning dove – abundant
40. bob-white quail – occasional
41. Arkansas kingbird – abundant
42. common kingbird – frequent
43. scissor-tailed flycatcher – common
44. brown thrasher – few
45. loggerhead shrike – few
46. red-headed woodpecker – few
47. cliff swallow – few
48. barn swallow - few
49. burrowing owl- few
50. marsh hawk – three
51. broad-winged (?) hawk – two

The above list represents, merely, casual observation while studying the food supply for waterfowl in this area.

Mammals

Muskrats were common in the northwest and west portions of the Cheyenne Bottoms, and the area could obviously be developed to supply large numbers of this fur bearer and bring considerable revenue, which would aid in paying for this project. A few mink tracks were noted. Black-tailed jack rabbits were plentiful, and a few cottontails were noted nearby. A prairie dog colony was reported on the southeast side.

Cold-blooded Vertebrates:

Bullheads are plentiful here, and Lake Cheyenne has already become very popular for fishing. One

large gold fish (possibly escaped from some farmer's water tank) was noted in Rush Lake.

A variety of amphibians were found to be abundant in the Cheyenne Bottoms. These include the tiger salamander, cricket frog, leopard frog, and toads (*Bufo cognatus* and *Bufo woodhousii*).

Western painted turtles *(Chrysemys b. bellii),* mud turtles *(Kinosternon flavescens),* and box turtles *(Terrapene ornata)* were plentiful. Snapping turtles *(Chelydra serpentina)* were reported near the Robl farm. One water snake *(Natrix grahamii)* was collected. Bull snakes *(Pituophis sayi),* hognosed snakes *(Heterodon contortix),* garter snakes *(Thamnopis radix),* and one ground rattler *(Sistrurus catenatus edwardsii)* were collected around the Little Salt Marsh. One blue racer *(Coluber contrictor flaviventris)* was noted on the northeast side of Lake Cheyenne.

Crayfish and two species of snails were abundant everywhere around the lakes. Aquatic insects were also abundant.

Vegetation:

In spite of the relatively short time which elapsed since creation of Lake Cheyenne, a fair marsh flora has developed in this area.

At present, wave action keeps the water so turbid with suspended particles of clay that submerged aquatic plants may not be able to grow (as a result of the exclusion of light) until the marsh vegetation (bulrushes, etc.) becomes more widely established in the now open areas and regards wave action.

An aquatic form of the swamp smartweed (*Polygonum muhlenbergii*) with greatly inflated stems is one of the best duck foods noted here. Huge floating mats of this species are rapidly covering the lake. The only other aquatic phonerogam noted on Lake Cheyenne was the lesser duckweed (*Lemna minor*). It is probably that some of the excellent food plants, such as the sago pondweed (*Potamogeton pectinatus*), widgeon grass (*Ruppia* sp.), musk grass (*Chara* sp.), and many others noted in the Little Salt Marsh can be transplanted successfully to the Cheyenne Bottoms.

Forty-three species of marsh and moist-soil plants, including four species of bulrushes (*Scirpus* spp.), six other sedges (Cyperaceae), five species of smartweed (*Polygpnum* spp.) arrowhead (*Sagittaria latifolia*), bur-reed (*Sparganium eurycarpum*), and water millet (*Echinochloa crusgalli*) were collected around Lake Cheyenne. A tall form of the spike rush (*Eleocharis* sp.) is one of the most abundant marginal plants. The abundance of alkali grass (*Distichlis stricta*), especially on the southeast side, together with scattered sea-blite (*Dondia depressa*) and arrow-grass (*Triglochin maritima*) indicate the alkaline or saline condition of this soil, but numerous "fresh water" plants and the abundance of fish and amphibians show that the quantity of these salts is not great enough to be detrimental to wild life.

If permanent water is maintained in these bottoms, it is obvious that they will become more alkaline through long, continued evaporation, and change the character of this area. An outlet with a control gate, therefore, should be supplied if the area is ever acquired as a Federal Refuge, to prevent it from becoming excessively alkaline.

