KANSAS HERPETOLOGICAL SOCIETY

NEWSLETTER NO. 123

MARCH 2001

ANNOUNCEMENTS

HERPETOLOGY—SUMMER 2001

Herpetology (Zo 459) and Advanced Herpetology (Zo 859) will be offered as 3 credit-hour summer courses at Emporia State University from 11 June –11 July 2001.

Instructors will be Lynnette Sievert (http://academic.emporia.edu/sievertl/) and Greg Sievert (http://academic.emporia.edu/sievertg/). Classes will meet in Science Hall Room 46 from 8:00–10:30 am MTWR.

This course will cover mainly amphibians, turtles, and reptiles of the United States with an emphasis on those of the Great Plains. The course will consist of both lectures and lab work. In the lab, students will work with both live and preserved specimens from across the U.S. Field trips will depend on the weather.

For more information about Herpetology at ESU please visit the main web page for this course at: *http://academic.emporia.edu/sievertl/herp.htm.* The Herpetology syllabus web page is: *http://academic.emporia.edu/sievertl/herpsyl.htm.*

For information about enrolling for summer courses contact the ESU Admissions office at (316) 341-5465. For more information about summer classes in Biology, contact the Department of Biological Sciences at (316) 341-5311. To ask about Herpetology contact Lynnette Sievert at (316) 341-5606 or e-mail her at sievertl@emporia.edu.

CNAH OPENS FIRST ACADEMIC PORTAL

The Center for North American Herpetology (CNAH) went on-line with their new web site on 22 February 2000 (http://www.naherpetology.org). CNAH is non-profit 501c3 foundation established by KHS members Suzanne L. and Joseph T. Collins in 1994. The web site is the first ever academic portal to all North American herpetology, and features the CNAH North American standard common and current scientific names list (updated daily) and Suzanne's award-winning photography. The site also contains the CNAH/*Contemporary Herpetology* online directory of herpetologists, as well as many links to a wide variety of subjects related to herpetological field work and research. When you check it out, be sure to add yourself to the directory.

TWO CLASSIC SNAKE BOOKS BACK IN PRINT

The Blackburn Press is a relatively new publishing company, dedicated to keeping in print and available for purchase book titles which larger publishers have lost interest in and have declared *out of print.* The Press is especially interested in scientific and technical titles.

The Blackburn Press wishes to inform you of two titles which are now available again:

Snakes: Ecology and Evolutionary Biology

by Richard A. Seigel, Joseph T. Collins, and Susan S. Novak

This book, first published in 1987 and here reprinted with a new foreword by the authors, has become a classic in the field of herpetology. In ecological and evolutionary research, snakes occupy a unique niche. Studies of their adaptations and life histories have broad applications for the most basic questions in biology.
ISBN 1-930665-15-6. For more information go to

http://www.blackburnpress.com/snakecandevb.html

Snakes: Ecology and Behavior

by Richard A. Seigel and Joseph T. Collins

This book, first published in 1993 and here reprinted with a new foreword by the authors, is still the most comprehensive survey of snake biology available in a single volume. Authoritative and comprehensive in scope, this important book offers herpetologists, biologists and others interested in the study of snakes a broad survey of snake ecology and behavior, as well as extensive coverage of the literature in bibliographic form.
ISBN 1-930665-14-8. For more information go to

http://www.blackburnpress.com/snakecandbeh.html

Frances Reed
Publisher
The Blackburn Press

KHS BUSINESS

SPRING 2001 KHS FIELD TRIPS—A REMINDER

A *reminder* that the Kansas Herpetological Society will hold two field trips during the spring of 2001:

Field Trip East 4–6 May 2001

The KHS will meet at Linn County Park at La Cygne Lake located just to the east of La Cygne, Kansas. The park will be the base camp with trips to a variety of locations on Saturday and Sunday.

There will be many opportunities to observe and photograph amphibians, turtles, and reptiles in the Marais des Cygnes National Wildlife Refuge. We will visit the habitat of a number of threatened species—maybe we will be lucky enough to observe some of them.

Directional signs will be up by late Friday evening (4 May) FRS radio channel 4 will be monitored. Everyone should plan to meet at the base camp before 9:00 am on Saturday morning for instructions. A barbeque on Saturday evening is a possibility.

Field Trip West 1–3 June 2001

The KHS will travel to Hamilton County, Kansas, to search for two new species of snakes and one new species of frog that may be found in Kansas. Everyone should plan to meet at the Hamilton Wildlife Area located northwest of Syracuse, Kansas before 9:00 am on Saturday morning for instructions. There is primitive camping at the wildlife area and a single motel in Syracuse (see below). Please note that Syracuse is the only town of any size in the area. The wildlife area is about seven miles from Syracuse. This could prove to be one of the most productive meetings/field trips in the history of the KHS. There is not only the possibility of at least three new species being discovered for the state of Kansas, but several species of very rare and beautiful amphibians and reptiles can be found in the area.

The Syracuse Inn (only motel in Syracuse) has 30 units and the phone number is 316-384-7411. Braddock Ames Bed and Breakfast (in Syracuse) can be contacted at 316-384-5218. There are at least six cafe's and restaurants in Syracuse and several open as early as 6:00 am. Several stay open to 8:00 pm or later most nights.

Mark your calendars now, and look for more information on the KHS web site. FRS radio channel 4 will be monitored for both trips. This will be your last written notification of the KHS spring field trips.

BOOKMARK THESE KHS WEB SITES—NOW

For everything about the KHS, go to

http://eagle.cc.ukans.edu/~cnaar/khs/khsmain.html

For information about the KHS Annual Meeting, go to

http://eagle.cc.ukans.edu/~cnaar/khs/AnnualMeetingInfo.html

For information about the KHS Spring Field Trip East, go to

http://eagle.cc.ukans.edu/~cnaar/khs/FieldTripSpring1Info.html

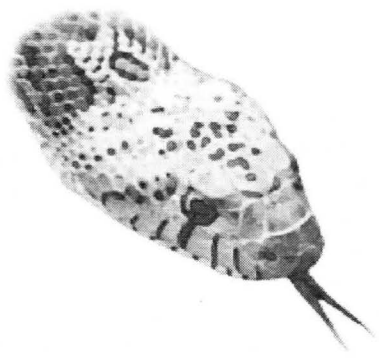
For information about the KHS Spring field Trip West, go to

http://eagle.cc.ukans.edu/~cnaar/khs/FieldTripSpring2Info.html

For information about the KHS Fall Field Trip, go to

http://eagle.cc.ukans.edu/~cnaar/khs/FieldTripInfoFall.html

Remember: Not all of these web sites are fully prepared at any given time; they are always works-in-progress to keep you informed of upcoming KHS activities. Bookmark them, and check hem regularly. You will find out faster at these websites about where and when the KHS is planning an activity than you will waiting for a KHS Newsletter to arrive in the mail.



ABSTRACTS OF PAPERS

Presented at the Joint Annual Meetings of the Kansas Herpetological Society
and the Missouri Herpetological Association
Kansas City, Missouri
21–22 October 2000

THE EVOLUTION OF THE MATING SEASON IN THE PITVIPERS OF NORTH AMERICA

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In the majority of snakes in the temperate zone, the mating season is temporally dissociated from the time of fertilization. Similarly, in males, the mating season is often temporally dissociated from spermatogenesis. In the temperate zone pitvipers of North America, estrus, the time when females signal that they are receptive to males, occurs at some time during vitellogenesis. In these pitvipers, vitellogenesis is initiated in the late summer or fall. The vitellogenic follicles overwinter at an intermediate size, resume development in the spring, and culminate with ovulation in the spring. The seasonal patterns of estrus (late summer/fall or spring or both seasons) vary with the species and with populations within a species. In this model I assume (i) that females determine the mating season, (ii) that there are significance costs to females during estrus and, (iii) that males adapt their mating season to the combined time when females enter estrus. I propose that the primitive pitvipers in North America were originally tropical animals (climatewise, not current geographic definition). The vitellogenic cycle was continuous (no winter pause) and the mating season occurred at some time during vitellogenesis. As populations of pitvipers evolved into temperate climates, due to range expansion into the temperate regions or climate change in the existing ranges. The seasonal vitellogenic cycle was interrupted by the winter. Since the mating season occurred during vitellogenesis, having a summer/fall and spring mating season would be consistent with the tropical pattern. The different mating patterns seen today reflect a loss of either the summer/fall or the spring mating season. The reason for the loss may be due to two factors, (i) the success of one mating season (all the females being fertilized) and (ii) the costs associated with having a redundant mating season. Since males also have significant costs associated with being prepared to mate, the loss of the female mating season would result in the corresponding loss of that season in males.

OBSERVATIONS ON THE SNAKES OF THE RED HILLS, KANSAS

SARAH BELLOWS-BLAKELY
Topeka Collegiate School
Topeka, Kansas

Results of a 1998 Topeka Collegiate School field trip to the Red Hills province in south central Kansas will be presented. The trip yielded a diverse array of snake species. Most notable among these was the Kiowa County record of the Texas Blind Snake, *Leptotyphlops dulcis*. This range extension represents the northern limit of the known distribution for this species in Kansas.

THE DISTRIBUTION, HABITAT, AND TAXONOMIC STATUS OF THE PLAINBELLY WATER SNAKE (*NERODIA ERYTHROGASTER*) IN THE LOWER CUMBERLAND RIVER BASIN.