Engineering studies have indicated the practicability of creating and maintaining a permanent lake in this basin by tapping the water from Walnut Creek.

If acquisition problems can be surmounted, the area, undoubtedly, could be made a very valuable refuge for migratory waterfowl. The fact that it is probably the only large-sized area of comparable value in a region, which is almost lakeless for several hundred miles in every direction, merits the expenditure of a much larger sum for its acquisition and development than might be the case in other regions.

No doubt the present lake will soon disappear as a result of evaporation, and the existing fine waterfowl area again revert to low-grade pasture and hayland unless immediate steps are taken to supply water from a dependable source.

It seems desirable that a study also be made of the cost of constructing dikes to break up wave action and restrict the flooded portions to an extent which will permit the maintenance of deeper water in sections now only submerged periodically.

A more detailed study should be made of the Stafford County Salt Marsh and the excellent Little Salt Marsh (see separate report on Little Salt Marsh), which are very popular hunting grounds, and largely controlled by gun clubs at present. It is possible that by utilizing the water from Rattlesnake Creek, a desirable refuge site might be created in that area. This study should be made with the assistance of a competent hydraulic engineer.

Report by F. M. Uhler
[Uhler was Biol. Surv. (USFWS) employee]

Rough Field Map of Cheyenne Bottoms, Barton Co., Kan. (appended to report)

(stamped Department of Agriculture Received July 1, 1929 Biological Survey)

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Associate Editor's Note: This paper, originally prepared as a type-written nine-page unpublished report (apparently for the U. S. Department of Agriculture), probably contains the first herpetological observations ever made at the Cheyenne Bottoms Wildlife Area in Barton County, Kansas. For greater comprehension, listed on the next page are the modern-day common and scientific name equivalents of the fifteen herpetological taxa observed by Uhler and Warren in June 1929.

Tiger Salamander	Barred Tiger Salamander *(Ambystoma mavortium)*
Cricket Frog	Northern Cricket Frog *(Acris crepitans)*
Toad *(Bufo cognatus)*	Great Plains Toad *(Anaxyrus cognatus)*
Toad *(Bufo woodhousii)*	Woodhouses's Toad *(Anaxyrus woodhousii)*
Leopard Frog	Plains Leopard Frog *(Lithobates blairi)*
Blue Racer *(Coluber constrictor flaviventris)*	Eastern Racer *(Coluber constrictor)*
Bull Snake *(Pituophis sayi)*	Bullsnake *(Pituophis catenifer)*
Water Snake *(Natrix grahamii)*	Graham's Crayfish Snake *(Regina grahamii)*
Garter Snake *(Thamnophis radix)*	Plains Garter Snake *(Thamnophis radix)*
Hog-nosed Snake *(Heterodon contortrix)*	Eastern Hognose Snake *(Heterodon platirhinos)*
Ground Rattler *(Sistrurus catenatus tergeminus)*	Massasauga *(Sistrurus catenatus)*
Snapping Turtle *(Chelydra serpentina)*	Common Snapping Turtle *(Chelydra serpentina)*
Mud Turtle *(Kinosternon flavescens)*	Yellow Mud Turtle *(Kinosternon flavescens)*
Western Painted Turtle *(Chrysemys b. bellii)*	Northern Painted Turtle *(Chrysemys picta)*
Box Turtle *(Terrapene ornata)*	Ornate Box Turtle *(Terrapene ornata)*

This paper is based on a copy in the library of Joseph T. Collins (given to him by Marvin Schwilling) and was carefully prepared and checked for publication by Suzanne L. Collins. It was copied exactly as written except that italics were substituted for underlining. This paper should be cited as:

Uhler, F. M. and F. A. Warren. 2008. [A Biological Survey of] Cheyenne Bottoms, Barton County, Kansas. Journal of Kansas Herpetology 26: 9-12.