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The distribution, habitat availability, and taxonomic status of the Plainbelly Water Snake (*Nerodia erythrogaster*) in the lower Cumberland River basin (LCRB) was studied to better understand its geographic, ecological, and phylogenetic relationship to populations of the surrounding regions. Prior to this study, ecological, and phylogenetic relationship to populations of the surrounding regions. Prior to this study, existing data suggested a distributional hiatus between the Dover (Stewart Co., Tennessee) and Clarksville (Montgomery Co., Tennessee) populations, only anecdotal statements concerning habitat preference were available, and the taxonomic status of the region was very unclear. Walking and road-cruising searches near suitable habitat were used to locate specimens within the LCRB, National Wetland Inventory (NWI) maps were analyzed to determine habitat availability, and digital image analysis was used to quantify certain subspecific taxonomic characteristics. Excluding the stretches below Barley Dam (Kentucky) and above Ashland City (Tennessee), *N. erythrogaster* can be found in suitable palustrine habitat

throughout the LCRB. The habitat associated with *N. erythrogaster* in the LCRB is dominated by forested, emergent, and scrub/scrub palustrine habitats as designated by the N7NI maps. The LCRB has seen an 11% reduction in potential *N. erythrogaster* habitat between the early 1980s and the mid-1990s, which is more than twice the regional average. *N. erythrogaster* from the southern half of The Land Between the Lakes (LBL) upstream throughout the remainder of the LCRB are Copperbelly Water Snakes (*N. e. neglecta*). *N. erythrogaster* from the northern half of LBL, the Reelfoot Lakes region of northwestern Tennessee, and the Jackson Purchase region of western Kentucky are intergrades between N. e. neglecta and the Yellowbelly Water Snake (*N. e. flavigaster*). These data also indicate that the area of intergradation encompasses northeast Arkansas, southeastern Missouri, most of southern Illinois, and all drainages of the Mississippi River within the species range north of southern Illinois.

A SOLITARY ANOLE IN ALTERED HABITATS: *ANOLIS GINGIVINUS* IN ANGUILLA

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& Department of Biology
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Overland Park, Kansas

The natural habitat of Anguilla is an evergreen scrub forest, much of it degraded by feral goats. Today the island is comprised of a patchwork of variously altered habitats. *Anolis gingivinus*, the Anguilla Bank Anole, is found throughout this island nation in varying densities. In June 2000, we investigated the natural history of *A. gingivinus* to identify the factors that most accurately predict anoline populations densities and to determine if ecological release has taken place. Ecological release occurs when individuals are released from niche constraints due to a lack of congeneric competition. We specifically examined population densities, structural habitat use, thermal biology, and diet. Based on the relative abundance of available perches, diameters of available perches, and insolation, we could predict with some degree of accuracy the relative number of anoles in six representative habitats. Structural habitats, thermal biology, and diet were very similar to those of morphologically similar species on multi-species islands. These data suggest that ecological release has not occurred.

FEMALE COPPERHEAD AGGREGATIONS IN NORTHEASTERN KANSAS

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Female Copperhead aggregations (2 to 9, exceptionally 16) form when the females are in late pregnancy, from early July into September. Group security is involved; a predator attacking one female would be at risk from bites of others lying in contact or nearby. Groups are always associated with a den; in northeastern Kansas dens are usually in hilltop outcrops of the Oread Limestone. Many gravid females do not aggregate. Nine members of aggregations were equipped for radiotelemetry. Five stayed with their dens and den partners, but four others moved erratically between dens or away from dens and back. Neonates, like the females, seem to have mutual attraction, and remain closely associated for about a week until they shed. Aggregations, both gravid females and neonates, are vulnerable to slaughter by misguided humans.

THE NATURAL HISTORY OF THE NORTHERN PRAIRIE SKINK IN A HEAVILY DISTURBED LANDSCAPE

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The Northern Prairie Skink (*Eumeces septentrionalis*) has a poorly known life history. I conducted a visual encounter survey from 1996–2000 at a disturbed landscape in Adair County, Iowa, to gain information on the relative abundance, phenology, and reproductive ecology of the northern prairie skink. Northern prairie skinks were active from mid-April to late September of most years. The

relative abundance of skinks was highest in 1998 at nine skinks/trip. There was an increase in relative abundance from 1996 to 1997 and there was a stable trend in the relative abundance for 1997–2000. Males with breeding colors were present from 12 May to 18 June when copulation is assumed to occur and the earliest nest was observed on 21 June. Nests were short burrows excavated beneath a cover object in an area that received adequate sunlight. Females were observed to move eggs out of the burrow onto a shallow shelf, which received heat more efficiently. Females averaged six eggs per clutch. Hatchlings appeared 18 July to 17 August, with the majority of skink observations in August and September being hatchlings. Skink activity decreased from late July-September. Eumeces septentrionalis is able to successfully colonize disturbed habitat. Cover object placement, maintenance of open grassy areas, and proper fire management are effective practices in the conservation and management of the Northern Prairie Skink.

THE KANSAS-GAP PROJECT: IMPLICATIONS FOR KANSAS HERPETOLOGY

Nicole M. Gerlanc
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Manhattan, Kansas

The mission of the Gap Analysis Program (GAP) is to provide state, regional, and national assessments of the conservation status of native vertebrate species, to identify natural land cover types of the U. S. and to facilitate the application of this information to land management activities. One of the objectives of GAP is to generate digital distribution maps for each vertebrate species. The development of the vertebrate layer of the Kansas GAP Analysis Project began in the spring of 1997. We are developing a database of habitat associations and location records (historical and current) of each vertebrate species to be mapped. When completed the vertebrate layer will provide maps with error estimates that predict the distributions of terrestrial vertebrate species in Kansas. I will present an update on the progress of the herpetological layer in Kansas and discuss possible applications of our models.

CONSERVATION OF AMPHIBIANS AND REPTILES AT THE SEDGWICK COUNTY ZOO

Karen Graham
Sedgwick County Zoo
Wichita, Kansas

It is estimated that over 134 million people visit American Zoo and Aquarium Association (AZAA) accredited institutions annually; more than attend all professional football, baseball, and basketball games combined. Most of these people have a very incomplete understanding of biological concepts and conservation issues. Thus, zoos serve as important links between biologists and local communities.

Conservation efforts in which zoo's participate can promote both the zoos and the plight of animals and their ecosystems. However, it is of crucial importance that the visitor is not left with the impression that they are not culpable for environmental degradation because zoos will "save the day." Zoos must provide a realistic view of the biodiversity crisis and provide positive choices that their visitors can make to affect the slowing of biodiversity loss.

An overview of international, national, and local amphibian and reptile conservation projects in which the Sedgwick County Zoo is involved are presented and proposals for further local involvement are investigated.

SOME AMPHIBIANS AND REPTILES OF EL SALVADOR

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Results of a recent collecting trip to numerous localities in El Salvador will be presented.

AMPHIBIANS AND REPTILES OF SEQUOYAH NATIONAL WILDLIFE REFUGE

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Sequoyah National Wildlife Refuge is a 8,320 ha management area located in Haskell, Sequoyah, and Muskogee Counties in eastern Oklahoma. Terrestrial habitats on the refuge consist of primary bottomland hardwood forests, abandoned crop fields and active agricultural land. Lentic and lotic aquatic habitats are represented by shallow sloughs, cattail marshes, Robert S. Kerr Reservoir, the Canadian

and Arkansas rivers. Many small tributaries to the Canadian and Arkansas rivers also flow through the refuge. From May 2000 through September 2000 various herpetofaunal survey methods were implemented to develop a baseline amphibian and reptile inventory for the refuge. Methods used were coverboards, road cruising, nocturnal anuran surveys, and commercial hoop nets for aquatic turtles. Thirty-four reptile species and 11 amphibian species were documented.

NEOTROPICAL BOAS: FROM THE SUBLIME TO THE ENORMOUS

ROBERT W. HENDERSON
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Milwaukee, Wisconsin

The *Corallus hortulanus* complex of neotropical tree boas is comprised of four species: (1) *C. cookii* (St. Vincent), (2) *C. grenadensis* (Grenada Bank), (3) *C. hortulanus* (Amazonia, Guianas, Atlantic forest of southeastern Brazil), and (4) *C. ruschenbergelii* (southern Central America, northern Colombia, northern Venezuela, Trinidad and Tobago). Aspects of the ecology of *C. grenadensis* have been studied on Grenada. *Corallus grenadensis* is extremely variable in color and pattern. Predominant dorsal ground color is correlated with elevation, rainfall, temperature, and cloud cover. Pale colored snakes predominate in low, hot, xeric areas, and dark brown snakes occur at high elevations (> 400 m) in areas of low percentage of possible sunshine, high rainfall, and depressed temperature. Taupe colored snakes predominate at moderate elevations. *Corallus grenadensis* is a highly arboreal, nocturnally active, anole and rodent predator that exhibits both active (for sleeping anoles) and ambush (for active rodents) foraging modes. It is especially common in areas under 100 m elevation in mixed agriculture with tree crowns forming a contiguous canopy. Tree boas were censused at several sites. Sometimes over a period spanning ten years. One population exhibited a steady decline over a six-year period; one showed a steady increase over a ten-year period, and several others exhibited fluctuations.

PROBLEMS IN ARKANSAS HERPETOLOGY

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Approximately 118 species of amphibians and reptiles are currently recognized as occurring in the state of Arkansas. As the new state herpetologist, I have been charged with the long term conservation and management of these species. My focus in accomplishing this task may be categorized in three major working groups: (1) assessment of true herpetological diversity, (2) geographic distribution, and (3) implementation of conservation and management strategies.