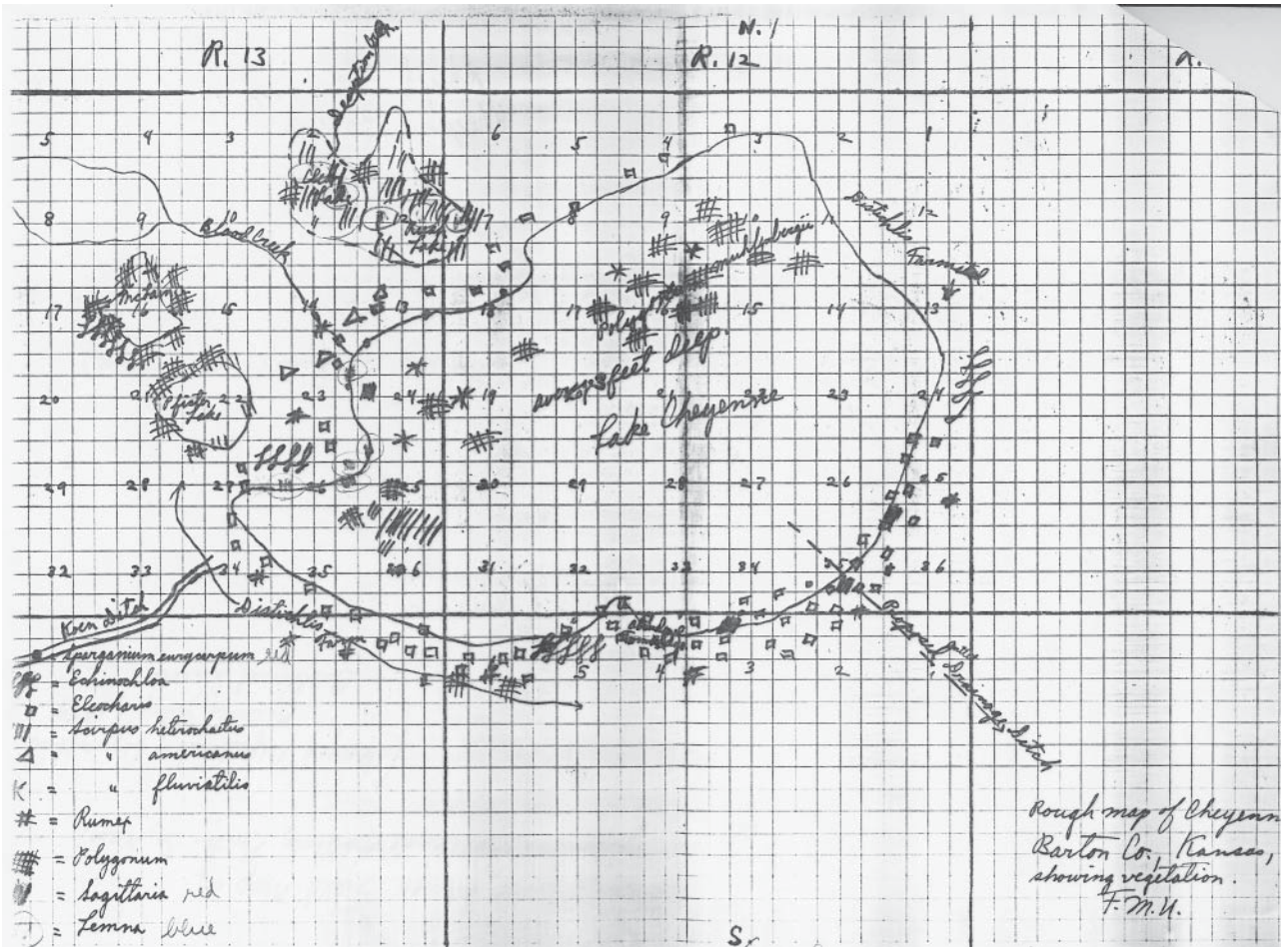

Figure 1. A rough field map of Cheyenne Bottoms as sketched by F. M. Uhler for inclusion with the 1929 report.