Arkansas harbors several allopatric and geographically isolated populations of amphibians and reptiles, such as the Spotted Dusky Salamander (*Desmognathus conanti*), Wood Frog (*Rana sylvatica*) and Queen Snake (*Regina septemvittata*). It is very important to assess the specific identity of these populations, through the use of molecular systematic techniques and comparative ecological studies, so appropriate conservation measures can be applied for their long-term survival.

The peripheral distribution of several species and the documentation of possibly occurring species needs further clarification. Those species with peripheral distributions include such taxa as the Gulf Coast Toad (*Bufo valliceps*), Southern Prairie Skink (*Eumeces obtusirostris*), Great Plains Skink (*Eumeces obsoletus*), and Ground Snake (*Sonora semiannulata*).

Conservation and management of commercially viable species such as the American Alligator (*Alligator mississippiensis*), Alligator Snapping Turtle (*Macrochelys temminckii*), and common aquatic turtles is currently regulated in Arkansas. There is a pressing need to curtail present unregulated take of Box Turtles (genus *Terrapene*) within Arkansas.

HIGHLIGHTS IN THE CAREER OF A STATE HERPETOLOGIST

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In this slide program I will discuss some of the important, successful or exciting projects and discoveries in my career as state herpetologist with the Missouri Department of Conservation.

DIGESTIVE PARAMETERS OF GREAT PLAINS SKINKS (*EUMECES OBSOLETUS*) IN KANSAS

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& LYNETTE SIEVERT
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Ten *Eumeces obsoletus* were collected from Chase County and Greenwood County, Kansas. Thirty-seven fecal and five food samples were collected. Bomb calorimetry was used to calculate digestive efficiency (D.E.= 91.0 + S.D. 2.1%). Skinks were fed marked crickets for 5 d to determine food passage time. We found a bimodal distribu-

tion with peaks at 25.96 + S.D. 1.56 and 47.06 + S.D. 2.77. Resting metabolic rate was measured between 0900 and 1500 hr at 21• C with an oxygen analyzer (16.71 + 0.88 I/g/hr).

REINTRODUCTION OF THE PICKEREL FROG IN CHEROKEE COUNTY, KANSAS

Jay Kirk
Friends University
Wichita, Kansas

The Pickerel Frog (*Rana palustris*) has not been seen in Kansas since 1932, when the only three specimens were collected. Many factors could have caused the pickerel frog's disappearance, but the most likely reason is the extensive lead and zinc mining that was conducted throughout the Ozark Plateau of southeastern Cherokee County, their sole suitable habitat. One hundred and twenty Pickerel Frogs were collected from Missouri and relocated to Schermerhorn Cave. Schermerhorn Cave is located in a city park, just south of Galena, Kansas. Each frog was toe-clipped for identification, weighed, and measured from snout to vent. Breeding was not observed during the one breeding season that overlapped the study period. Most of the frogs released were juveniles, so success of this project cannot be judged until they have reached maturity.

SLEEP SITE FIDELITY AND OTHER NOCTURNAL BEHAVIORS OF *ANOLIS GINGIVINUS* FROM ANGUILLA

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Kirksville, Missouri

Nocturnal behaviors and sleep site fidelity of *Anolis gingivinus* were studied in three ecologically distinct habitats on Anguilla. Our observations provided an opportunity to examine an anole with few or no nocturnal predators and no sleep perch competition from sympatric congeners. Perch height, perch diameter, and distance from the center of the vegetation all varied significantly across the three sites, indicating a wide use of available habitats. Relaxed specificity of orientation on the sleeping perch suggested a lack of fear of predation. Although no significant differences existed in perch characteristics between the sexes' females showed much greater sleep site fidelity. Sleep site fidelity, although present, was less prevalent than in a previous study of Puerto Rican anoles, probably reflecting the lack of predation pressure. Future studies of nocturnal behaviors in solitary anoles and complex anoline communities could illuminate the factors that control the sleep site decisions in a given species.

MICROHABITAT, ACTIVITY, AND DENSITY OF DWARF GECKOS (*SPHAERODACTYLUS*) ON THE ANGUILLA BANK

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The ecology of West Indian geckos in the genus *Sphaerodactylus* is largely unknown, despite their great diversity, broad distribution, and high population densities (to 67,000/ha). The lack of knowledge is largely attributable to their diminutive size (most species obtain an SVL of <35mm) and secretive habits which make observations very difficult. Two species of *Sphaerodactylus* occur on the Anguilla Bank, *S. parvus* and *S. sputator. Sphaerodactylus parvus* was originally described as a subspecies of *S. macrolepis*, but after reevaluating previously published morphological and biogeographical data, we have elevated *S. parvus* to a full species. We examined the factors that influence macro- and microhabitat use, activity, and population densities. The single most critical microhabitat variable for *S. parvus* was the abundance of rock cover. Higher rock density was significantly correlated with encounter rate, percentage of rocks harboring geckos, and population density. The substrate composition under and around the rocks was also important, with geckos using rocks in complex microhabitats in much greater frequency than they were available in the habitat. More than 90% of *S. parvus* encountered during the day were found under rock cover, whereas 60% observed after dusk were emergent on leaf litter, presumably active. *Sphaerodactylus parvus* densities ranged from 0-5.2/m2 (52,000/ha), with an average density across all study sites of 2.6/m (26,000/ha).

THE KNIGHT ANOLE (*ANOLIS EQUESTRIS*) IN EXTREME SOUTHERN MAINLAND FLORIDA: LIFE HAS NEVER BEEN SO GOOD

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KENNETH G. RICE
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A marked population of the exotic Knight Anole (*Anolis equestris*) was studied during September 1996–April 2000 in an urban system in extreme southern mainland Florida. Sexual maturity was achieved faster in females (7.5 mo.) than in males (13 mo.). The age at which body size reached an asymptote was older for males (4.5 yrs) than females (1.8 yrs). Monthly survivorship for adults was nearly 1.0, and sex ratios were even. The population turned over in about six years, although some individuals were estimated to have lived a decade or longer. General and courtship activity were continuous with seasonal summer peaks during April–October. Floristic and climatic similarity between extreme southern Florida and the Havana province provided amenable conditions to an exotic species whose high survivorship, rapid sexual maturity, omnivorous diet, extended breeding season, and dearth of predators and competitors increased the likelihood of colonization success in subtropical systems, including those of the West Indies.

AMPHIBIANS, TURTLES, AND REPTILES OF THE SMOKY HILL RANCH AND SURROUNDING AREAS OF WESTERN KANSAS

LARRY L. MILLER
Kansas Heritage Photography
Wakarusa, Kansas

The Smoky Hill Ranch, which is owned by the Kansas Chapter of the Nature Conservancy and located in Logan County, and the counties surrounding the ranch and Logan County are home to a unique diversity of amphibians, turtles, and reptiles. Several of the species from the area have been studied extensively and photographed during the past twenty years by groups such as the Kansas Herpetological Society, Fort Hays State University, Lawrence High School, Kansas Heritage Photography, Topeka Collegiate School, and other organizations. A brief summary of their findings was presented along with a short slide presentation.

BLOOD VISCOSITY COMPARISONS BETWEEN ENDOTHERMS AND ECTOTHERMS AT TWO TEMPERATURES

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Ectotherms, as compared to endotherms, are more dependent on their external environment for temperature regulation. The purpose of this study was to investigate the effects of temperature on the blood viscosity of selected endotherms and ectotherms. Blood viscosity measurements were taken at two temperatures, 3°C and 38°C. Blood viscosity was investigated among rats, Marine Toads, and Bullfrogs (the latter collected in Kansas). At hematocrits of 40%, 30%, and 20%, a significant difference was found between the blood viscosity of the rat and the Marine Toad at 38°C. There was no significant difference in apparent blood viscosity between the three taxa at 3°C at all hematocrits. When comparing the percent difference between blood viscosity values at 38°C and 3°C for endotherms and ectotherms, it was found that the endotherms had at least a fourfold increase in blood viscosity at 3°C relative to that at 38°C. In contrast, the ectotherms showed only a twofold increase at 3°C relative to that at 38°C. No significant differences in plasma viscosity existed between endotherms and ectotherms. The difference in relative viscosity (blood viscosity/plasma viscosity) values when compared at 38°C and 3°C was 2.5X greater in the rat at 3°C, but was approximately 2.0X lower in the ectotherms. This suggests that ectotherms have red blood cells that are less viscous at colder temperatures. Such adaptation of the red blood cells would benefit ectotherms in the maintenance of blood flow during the winter hibernation.

FOOD HABITS OF SNAKES ON A SAND PRAIRIE IN SOUTH-CENTRAL KANSAS

DWIGHT R. PLATT
Bethel College
North Newton, Kansas

Food records were obtained from 1,883 scats and 156 regurgitated stomach contents collected from snakes of eight species captured on a sand prairie in western Harvey County, Kansas, from 1966 through 1974 and in 1984–85. Diet was analyzed as frequency, percent of items, and percent of biomass for each food type. The Eastern Racer was most euryphagous, including large numbers of both insects and vertebrates in its diet. Differences in food habits between sexes, among three age groups and at different

seasons and in different years were studied. The Western Hognose Snake fed on many kinds of small vertebrates, especially lizards, lizard eggs, rodents, and amphibians. The Bullsnake, Prairie Kingsnake, and Kansas Glossy Snake specialized on mammalian prey, with each species selecting differently from the common small mammal populations. The foods eaten by the Plains Garter Snake, Common Garter Snake, and Eastern Hognose Snake were predominantly amphibians, mostly Plains Leopard Frogs.

ECOLOGY OF THE ALLIGATOR SNAPPING TURTLE, *Macrochelys temminckii*, AT SEQUOYAH NATIONAL WILDLIFE REFUGE

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Sequoyah National Wildlife Refuge is a 8,320 hectare management area located in Haskell, Sequoyah, and Muskogee Counties in eastern Oklahoma. Roughly 4,000 ha are occupied by Robert S. Kerr Reservoir, the Canadian River, Arkansas River and their tributaries. Between 1997 and 2000 we sampled the refuge for Alligator Snapping Turtles resulting in an effort of 565 net nights and a total 197 Alligator Snapping Turtle captures, representing 156 individual turtles. In 1999 and 2000, we conducted an ultrasonic telemetry study in order to determine movements, home range and microhabitat use. Data analysis of population densities, home ranges, movement patterns, and habitat use will be discussed. Comments will also be made on diet and nesting habitats.

NATURAL HISTORY OF THE MOLE SALAMANDER, *Ambystoma talpoideum*, IN SOUTHEASTERN MISSOURI

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Although much of the life history of *Ambystoma talpoideum* has been well documented in the southern and eastern portions of its distribution, little has been documented on this species in southeastern Missouri, which represents the northernmost extent of its distribution. I present data collected from one season of research on individual populations of *A. talpoideum* at two research ponds (Taylor Pond and Wet Pond) in southeastern Missouri. Data presented includes time of hatching, larval growth, timing of metamorphosis, size at metamorphosis, size of breeding adults, and timing of breeding period. Larval growth was more stable in the more permanent pond (Wet Pond), while growth slacked during a high larval density/low water situation from mid to late summer in the less permanent pond (Taylor Pond). Regardless, metamorphosis in both ponds occurred in May of the following year, approximately 15 months after hatching, and size at metamorphosis was similar, averaging approximately 55 mm snout-vent length (SVL). Paedomorphosis was documented at the permanent pond, but unrecorded at the less permanent pond. Breeding adults began immigrating to Taylor Pond in early December, and peaks in immigration occurred in early January and mid-February. While earliest immigrating groups were composed of males and females, most males reached the pond by early January, with succeeding inward migrating groups composed primarily of females. Emigration from the pond began primarily in mid-February, with earliest movements composed primarily of females. Subsequently, mixed groups of males and females left the pond until early April, with a peak in emigration occurring in mid-March. Of the total breeding population, females outnumbered males 1.43 to 1. Breeding adults ranged in size from 55.8 mm to 75.0 mm SVL, with females ($x = 66.3$ mm, $n = 92$) slightly larger than males ($x = 65.5$ mm, $n = 64$).

THE HERPETOFAUNA OF KISATCHIE, LOUISIANA

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A pictorial overview of the herpetofauna and physiography of Kisatchie National Forest region of North Central Louisiana. Discussion includes distribution, natural history, historical biogeography, and systematics of the reptiles in this region. Special emphasis is placed on endemic species and unique phenotypes.

PRELIMINARY OBSERVATIONS ON TURTLE ASSEMBLAGES IN THE KANSAS RIVER DRAINAGE

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Sampling for aquatic turtles in a section of the Kansas River drainage in Douglas and Leavenworth counties, Kansas, was completed during the summer of 2000. Four distinct habitat types were sampled within the drainage: main channel, backwater, tributary, and floodplain scour. Aquatic turtle assemblages were compared between the four habitat types. A total of 182 turtles, representing seven

species, were captured. Main channel sites produced the greatest abundance of turtles with *Apalone mutica* comprising 93% of all captures. Main channel, backwater, and scour habitats appear to support distinctly different aquatic turtle assemblages. Tributary sites showed the greatest species richness, diversity, and evenness, and may be important diversity pockets when considering turtle conservation issues.

THERMAL BIOLOGY OF *AMEIVA PLEI AND AMEIVA CORAX* FROM THE ANGUILLA BANK

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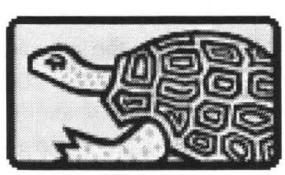
We examined the thermal biology of two species of lizards, *Ameiva plei* from Anguilla and Scrub Island and melanistic *A. corax* from Little Scrub Island. Both species maintained body temperatures well above ambient, although body and environmental temperatures for *A. corax* were significantly lower than for *A. plei*. Heating and cooling rates of both species did not differ significantly under controlled laboratory conditions, suggesting that melanism in *A. corax* has little or no impact on its thermal biology.



THE HELLBENDER, *CRYPTOBRANCHUS ALLEGANIENSIS:* THEN AND NOW

Robert Wilkinson
Southwest Missouri State University
Springfield, Missouri

A global decline in amphibian populations has been noted by biologists since the early 1970s. There are two problems with documenting the decline in amphibian populations: natural fluctuations in population numbers and lack of long-term data. We censused populations of the long-lived Hellbender, *Cryptobranchus alleganiensis*, in Missouri rivers, and compared the 1998–1999 data to data from previous studies from the 1970s and 1980s. The Hellbender populations appear to have declined in all rivers sampled. This decline is characterized by an increase in average body size, due to an apparent lack of recruitment of young into the population. Hellbenders from all rivers, except the Niangua, tended to be in better body condition in the 1998–1999 sample than they were in the past. It is not known whether the population decline for Hellbenders has a single cause or whether each population has experienced independent declines.

AMPHIBIAN CONSERVATION AT THE DETROIT ZOO

Kevin Zippel
Detroit Zoo
Detroit, Michigan

The Detroit Zoological Institute (DZI) has a long history of success with amphibians. In 1997, DZI intensified its commitment to amphibian conservation with the inception of the National Amphibian Conservation Center (NACC), the first facility in the world designed, constructed, and interpreted specifically for amphibians. Set in a 2-acre resurrected Michigan wetland, this 12,000-square-foot facility is dedicated to saving amphibians and shaping public attitude toward these threatened and valuable animals. Nearly half the facility will be off-exhibit, comprising holding and breeding rooms, offices, and research space. Four to five staff members will be present to take care of the day-to-day needs of the animals and to support breeding and research programs. Opened in June of 2000, the facility will eventually contain nearly 100 species of amphibians, and over 1000 specimens. The NACC will serve as a national resource that physically and programmatically provides a foundation for amphibian research and conservation.

Kathy Shidler and Mark R. Ellis (KHS President) represent the Kansas Herpetological Society at a recent meeting of the Kansas Advisory Council on Environmental Education.

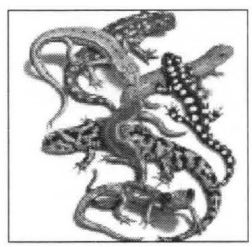
HERPETOLOGICAL T-SHIRTS FOR SALE

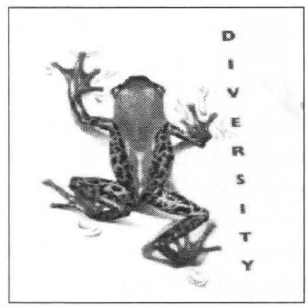
New T-Shirts featuring a frog and a collage of salamanders are available for $15.00 each plus $2.00 (if mailed). The shirts are preshrunk 100% cotton, medium weight, and white with brilliant color design on the front. Sizes available: adult (XL, LG, M, SM) child (medium only). Must order before 30 March 2001. Shirts will be shipped by 15 April 2001 for spring and fall KHS field trips. Order by style and size. Styles available are: *Diversity Frog* and *Colorful Salamanders*. Send order and payment to:

Kansas Heritage Photography
840 SW 97th Street
Wakarusa, Kansas 66546

Do not forget to include your complete shipping address. If you have questions, contact Kansas Heritage Photography at email:

wakarusa@cjnetworks.com





FEATURE ARTICLES

AN HERPETOFAUNAL SURVEY OF THE APALACHICOLA BARRIER ISLANDS, FLORIDA: THE 2000–2001 SEASON

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From mid-December 2000 to mid-January 2001, we conducted a survey of the amphibians, turtles, reptiles, and crocodilians on three of the four Apalachicola barrier islands in northwestern (panhandle) Florida. The Apalachicola barrier islands consist of four entities, St. Vincent Island (a federal wildlife refuge), Cape (Little) St. George Island (created by the federal government during World War II and now managed by the Florida Department of Environmental Protection), St. George Island (with St. George Island State Park at the east end), and Dog Island (a portion of which is owned by The Nature Conservancy). SVNWR = St. Vincent National Wildlife Refuge.

Taxonomy is that of Collins (1997).