ARTICLES

AN EXOTIC HERPETOFAUNAL BIOBLITZ SURVEY AT A STATE PARK IN SOUTHERN FLORIDA

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Abstract: We conducted an exotic herpetofaunal bioblitz survey at the Barnacle Historic State Park (BHSP), an urban Florida state park in Miami-Dade County in November 2005. On that day and evening, we recorded seven exotic species and two native species. Three additional exotic species and six additional native species were known to occur there but were not observed that day. The exotic herpetofaunal community at the BHSP comprised 26.3% of exotic amphibians and reptiles known to occur in Miami-Dade County. Despite its protection as a park, the overwhelming dominance of exotic species at this site typifies urban systems in southern Florida. Bioblitzes, such as this one, provide a useful first step in pointing out a park's susceptibility to exotic species colonization events, so that targeted studies can subsequently evaluate impact and feasibility of various management techniques.

The state of Florida leads the United States in the number of exotic amphibian and reptile species (Meshaka, 2008), and southern Florida is the epicenter of exotic herpetofaunal diversity (Meshaka et al., 2004; Meshaka, 2006, 2008). Many but not all of these species thrive in disturbed habitats, and some species such as the Greenhouse Frog *(Eleutherodactylus planirostris),* Cuban Treefrog *(Osteopilus septentrionalis)* and Indian Python *(Python molurus)* thrive in natural habitats as well (Meshaka, 2001; Meshaka et al., 2004; Meshaka and Layne, 2005; Snow et al., 2007). Lands in the public trust are charged with maintaining natural systems as close to historical norms as possible, and parks are important sources both of remaining natural habitats and altered habitats that can be restored. We undertook an exotic herpetofaunal bioblitz survey at a small urban park located in extreme southern mainland Florida with the goal of evaluating its susceptibility to exotic herpetofaunal colonization, the results of which can be used in formulating future studies concerning ecological impact and future resource management plans.

Study Area and Methods

Acquired by the State of Florida in 1973, the Barnacle Historic State Park (BHSP) is located in Miami-Dade County, Florida, USA, within Coconut Grove, Miami. The park is encapsulated within high-rise urban development and likewise is the smallest, southeastern Florida state park, containing only about 9.0 acres. Four habitat types, rockland hammock (4.0 acres), mangrove swamp (0.02 acres), ruderal habitat (2.7 acres), and developed habitat (0.7 acres) comprise approximately 7.4 acres that can support terrestrial, arboreal, and building-dwelling herpetofauna. The remaining acreage is submerged estuarine habitat that parallels Biscayne Bay, unsuitable for most herpetofauna. The major residual upland natural community of rockland hammock is a hardwood forest where oolitic limestone is near or at the surface, with a thin layer of decaying leaf litter forming organic soil over the rock. This sub-tropical forest is dominated by remnant South Florida Slash Pine (*Pinus elliottii* var. *densa*), with a canopy of Gumbo Limbo *(Bursera simaruba),* Live Oak *(Quer-*

cus virginiana), Redbay *(Persea borbonia),* Strangler Fig *(Ficus aurea),* and Mastic *(Mastichodendron foetidissimum).* The understory consists largely of Stoppers (*Eugenia* spp.), Wild Coffee *(Psychotria nervosa),* Marlberry *(Ardisia escallonioides),* and white Indigo Berry *(Randia aculeate).*

We assembled 10 field workers, who collectively spent 38.75 hours searching during the day and evening of 14 November 2005. Vouchers were taken of the species encountered, and the specimens were deposited in the Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas. Common names follow Collins and Taggart (2002).

Results and Discussion

The 10 collectors searched in the park and captured 30 individuals of seven exotic amphibian and reptile species and two individuals of a native species (Table 1). On average, 0.18 exotic species was captured every hour and 0.77 specimens of each of these exotic species was captured every hour. It should be noted, however, that the latter estimate is extremely conservative of the overall abundance of individual specimens because numbers were based on capture only. As noted by Gibbons (2005), more than 200 Brown Anoles *(Anolis sagrei)* were encountered during the survey. In light of the overcast weather, we were not surprised that the Common Agama *(Agama agama),* known to occur along the rocky bank in front of a building, and the Green Iguana *(Iguana iguana)* and Knight Anole *(A. equestris),* also known from this park, were not encountered on our visit.

Typical of the southern Florida herpetofauna, more reptile species, especially lizards, were encountered than amphibians (Meshaka, et al., 2004). The exotic herpetofaunal community at the BHSP, 10 species, comprised 26.3% of the possible 38 exotic species in Miami-Dade County (Meshaka et al., 2004; Meshaka, 2006; Snow et al., 2007). The eight native reptile species, on the other hand, comprised only 21.1% of the possible 38 lizard and snake species native to Miami-Dade County and 10.5% of the total herpetofauna (n=76) native to Miami-Dade County (Meshaka and Ashton, 2005). This lopsided pattern of exotic herpetofaunal species-dominance typifies urban developments (Meshaka et al., 2008) and small island-like gardens that are surrounded by urban development (Meshaka, 1999a,b).

The single *Eleutherodactylus planirostris* and three Brahminy Blind Snakes *(Ramphotyphlops braminus)* were found under rocks in the tropical hardwood hammock at the fore of the park. The Bark Anole *(Anolis distichus)* was found mostly on smooth-barked trees at approximately eye level. Whereas *A. sagrei* was most commonly seen on the vegetation growing near and on the walls of the property, the Puerto Rican Crested Anole *(A. cristatellus)* occurred mostly in the tropical hardwood hammock. What morphologically appeared to be the Cuban Green Anole *(A. porcatus)* was found on trees at heights above 180 cm, and *Hemidactylus mabouia* was found under rocks during the day (n = 2), and on trees (n = 6) and a house (n = 2) at night. These habitat associations and structural uses that we report at the BHSP did not conflict with those noted for these species in Florida (Meshaka et al., 2004). Few young Green Anoles *(A. carolinensis)* were found in trees, and the single Eastern Corn Snake *(Pantherophis guttatus)* was found on a palm tree at night.

Table 1. Species of amphibians and reptiles known from The Barnacle Historic State Park in Coconut Grove, Miami-Dade County, Florida. * = detected during the Bioblitz survey on 14 November 2005.

Exotic Species	Native Species
*Eleutherodactylus planirostris**	**Anolis carolinensis*
Agama agama	*Aspidoscelis sexlineata*
*Anolis cristatellus**	*Plestiodon inexpectatus*
*Anolis distichus**	*Sphaerodactylus notatus*
Anolis equestris	*Coluber constrictor*
*Anolis porcatus**	*Diadophis punctatus*
*Anolis sagrei**	**Pantherophis guttatus*
*Hemidactylus mabouia**	*Tantilla oolitica*
Iguana iguana	
*Ramphotyphlops braminus**	

Although anoles provide an abundant prey base for the Eastern Racer *(Coluber constrictor)* and *P. guttatus,* we are concerned that the inclusion of vertebrates in the diets of several of these anoles (Meshaka et al., 2004) combined with their high abundances could prove to be a source of mortality for the geographically-restricted Reef Gecko *(Sphaerodactylus notatus),* the regionally-imperiled Six-lined Racerunner *(Aspidoscelis sexlineata),* and the state-listed Rim Rock Crowned Snake *(Tantilla oolitica).*

With more management attention being paid to exotic herpetofauna by the Florida Park Service, herpetofaunal bioblitz surveys, such as the one we report here, provide a useful first step with respect to awareness of exotic species impact on public trust lands as measured by diversity and relative abundance. Subsequently, more targeted study can be conducted, the results of which can form the basis for good management decisions that balance the severity of ecological impacts by these species with the feasibility of removal programs.