18 December 2000

Florida: Franklin Co: Apalachicola
Anolis carolinensis – basking by day; temp 50°F, sunny

21 December 2000

Florida: Franklin Co: St. Vincent NWR, Dune Road
Anolis carolinensis – temp 55°F; two adults under wood structure 13 (both brown)

23 December 2000

Florida: Franklin Co: St. George Island on The Plantation at the George Mahr Seabase Boy Scout Camp
(temp 54°F at 1:30 pm)
Hyla cf. *femoralis* – ±10 adults and subadults under boards
Hyla squirella – ±20 adults and subadults under boards
Gastrophryne carolinensis – ±10 subadults under boards
Eleutherodactylus planirostris – 1 adult and 1 subadult under boards
Anolis carolinensis – 1 adult under board
Ophisaurus ventralis – 1 juv under board
Scincella lateralis – 1 adult under board

Florida: Franklin Co: St. George Island at the Apalachicola National Estuarine Research Reserve
(temp 57°F at 2:30 pm)
Hyla squirella – 3 adults under logs and boards
Scincella lateralis – 1 adult under log

Florida: Franklin Co: Magnolia Beach dump
(temp 59°F at 3:30 pm)
Scincella lateralis – 1 adult under sheet metal

24 December 2000

Florida: Franklin Co: St. George Island, west end
(temp 38°F at 8:00 am)
Ophisaurus ventralis – 1 juv under railroad tie

Florida: Franklin Co: St. George Island State Park
(temp 60°F at 1:00 pm)
Bufo terrestris – ±150 tadpoles in pond
Hyla squirella – 9 adults and subadults under boards
Rana sphenocephala – ±150 tadpoles in pond
Anolis carolinensis – 1 adult under board

25 December 1999

Florida: Franklin Co: St. George Island, The Plantation, Pelican Point Dump
(temp 53°F at noon; sunny)
Hyla squirella – 3 adults under boards
Eleutherodactylus planirostris – 6 adults under boards
Thamnophis sirtalis – 1 adult under board

26 December 2000

Florida: Franklin Co: St. Vincent NWR, Rattlesnake Road at Rattlesnake Slough
Amphiuma means – 1 subadult found dead at margin of slough
Hyla cinerea – 2 subadults under logs

Hyla squirella – 5 subadults under logs & boards
Rana sphenocephala – 1 subadult under palm log a margin of slough
Scincella lateralis – 1 adult bark of fallen pine tree

27 December 2000

Florida: Franklin Co: St. Vincent NWR, near jct. Road D and Road 5
Thamnophis sirtalis – 1 young adult AOR

Florida: Franklin Co: St. Vincent NWR, water control structure on Road E between Lake 3 and Lake 4
Bufo terrestris – 2 juvs under logs
Hyla cinerea – 1 subadult under bark on log
Hyla squirella – ±250 subadults under bark on logs
Gastrophryne carolinensis – 5 subadults under logs
Anolis carolinensis – 1 adult under log (brown)
Scincella lateralis – 3 adults under logs
Alligator mississippiensis – ±15 adults basking

Florida: Franklin Co: St. Vincent NWR, along Dead End Road
Bufo terrestris – 2 juvs under logs
Hyla squirella – ±200 subadults under bark on logs
Gastrophryne carolinensis – 12 subadults under logs
Pseudemys sp. – 1 adult (partial skel)
Scincella lateralis – 2 adults under logs

Florida: Franklin Co: St. Vincent NWR, west of Rattlesnake Slough water control structure
Gastrophryne carolinensis – 1 subadult under log
Eumeces laticeps – 2 adults (male & female) in rotten pine stump
Scincella lateralis – 1 adult under log
Virginia striatula – 1 adult under log
Crotalus adamanteus – 1 subadult (ca. 20 inches TL) under log

28 December 2000

Florida: Franklin Co: St. George Island, The Plantation, St. George Island Airport
(temp 59°F at noon; partly cloudy)
Gastrophryne carolinensis – 1 subadult under log
Eleutherodactylus planirostris – 1 adult under debris
Anolis carolinensis – 1 adult basking on wood pile (brown)
Elaphe obsoleta – 1 subadult basking on substrate at forest edge
Thamnophis sauritus – 1 adult male under log

29 December 2000

Florida: Franklin Co: St. Vincent NWR, east of Rattlesnake Slough water control structure
Bufo terrestris – 2 juvs under logs
Hyla squirella – 3 subadults under bark on logs
Gastrophryne carolinensis – 1 subadult under log
Anolis carolinensis – 2 adults under logs (brown)
Eumeces laticeps – 3 adults under logs (2 males; 1 female)
Scincella lateralis – 1 adult under logs
Coluber constrictor – 2 spent clutches (5 & 6 eggs)
Elaphe obsoleta – 2 adults; one inside rotten pine stump; another under RR tie
Masticophis flagellum – 1 spent clutch (7 eggs)
Thamnophis sauritus – 1 large adult inside rotten pine stump

30 December 2000

Florida: Franklin Co: St. George Island, The Plantation, Casa del Mar Estates
(temp 40°F, sunny)
Eumeces laticeps –1 subadult under bark in stump

31 December 2000

Florida: Franklin Co: St. Vincent NWR, water control structure on Road E between Lake 3 and Lake 4 near Fence Trap 10
Hyla squirella – 12 subadults under bark on logs

Florida: Franklin Co: St. Vincent NWR, Dune Road
(GPS N29.63201, W85.11510)
Coluber constrictor – adult found alive in open with raptor talon marks

Florida: Franklin Co: St. Vincent NWR, Dune Road
Terrapene carolina – upper shell only

Using video camera with Joann Lewis and Kelly Irwin, we checked 15 *Gopherus* burrows and observed the following:

Florida: Franklin Co: St. Vincent NWR, Dune Road
Gopherus polyphemus – adult in burrow near Fence Trap 4 (GPS N29.63246, W85.12935)
Crotalus adamanteus – adult in burrow (GPS N29.63201, W85.11510)
Gopherus polyphemus – adult in burrow (GPS N29.63293, W85.10907)

Florida: Franklin Co: St. Vincent NWR, A Road btwn Oyster Pond Restoration Bridge and Rattlesnake Road
Gopherus polyphemus – adult in burrow (GPS N29.64030, W85.14715)
Crotalus adamanteus – adult in burrow (GPS N29.64030, W85.14715)

4 January 2001

Florida: Gulf Co: Cape San Blas Lighthouse
Coluber constrictor – adult active by day near debris

5 January 2001

Florida: Franklin Co: Cape (Little) St. George Island
Hyla cinerea – at edge of freshwater swamp covered with duckweed, E wing of island

7 January 2001

Florida: Franklin Co: St. George Island, The Plantation, Pelican Point Dump
Scincella lateralis – 1 adult under board

Florida: Franklin Co: St. George Island, The Plantation, George Mahr Seabase
Eleutherodactylus planirostris – 1 adult under board
Hyla squirella – 6 adults and subadults under boards
Anolis carolinensis – 1 adult under board
Scincella laterals – 2 under boards

8 January 2001

Florida: Franklin Co: St. Vincent NWR, near Cabin
Hyla cinerea – 1 adult

Florida: Franklin Co: St. Vincent NWR, NE border of Oyster Slough
Hyla cinerea – 5 subadults under pine bark
Hyla squirella – 1 adult under pine bark
Rana sphenocephala – 1 subadult active along marsh
Scincella laterals – 1 adult under cabbage palm bark
Sistrurus miliarius – 1 adult under cabbage palm bark

Florida: Franklin Co: St. Vincent NWR, N border Rattlesnake Slough
Hyla cinerea – 5 adults under pine bark
Gastrophryne carolinensis – 1 subadult under pine bark
Anolis carolinensis – 1 adult active by day
Eumeces laticeps – 1 juv in upright cabbage palm
Scincella laterals – 6 adults under cabbage palm bark

Florida: Franklin Co: St. Vincent NWR, Rattlesnake Slough Water Control Structure
Virginia striatula – 1 adult under Wood Structure 33

Florida: Franklin Co: St. Vincent NWR, A Road btwn Oyster Pond Restoration Bridge and Rattlesnake Road
Crotalus adamanteus – adult (four feet) in burrow (GPS N29.64030, W85.14715)

Florida: Franklin Co: St. Vincent NWR, along Dune Road
Hyla cinerea – 1 subadult under pine bark
Hyla squirella – ± 50 subadults under pine bark
Rana sphenocephala – 1 subadult active by day
Anolis carolinensis – 6 adults active by day
Eumeces laticeps – 1 adult male in upright cabbage palm
Elaphe obsoleta – 1 subadult in downed cabbage palm
Masticophis flagellum – 1 clutch of four eggs (unhatched)
Thamnophis sauritus – 1 adult escaped in saw palmetto
Sistrurus miliarius – 2 under cabbage palm bark (1 adult & 1 juv)

Florida: Franklin Co: St. Vincent NWR, Indian Pass on Island
Bufo terrestris – 1 adult under cabbage palm bark

10 January 2001

Florida: Franklin Co: St. Vincent NWR, Dune Road
Hyla cinerea – 1 subadult under pine bark
Hyla squirella – ±10 subadults under pine bark
Gastrophryne carolinensis – 1 subadult under pine bark
Anolis carolinensis – 10 adults under pine bark (brown)
Eumeces laticeps – 1 adult female under pine bark
Virginia striatula – 1 adult under pine bark
Sistrurus miliarius – 1 juv under cabbage palm bark

Florida: Franklin Co: St. Vincent NWR, Road E, Lake 3–Lake 4 Water Control Structure
Hyla squirella – ±25 subadults under pine bark
Anolis carolinensis – 1 adult under pine bark (brown)
Alligator mississippiensis – 7 adults basking (all five feet or larger)

Florida: Franklin Co: St. Vincent NWR, Pickalene Shore Road
Scincella lateralis – 1 adult under pine bark

Florida: Franklin Co: St. Vincent NWR, O Road to beach
Anolis carolinensis – 1 adult under wood pile (brown)

11 January 2001

Florida: Franklin Co: St. Vincent NWR, at bridge near cabin
Cemophora coccinea – 1 juv under woodpile

Florida: Franklin Co: St. Vincent NWR, near Red Wolf pen
GPS N29.64028, W85.13512
Hyla squirella – 3 subadults under pine bark
Anolis carolinensis – 1 adult under pine bark (brown)

Florida: Franklin Co: St. Vincent NWR, near Old Coast Guard Base
GPS N29.64030, W85.14715
Hyla cinerea – 1 adult under pine bark
Hyla squirella – 2 subadults under pine bark
Anolis carolinensis – 2 adults under pine bark (brown)
Coluber constrictor – clutch of six eggs in cabbage palm
Elaphe obsoleta – 1 adult inside rotten RR tie
Crotalus adamanteus – 1 adult (four feet) in abandoned underground burrow
Sistrurus miliarius – 1 adult in abandoned underground burrow

Florida: Franklin Co: St. Vincent NWR, along Road A
Hyla cinerea – 2 subadults under pine bark
Hyla squirella – 20 subadults under pine bark
Anolis carolinensis – 29 adults under pine bark (brown) – two found dead (frozen)
Eumeces laticeps – 3 adults under pine bark
Scincella lateralis – 2 adults under pine bark
Coluber constrictor – clutch of eleven eggs in cabbage palm
Elaphe guttata – 1 subadult under pine bark
Virginia striatula – 1 adult under pine bark

12 January 2001

Florida: Franklin Co: St. Vincent NWR, Pig Slaughter Road, btwn Charlotte & Insulator Roads
GPS N29.64129, W85.09896
Hyla squirella – 1 subadult under pine bark
Anolis carolinensis – 1 adult under pine bark (brown)
Eumeces laticeps – 1 juv under board

Florida: Franklin Co: St. Vincent NWR, Road A
Anolis carolinensis – 2 adults under pine bark (brown)

Florida: Franklin Co: St. Vincent NWR, Road E, Lake 3–Lake 4 Water Control Structure
Hyla squirella – ±65 subadults under pine bark
Gastrophryne carolinensis – 2 subadults under pine bark
Anolis carolinensis – 1 adult under pine bark (brown)
Scincella lateralis – 1 adult under pine bark
Alligator mississippiensis – 3 adults basking

Florida: Franklin Co: St. Vincent NWR, Pickalene Road
Anolis carolinensis – 4 adults under pine bark (brown)
Scincella lateralis – 2 adults under pine bark

15 January 2001

Florida: Franklin Co: St. Vincent NWR, Road H, just E of Road 4/1
Eumeces laticeps – 1 juv under pine bark
Scincella lateralis – 2 adults under pine bark
Elaphe guttata – 1 subadult shed skin under pine bark

Florida: Franklin Co: St. Vincent NWR, Road E, Lake 3–Lake 4 Water Control Structure
Alligator mississippiensis – 19 adults basking

Florida: Franklin Co: St. Vincent NWR, jct. Road F & Road 6
Hyla squirella – 1 subadult under pine bark
Anolis carolinensis – 1 adult under pine bark (brown)
Eumeces laticeps – 2 adults (male & female) under pine bark

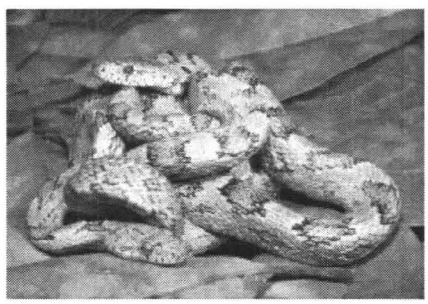
Florida: Franklin Co: St. Vincent NWR, along Dune Road
Scincella lateralis – 2 adults under Wood Structure 5

Acknowledgements

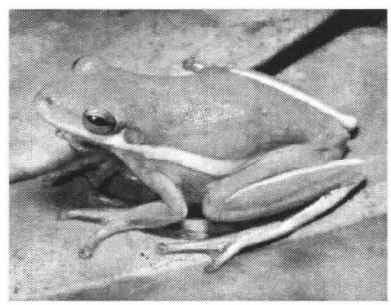
We are grateful to Terry Peacock, Manager, and Thomas E. Lewis, Biologist, St. Vincent National Wildlife Refuge, for their extensive help and encouragement during this survey. Jo Lewis provided the use of a videocam to search *Gopherus* burrows, and to her we are indebted. Additional thanks are due Jerry D. Collins, Emily C. Moriarty, and Frances Thoennes for their field assistance. Joe and Marie Romanelli graciously provided us with ferry transportation off St. Vincent Island, permitting us to stay later than normal to make observations.

Literature Cited

Collins, Joseph T. 1997. *Standard Common and Current Scientific Names for North American Amphibians and Reptiles. Fourth Edition.* SSAR Herpetological Circular 25: 1–40.



Two Midland Rat Snakes *(Elaphe spiloides)* from St. Vincent National Wildlife Refuge, Franklin County, Florida. Photograph by Suzanne L. Collins.



A Green Treefrog *(Hyla cinerea)* from St. Vincent National Wildlife Refuge, Franklin County, Florida. Photograph by Suzanne L. Collins.

THE SUBSPECIFIC STATUS OF THE COMMON GARTER SNAKE, *THAMNOPHIS SIRTALIS*, IN WESTERN OKLAHOMA

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Enid, Oklahoma 73703

Determining the subspecific status of the Common Garter Snake, *Thamnophis sirtalis*, in western Oklahoma has been problematic because of confusion over the taxonomic and distributional relationships between the Red-sided Garter Snake, *T. s. parietalis*, and the Texas Garter Snake, *T. s. annectens*. Brown (1950) relates that *T .s. annectens* differs from *T. s. parietalis* in:

(1) The absence of pink or red in the body color.

(2) The absence of any tendency towards the fusion of the upper row of lateral dark blotches, into a dark stripe.

(3) Distinct lateral light stripe, involving portions of the second, third, and fourth scale rows on the anterior third of the body.

(4) The very broad and distinct dorsal stripes.

(5) The normally orange (instead of yellow) dorsal stripe.

He also noted an intergrade of *T. s. parietalis* and *T. s. annectens* from 6 miles east of Canadian, Hemphill County, Texas. Forquette and Lindsay (1995) reported a specimen from 9 miles east of Stinnet, Hutchison County, Texas, that was more like *T. s. annectens*. Webb (1970) expected *T. s. annectens* to occur in Oklahoma based on Fitch and Maslin (1961), who identified disjunct populations of *T. s. annectens* in Meade County, Kansas, and Hemphill and Hutchison counties in the Texas panhandle. Collins (1974) mentioned *T. s. annectens* in Meade County, Kansas. However, without preserved specimens, the subspecies remained to the "possible occurrence" list. Conant (1975) recognized *T. s. annectens* as occurring in the Texas panhandle and Meade County, Kansas. Lardie (1975) reported on a specimen of *T. sirtalis* he collected with *T. s. annectens* characteristics from 2.5 km north of Fargo, Ellis County, Oklahoma, that produced 10 young (Lardie, 1976). Lardie (1979) reported on two specimens of *T. s. annectens* x *parietalis* from 7.5 km southeast of Cleo Springs, Major Co., Oklahoma. Fitch (1980) recognized the *T. s. annectens* populations in the Texas panhandle. However, all Kansas and Oklahoma populations are mapped as *T. s. parietalis*. Collins (1982) retained *T. s. annectens* in the "possible occurrence" category for Kansas, considered Lardie's (1975) Ellis County, Oklahoma specimens, and one badly mutilated that was collected by K. J. Irwin from Meade County, Kansas (KU187499), but still felt more preserved specimens were needed. Lardie and Black (1981) and Lardie (1982), reporting on voucher specimens of *T. sirtalis* in northwestern Oklahoma, identified *T. s. annectens* as occurring in Ellis County, and intergrades of *T. s. annectens* x *parietalis* in Woods, Woodward, Major, and Alfalfa counties. *T. s. parietalis* is listed as occurring in Grant, Garfield, Logan, Kay, Payne, Lincoln, Osage, Pawnee, and Creek counties. Dixon (1987) indicates that *T. s. parietalis* occurs in all Texas counties surrounding Oklahoma, including the northeastern panhandle, and *T. s. annectens* in the northwestern portion of the Texan Biotic Province and eastern Balconian Biotic Province from the second row of counties inside north Texas, through Tarrant and Dallas to Bexar counties. He commented that there was considerable confusion over the taxonomic boundaries of the subspecies in Texas. Seivert and Seivert (1988, 1993) recognized that *T. s. annectens* occurred in northwestern Oklahoma. Conant and Collins (1991 & 1998) includes the northeastern Texas panhandle, Meade County, Kansas, and northwestern Oklahoma to about the Cimarron Gypsum Hills, separated from the north central Texas population, and *T. s. parietalis* throughout the eastern two thirds of Kansas, and much of eastern Oklahoma. Collins (1993) recognized that two distinct subspecies did occur in Kansas, the Red-sided Garter Snake, *T. s. parietalis* in the eastern two-thirds of the state, and the Texas Garter Snake, *T. s. annectens* in Meade County. While *T. s. parietalis* also occurs in Meade County, he relates there was no evidence that the two subspecies intergraded in Kansas, and gives a good summary of the characteristics that distinguish between the two of them. Schaefer, et al (1995) reported on a specimen of *T. s. parietalis* collected in Slapout, Beaver County, Oklahoma, in the extreme southeastern panhandle, and 46.2 km northwest of Lardie's (1975) *T. s. annectens* record. Rossman, et al (1996) shows separation of *T. s. parietalis* to the east and *T. s. annectens* to the west with a dashed line (indicating uncertainty about range limits) through southwestern Kansas, western Oklahoma, and connecting with the main *T. s. annectens* population in north central Texas. Werler and Dixon (2000) agree with Dixon (1987) on distribution of *T. s. parietalis* and *T. s. annectens*. Tennant and Bartlett (2000), on the other hand, show *T. s. parietalis* and *T. s. annectens* on separate distribution maps that overlap most of Oklahoma. An arm of *T. s. annectens* range goes out to Meade County, Kansas, another over to the northeastern Texas panhandle, and a main area goes through north central Texas.