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AN ALTERNATIVE CLASSIFICATION OF THE NEW WORLD RAT SNAKES (GENUS *PANTHEROPHIS* [REPTILIA: SQUAMATA: COLUBRIDAE])

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Abstract: *Mintonius*, gen. nov, is erected for two species of large snakes (100-140 cm) from the north-central United States and adjacent Canada, principally around the Great Lakes region. The genus contains *M. vulpinus* and *M. gloydi*, and is distinguishable from its closest relatives, *Pantherophis, Pituophis*, and *Scotophis*, by aspects of its scutellation, color pattern, and gross morphology, as well biochemically, genetically, and phylogenetically. Key Words: evolutionary history, phylogeny, taxonomy, Fox Snake.

Introduction

Burbrink and Lawson (2007) hypothesized a relationship for the New World Rat Snakes (*Pantherophis* sensu Utiger 2002) in which their hierarchical arrangement differed from the taxonomic conventions in current use (Crother et al. 2000; Collins and Taggart 2002). Of particular note, they discovered a sister group relationship between *Pantherophis vulpinus* (Baird and Girard) and *Pituophis melanoleucus* (Daudin) rendering *Pantherophis* paraphyletic. Accordingly, Burbrink and Lawson (2007: 186) suggested that *Pantherophis* (Fitzinger 1843) be synonomized into *Pituophis* (Holbrook 1842), thereby reconciling the taxonomy of the group with their phylogeny.

The taxonomic suggestions of Burbrink and Lawson (2007) are consistent with the recovered phylogenetic history of the group and are therefore valid. However, we feel that combining these taxa into a single genus containing fourteen well-differentiated species minimizes the information content of the group, especially when one takes into consideration the morphology, behavior, ecology, and evolutionary history of these taxa.

An alternative classification is proposed below (and see Figure 1) which, like the Burbrink and Lawson (2007) classification, is consistent with the recovered phylogenetic relationships of the group, and is thus equally logical and comprehensive. We feel this arrangement is superior in its restriction and retention of *Pituophis* to its previous and widespread usage (containing only the species *catenifer, deppei, lineaticollis, melanoleucus,* and *ruthveni*), and the resurrection of one genus and description of another, increasing the information content inherent in the classification.

Systematic Account

***Mintonius* gen. nov.**

Type species: *Scotophis vulpinus* Baird & Girard, 1853: 75. Neotype: Designation by Conant (1940: 10): USNM 9969, (a 1242 mm female collected by P. R. Hoy from Racine, Racine County, Wisconsin). The holotype (UNSM 7269 [Racine, Wisconsin. P. R. Hoy, collector]) and paratype (USNM 1570 [Gross Island, Michigan]) are not known to currently exist.

Description: As given for the type species in Baird and Girard (1853: 75-76), but also defined phylogenetically by Burbrink and Lawson (2007). Additionally, *Mintonius* differs from its most closely related

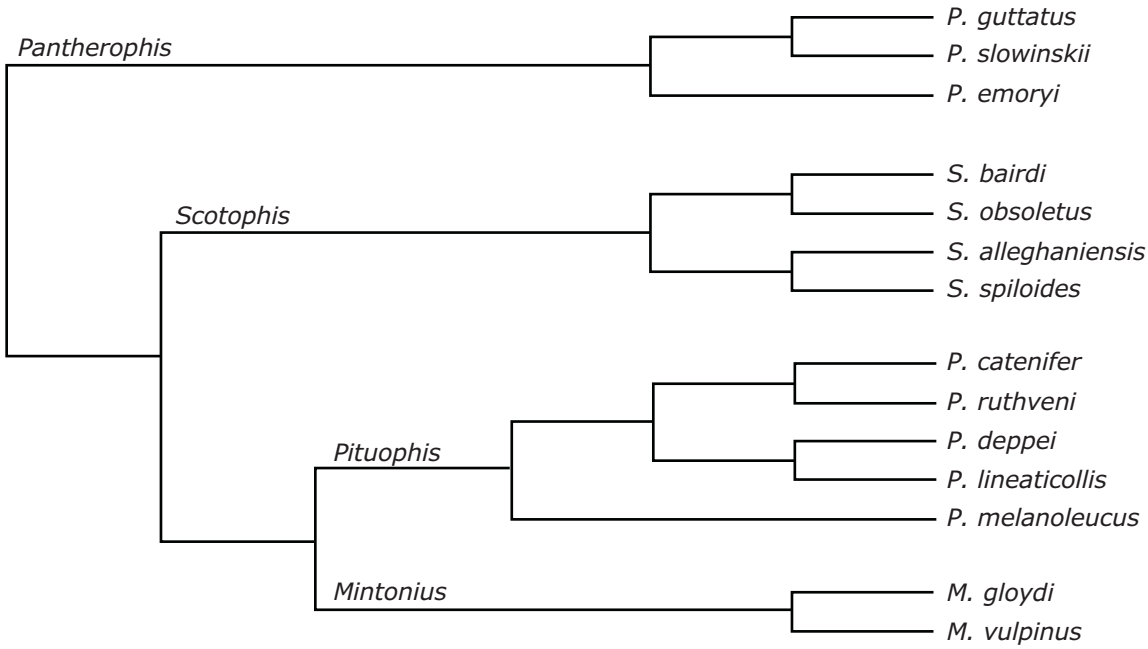

Figure 1. An expanded consensus phylogenetic hypothesis of Burbrink and Lawson (2007). The relationships of missing taxa have been added to the terminal branches following Burbrink (2002) [*Pantherophis* group], Rodríguez-Robles et al. (2000) [*Pituophis* group], and Burbrink (2001) [*Scotophis* group]. The relationships shown are those of the listed authors, and do not reflect an analysis of those data given in Table 1.

genera (*Pantherophis, Pituophis,* and *Scotophis*) by aspects of its scutellation (smooth laterally and keeled on the back [juveniles smooth throughout], 2 postoculars, 1 preocular, 8 supralabials [rarely 7 or 9, and with the 4th and 5th touching the eye], 10-12 infralabials, 23-25 dorsal scale rows at mid body [rarely 27]), and color pattern (reddish-brown to dark brown blotches over a yellowish-grey to yellowish-brown ground color along the body. The head is conspicuously off-colored from the body, ranging from copper-red to light brown. The belly is yellowish overall with well-defined dark (black to brown) rectangular blotches. *Mintonius* differs further by morphology in having a large stout body, a short tail (15% of total length), a head slightly set off from the body, and a snout that is rounded. These characters and others pertaining to behavioral, structural, and biochemical differences between *Mintonius* and those species allied to it are summarized in Table 1.

Content: *Mintonius gloydi* (Conant 1940) and *Mintonius vulpinus* (Baird and Girard 1853).

Range: Found over much of the glaciated upper midwest of North America in two currently recognized species. The first, *Mintonius vulpinus,* is bounded on the north and east by Lake Superior and Lake Michigan respectively and terminates to the west in Nebraska and central Illinois in the south. The second, *Mintonius gloydi,* is found along the shores of Lake Huron and Lake Erie in Michigan and Ohio, and in Canada in the region bounded by Lakes Huron, Erie, and Ontario.

Etymology: We take this opportunity to recognize the contributions of the late Sherman A. Minton and Madge Rutherford Minton of Indiana, both of whom made their mark in herpetology worldwide and also in Indiana, where the type species of this new genus occurs.

The paraphyly of the former genus *Pantherophis* and the retention of *Pituophis,* necessitates three additional changes plus the recognition of the new genus, *Mintonius,* so that the classification reflects the phylogeny, as shown in the following arrangement:

1) The genus *Mintonius* Collins & Taggart 2008 (Fox Snakes) proposed as follows: *Mintonius gloydi* (Conant 1940) - Eastern Fox Snake; *Mintonius vulpinus* (Baird and Girard 1853) - Western Fox Snake.

2) The genus *Pantherophis* Fitzinger 1843 (Corn Snakes) restricted as follows: *Pantherophis emoryi* (Baird and Girard 1853) - Great Plains Rat Snake; *Pantherophis guttatus* (Linnaeus 1766) - Eastern Corn Snake; *Pantherophis slowinskii* (Burbrink 2002) - Slowinski's Corn Snake.