Recently, Lardie (in press) reported on *T. sirtalis* in Ellis, Garfield, Grant, Kingfisher, and Major counties, Oklahoma, suggesting populations in northwestern Oklahoma were intergrades. While many of these specimens

exhibited color and pattern typical of *T. s. parietalis*, others show characteristics of *T. s. annectens* as detailed by Brown (1950) and summarized by Collins (1993). These include amount of (or lack of) reddish-orange between the stripes, color and width of the dorsal strip (light yellow to bright orange), and uniform dark appearance of the skin, or dark spots arranged in a checkerboard fashion.

In determining the subspecific status of *T. sirtalis*, having red color between the stripes, regardless of amount, should not necessarily mean it is pure *T. s. parietalis*, any more than the complete lack of reddish or orange indicates pure *T. s. annectens*. The specimen of *T. s. annectens* from 2.5 km north of Fargo at Wolf Creek, Ellis County, Oklahoma, reported by Lardie (1975) had no reddish color between the stripes, and an orange dorsal stripe, and her ten offspring were duplicates (Lardie, 1976). These specimens were all sent to the late Jeffrey H. Black and Oklahoma Baptist University, Shawnee, Oklahoma, and assigned catalog numbers OBU 1378 (RLL 1386), 1370 to 1388 (RLL 1387-1396). However, a specimen identified as *T. s. parietalis* was reported at Slapout, Beaver County, Oklahoma, 44.2 km northwest of Lardie's (1975) record, an intergrade *T. s. annectens* x *parietalis* identified from 6 miles east of Canadian in Hemphill County, Texas, ca. 72.7 km west of Lardie's (1975) record (Brown, 1950), and both *T. s. parietalis* and *T. s. annectens* from Meade County, Kansas, ca 102 km north (Collins, 1982, 1993). But at least five adults, and 68 of their young (OBU 1403, 1404, 1513-1519), including two previously reported (Lardie, 1979) from Williams Scout Camp, 1.6 km east, 6.5 km south of Cleo Springs, Major Co., Oklahoma, each had only a trace of red between their stripes, and a wide bright orange dorsal stripe. This was also the color and pattern characteristic of a specimen reported by Lardie and Black (1981), and Lardie (1982) from near Alva, Woods County, and several specimens collected along State Highway 132, between Nash and Manchester, in Grant County, Oklahoma.

In Garfield County, several specimens were collected with *T. s. annectens* characteristics. On 1 October 1995, a large DOR female *T. sirtalis* was collected 3.9 km west of Enid, Garfield County, Oklahoma, has no trace of red or orange between the stripes. The background color is dark with spots barely discernable, a yellow dorsal stripe covering the vertebral and a half scale row on each side, and lateral stripes on scale rows two and three, and scale row four for five scales only behind the neck. This specimen was assigned to the St. Gregory's University collection, Shawnee, Oklahoma, SGU 533. On 11 September 1998, two medium size adult specimens of *T. sirtalis* were discovered 4.3 km west of Enid, on the bank of "Brune" Creek, trying to swallow the same large Plains Leopard Frog, *Rana blairi*, each from an opposite end. One snake (SGU 2027) has no red or orange color between the stripes, dark background color with discernable spots, a yellow dorsal stripe covering the central and one half scale row on each side, and faint yellow lateral stripes on scale rows two and three. This specimen would at least qualify as an intergrade *T. s. annectens* x *parietalis*. The other (SGU 2028) has lots of reddish-orange between the stripes, surrounding both rows of distinct black spots, a yellow dorsal stripe covering the central and one half scale row on each side, and lateral stripes on scale rows two and three. This specimen would qualify as a typical *T. s. parietalis*. Another specimen of *T. sirtalis* was collected 3.2 km west of Enid near Sand Creek an 12 May 2000 (currently maintained alive), which has no red or orange between the stripes, a double row of dark blotches on a lighter, but somewhat dark background, a yellow-orange dorsal stripe on the central plus one half scale row on each side, and lateral stripes on scale rows two and three. Another example (currently maintained alive) would readily pass for *T. s. parietalis*. This specimen was collected 3.2 km west, .8 km north, Enid on 12 May 1997, less than a half mile from the previous specimen. It has reddish-orange between the lower row of dark spots (none around the upper row) with some of the orange overlapping onto the lateral stripes that are on scale rows two and three. The dorsal stripe is yellow and occupies the vertebral scale and one half row on each side. Many other specimens with various amounts of reddish-orange between the stripes that would pass for *T. s. parietalis* have been collected or observed in the same general area.

Individuals of *T. sirtalis* vary considerably in color and pattern throughout northwestern Oklahoma and some areas of adjacent states. The amount of red between the stripes may be considerable, slight, or none at all, the dorsal stripe may be yellow to bright orange, the lateral stripes usually are on scale rows two and three, occasionally a little of four, and there is normally a double row of dark spots between the stripes in a somewhat lighter (sometimes only slightly lighter) background color. Further, there does not seem to be any distance factor separating specimens with or without red color between the stripes and other characteristic variations. Specimens that appear quite different may be found at the same location or miles apart. Since the subspecific identification of *T. sirtalis* in northwestern Oklahoma is frequently unclear, it would seem reasonable to assume the population is an intergrade population, and that Brown's (1950) interpretation of *T. s. parietalis* x *annectens* in Hemphill County, Texas, applies regionally as well. The entire population of *T. sirtalis* in northwestern Oklahoma from at least Grant, Garfield, and Kingfisher counties west to include the northeastern Texas panhandle and Meade County, Kansas, should be considered intergrades of *T. s. parietalis* x *annectens*. Perhaps additional studies will help further clarify the subspecific status of *T. sirtalis* in all of western Oklahoma and adjacent states.

Acknowledgements

I want to remember the late Jeffrey H. Black for providing his assistance throughout the years. Thanks are also due to Jeffrey T. Burkhart and Doyle L. Crosswhite for their assistance in more recent years. Thanks are also due the Oklahoma Department of Wildlife Conservation and Wildlife Diversity Program for much assistance. Lastly, special thanks go, as always, to my wife, Yaeko, my sons George E. and Gary E. Lardie, and my daughter, Gloria E., and Dean Brisson for their assistance in field studies.

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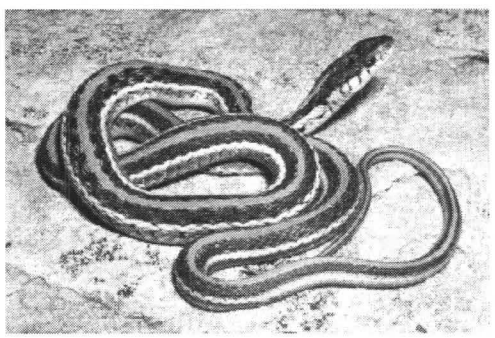
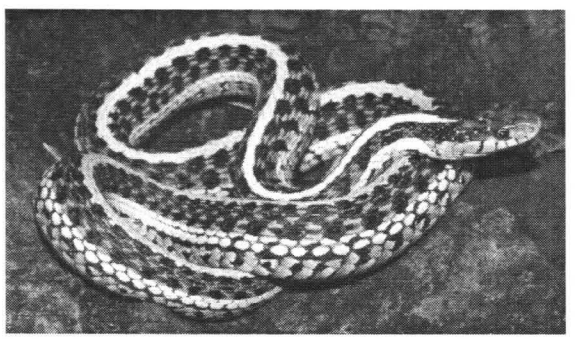


A Texas Garter Snake *(Thamnophis sirtalis annectens)* from an isolated colony in Meade County, Kansas (KU 218777). Photograph by Suzanne L. Collins.



A gravid female Red-sided Garter Snake *(Thamnophis sirtalis parietalis)* from Sedgwick County, Kansas. Photograph by Suzanne L. Collins.

SHORT COMMUNICATIONS

ODE TO AN OPHIDIAN AUTUMN

HANK GUARISCO
P. O. Box 3171
Lawrence, Kansas 66046

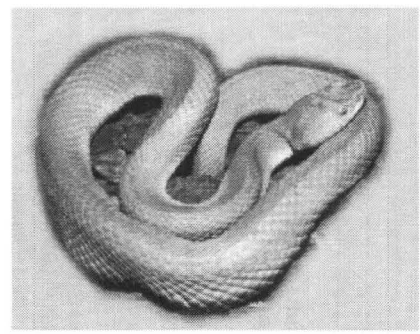
In northeastern Kansas, every season has its special joys to be enjoyed year after year—redbuds in the springtime, papaws in the fall. The season is fulfilled and complete when we experience certain special events that leave us with that "satisfied" feeling. For me, one such event is wandering through the woods near a creek and finding a grove of papaw trees with some ripe fruit. They are a special gift—they have a short season, bruise easily, and have a full, rich flavor and large, shiny, tropicallike seeds, which according to my herbalist friend, Steve Moring, do not germinate until the following July. Just walking through a grove of these small trees with their large yellow leaves on a warm September afternoon reminds me of "Middle Earth."