3) The generic name *Scotophis* Baird & Girard 1853 (Woodland Rat Snakes) resurrected for the following taxa: *Scotophis alleghaniensis* (Holbrook 1836) - Eastern Rat Snake; *Scotophis bairdi* [Yarrow (in Cope) 1880] - Baird's Rat Snake; *Scotophis obsoletus* (Say 1823) - Western Rat Snake; *Scotophis spiloides* (Duméril, Bibron and Duméril 1854) - Midland Rat Snake.

4) The genus *Pituophis* Holbrook, 1842 (Gopher Snakes, Bullsnakes, and Pine Snakes) retained as follows: *Pituophis catenifer* (Blainville 1835) - Gopher Snake; *Pituophis deppei* (Duméril 1853) – Mexican Bullsnake; *Pituophis lineaticollis* (Cope 1861) – Mid-

Table 1. Data matrix of characters for those taxa allied to *Pituophis* (sensu Burbrink, 2007). See footnote for character and character state designations. Data compiled from Keogh (1996), Conant and Collins (1998), and Stebbins (2003).

	Characters																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Bogertophis	a	a	a	a	a	a	a	10+	b	b	3+	b	a	29+	a	>36	a	12.5–12.6%
Mintonius	a	b	b	b	a	a	a	7–9	a	a	1–2	b	a	21–28	b	36	a	–
Pantherophis	ab	a	c	b	a	a	a	7–9	a	a	1–2	b	a	21–28	b	36	b	9.5%
Pituophis	c	b	cd	c	b	b	b	7–9	ab	a	1–2	a	b	29+	b	36	b	10.5%
Scotophis	b	b	e	b	a	a	a	7–9	a	a	1–2	b	a	21–28	b	36	a	9.6–9.7%
Senticolis	ab	a	a	b	c	a	a	7–9	a	a	3+	b	a	29+	b	?	a	15.7%

Character and character state descriptions used in Table 1.

1. Landscape: a. Terrestrial, b. Arboreal, c. Semi-fossorial
2. Body Form: a. Gracile, b. Robust
3. North American Distribution: a. Southwestern, b. Boreal, c. Southern, d. Western, e. Eastern
4. Left Lung: a. Absent, b. Present, c. Polymorphic
5. Intrapulmonary bronchus length: a. Short, b. Intermediate, c. Absent
6. Hisses: a. No, b. Yes
7. Rostral Scale: a. Round (unmodified), b. Large and pointed upward
8. Number of Supralabials
9. Lorilabial: a. Absent, b. Present
10. Eye/Supralabial Contact: a. Yes, b. Separated by Lorilabials
11. Number of Temporal Scales
12. Anal Scale: a. Single, b. Divided
13. Dorsal Scales: a. Weakly keeled, b. Strongly keeled
14. Dorsal Scale Rows at Mid-body
15. Origin of Hemipenis Retractor Muscles: a. Caudal vertebrae 32 or fewer, b. Caudal vertebrae 38 or higher
16. Diploid Chromosome Number
17. Distinct markings on top of the head (as adult): a. Absent, b. Present
18. Percentage of nucleotide base differences per sequence (in comparison to *Mintonius*) from analysis between aligned sequences (4,495 base pair of four genes used in Burbrink and Lawson, 2007).

dle American Gopher Snake; *Pituophis melanoleucus* (Daudin 1803) - Eastern Pine Snake; *Pituophis ruthveni* Stull 1929 - Louisiana Pine Snake.

Acknowledgements: This proposal is intended as an alternate interpretation of Burbrink and Lawson (2007); we would be remiss to not recognize the great amount of effort that went into their published findings. We wish to thank Darrel Frost for checking the construction of the new generic name and the emendations for the specific names contained therein. The manuscript benefitted by the comments of four anonymous reviewers.

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About the Kansas Herpetological Society

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 holds an annual meeting in the fall of each year. The meeting is, minimally, a two day event with lectures and presentations by herpetologists. All interested individuals are invited to make presentations. The annual meeting is also the time of the Saturday night social and fund-raising auction.

Field Trips

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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