Another wild autumn encounter that I treasure is the familiar pattern and musky odor of the Copperhead. Of course, in this part of Kansas, we are blessed with the possibility of such an encounter during the spring or summer as well. With the accelerated building and expansion of Lawrence in Douglas County, it is satisfying to know that there are still rocky limestone ledges and wooded bluffs—habitat and hibernacula of many Copperheads and the occasional Timber Rattlesnake—within two miles of the city.

I found papaws this fall, only a few and only in one special place—enough to share with a few friends. Late in September, a research assistant of the Kansas Biological Survey approached me with a black, five-gallon metal bucket containing a Timber Rattlesnake that his brother had rescued from a parking lot near the eastern edge of Kansas City. In spite of a jaw injury, probably sustained when macho co-workers in the parking lot were harassing it, the snake looked very healthy. I released it the next day in a remote, uninhabited area, where I hope it will recover. Although still a viable part of the Kansas fauna, the Timber Rattlesnake has declined sufficiently to be classified as a SINC species (Species in Need of Conservation) in Kansas. It has been reduced or eliminated throughout much of the northeastern United States, and has been on the New York endangered species list for some time. There are interesting early accounts of Timber Rattlesnake populations on the island of Manhattan retold by Klauber in his two volume compendium on these serpents.

On Friday the 13th of October, a warm, cloudy afternoon with the weather threatening to drop from the sky at any moment, I decided to finish a yearlong snake survey on private property very close to Lawrence. Checking a few metal shelters produced a large Eastern Racer and several tiny Ringneck Snakes, only a few months old. Although the Ringneck Snake is a very common snake—in eastern Kansas, the biomass of all other snake species combined does not equal the biomass of this species—the average female lays only about five eggs per clutch. Therefore, decimated Ringneck Snake populations would probably not bounce back as those of other snake species, such as the Common Garter Snake, which sometimes produces over twenty-five young. Anyway, continuing the snake survey, I found many Ringneck Snakes. It was such a beautiful afternoon; I wandered up a wooded north-facing slope with scattered orange limestone rocks—the familiar signs of a potential denning site. After turning a few good rocks with no luck, I lifted one small, flat, limestone rock and was greeted by the sight of two Copperheads, a large darker ruddy-colored male and contrasting smaller, light orange-pink female. They could barely fit under the rock. After a little prodding, they moved off into nearby rocks after emitting a pleasant, musty odor from their scent glands. Yes, it was a perfect autumn afternoon. On the way to my truck, I found a third light-colored Copperhead neatly coiled under a snake shelter.

That "satisfied" feeling came over me as I drove back to Lawrence, reflecting upon another good season in an area where a "Copperhead" doesn't only refer to a good beer at Lawrence's Free State Brewery.



A male patternless Copperhead *(Agkistrodon contortrix)* from Jefferson County, Kansas (KU 203075), collected by Henry S. Fitch. Photograph by Suzanne L. Collins.

KANSAS HERPETOLOGICAL SOCIETY
APRIL-MAY AMPHIBIAN, TURTLE & REPTILE COUNT

Locality:_____

_____

Date: _____

Time: From _____ To _____

Please carefully record the total number of each species observed or heard.

Salamanders

__ Smallmouth Salamander, *Ambystoma texanum*
__ Barred Tiger Salamander, *Ambystoma mavortium*
__ Eastern Tiger Salamander, *Ambystoma tigrinum*
__ Eastern Newt, *Notophthalmus viridescens*
__ Longtail Salamander, *Eurycea longicauda*
__ Cave Salamander, *Eurycea lucifuga*
__ Many-ribbed Salamander, *Eurycea multiplicata*
__ Grotto Salamander, *Typhlotriton spelaeus*
__ Red River Mudpuppy, *Necturus louisianensis*
__ Common Mudpuppy, *Necturus maculosus*

Frogs and Toads

__ Plains Spadefoot, *Spea bombifrons*
__ American Toad, *Bufo americanus*
__ Great Plains Toad, *Bufo cognatus*
__ Green Toad, *Bufo debilis*
__ Red-spotted Toad, *Bufo punctatus*
__ Woodhouse's Toad, *Bufo woodhousii*
__ Northern Cricket Frog, *Acris crepitans*
__ Spotted Chorus Frog, *Pseudacris clarkii*
__ Spring Peeper, *Pseudacris crucifer*
__ Strecker's Chorus Frog, *Pseudacris streckeri*
__ Boreal Chorus Frog, *Pseudacris maculata*
__ Western Chorus Frog, *Pseudacris triseriata*
__ Eastern Gray Treefrog, *Hyla versicolor*
__ Cope's Gray Treefrog, *Hyla chrysoscelis*
__ Crawfish Frog, *Rana areolata*
__ Plains Leopard Frog, *Rana blairi*
__ Bullfrog, *Rana catesbeiana*
__ Green Frog, *Rana clamitans*
__ Pickerel Frog, *Rana palustris*
__ Southern Leopard Frog, *Rana sphenocephala*
__ Eastern Narrowmouth Toad, *Gastrophryne carolinensis*
__ Great Plains Narrowmouth Toad, *Gastrophryne olivacea*

Turtles

__ Common Snapping Turtle, *Chelydra serpentina*
__ Alligator Snapping Turtle, *Macrochelys temminckii*
__ Common Musk Turtle, *Sternotherus odoratus*
__ Yellow Mud Turtle, *Kinosternon flavescens*
__ Eastern Box Turtle, *Terrapene carolina*
__ Ornate Box Turtle, *Terrapene ornata*
__ Common Map Turtle, *Graptemys geographica*
__ Ouachita Map Turtle, *Graptemys ouachitensis*
__ False Map Turtle, *Graptemys pseudogeographica*
__ River Cooter, *Pseudemys concinna*
__ Painted Turtle, *Chrysemys picta*
__ Slider, *Trachemys scripta*
__ Smooth Softshell, *Apalone mutica*
__ Spiny Softshell, *Apalone spinifera*

Lizards

__ Eastern Collared Lizard, *Crotaphytus collaris*
__ Lesser Earless lizard, *Holbrookia maculata*
__ Prairie Lizard, *Sceloporus undulatus*
__ Texas Horned Lizard, *Phrynosoma cornutum*
__ Ground Skink, *Scincella lateralis*
__ Coal Skink, *Eumeces anthracinus*
__ Five-lined Skink, *Eumeces fasciatus*
__ Broadhead Skink, *Eumeces laticeps*
__ Great Plains Skink, *Eumeces obsoletus*
__ Southern Prairie Skink, *Eumeces obtusirostris*
__ Northern Prairie Skink, *Eumeces septentrionalis*
__ Six-lined Racerunner, *Cnemidophorus sexlineatus*
__ Western Slender Glass Lizard, *Ophisaurus attenuatus*

Snakes

__ Texas Blind Snake, *Leptotyphlops dulcis*
__ Western Hognose Snake, *Heterodon nasicus*
__ Eastern Hognose Snake, *Heterodon platirhinos*
__ Western Worm Snake, *Carphophis vermis*
__ Ringneck Snake, *Diadophis punctatus*
__ Flathead Snake, *Tantilla gracilis*
__ Plains Blackhead Snake, *Tantilla nigriceps*
__ Night Snake, *Hypsiglena torquata*
__ Rough Green Snake ,*Opheodrys aestivus*
__ Eastern Racer ,*Coluber constrictor*
__ Coachwhip, *Masticophis flagellum*
__ Great Plains Rat Snake, *Elaphe emoryi*
__ Eastern Rat Snake, *Elaphe obsoleta*
__ Glossy Snake, *Arizona elegans*
__ Gopher Snake (Bullsnake), *Pituophis catenifer*
__ Prairie Kingsnake, *Lampropeltis calligaster*
__ Common Kingsnake, *Lampropeltis getula*
__ Milk Snake, *Lampropeltis triangulum*
__ Longnose Snake, *Rhinocheilus lecontei*
__ Ground Snake, *Sonora semiannulata*
__ Checkered Garter Snake, *Thamnophis marcianus*
__ Western Ribbon Snake, *Thamnophis proximus*
__ Plains Garter Snake, *Thamnophis radix*
__ Common Garter Snake, *Thamnophis sirtalis*
__ Lined Snake, *Tropidoclonion lineatum*
__ Rough Earth Snake, *Virginia striatula*
__ Smooth Earth Snake, *Virginia valeriae*
__ Brown Snake, *Storeria dekayi*
__ Redbelly Snake, *Storeria occipitomaculata*
__ Graham's Crayfish Snake, *Regina grahamii*
__ Plainbelly Water Snake, *Nerodia erythrogaster*
__ Diamondback Water Snake, *Nerodia rhombifer*
__ Northern Water Snake, *Nerodia sipedon*
__ Copperhead, *Agkistrodon contortrix*
__ Cottonmouth, *Agkistrodon piscivorus*
__ Massasauga, *Sistrurus catenatus*
__ Timber Rattlesnake, *Crotalus horridus*
__ Western Rattlesnake, *Crotalus viridis*

This list is based on the common and scientific names that appear in the fourth edition of *Amphibians and Reptiles in Kansas* (Collins 1997), with modifications from information published since that date. Compiled for the Kansas Herpetological Society by Joseph T. Collins. November 2000.

RETURN TO

KANSAS BIOLOGICAL SURVEY
UNIVERSITY OF KANSAS
2021 CONSTANT AVENUE
LAWRENCE, KANSAS 66047

Verified by: _____
Signature

Observers:

_____

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