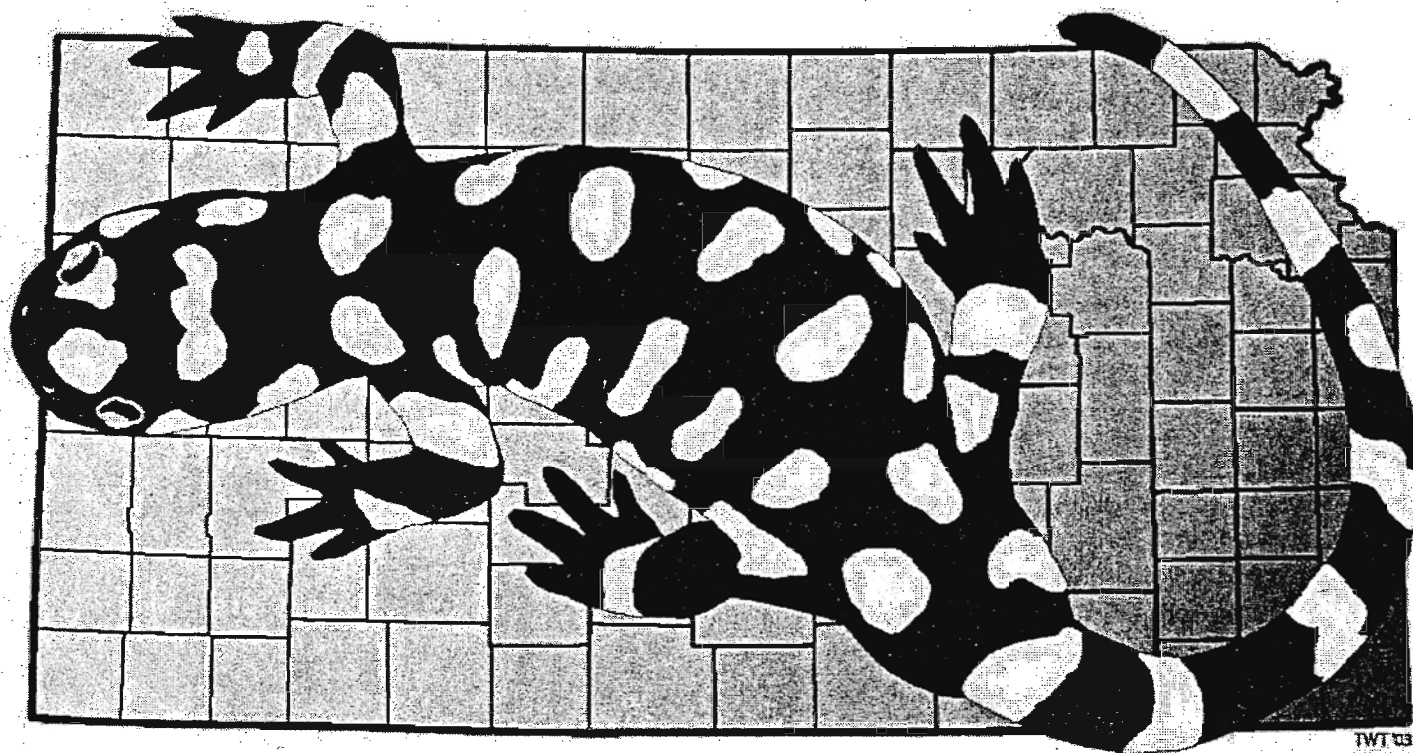


# Kansas Herpetological Society

## 30th Annual Meeting Program



Meeting Theme: Natural History of Amphibians and Reptiles

Emporia State University

8<sup>th</sup> - 9<sup>th</sup> November 2003

# Kansas Herpetological Society 30th Annual Meeting Program

8-9 November 2003

ESU Science Building  
Emporia State University  
Emporia, Kansas

## Meeting Theme: Natural History of Amphibians and Reptiles

### KHS Photography Competition - Room 46

KHS members participating in the competitive exhibit of photographs of native Kansas amphibians, turtles, and reptiles, will be candidates for *The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology*. The competing photographs are available for viewing in Room 46 in the Science Hall at Emporia State University from 10:00 am to 4:00 pm on Saturday, 8 November 2003. Photographers should plan to have their images set up in Room 46 no later than 10:00 am on that date. All photographers exhibiting must be KHS members, and each photographer is limited to five (5) images. The photographer chosen as the 2003 recipient of *The Collins Award* must be present to receive it. Images will be judged on originality, technical excellence, composition, color, action, drama, and overall impact. Entry to the competition constitutes agreement by the photographer to allow the winning photograph to be published by the KHS on its web site or in publicity releases. Entrants retain all other rights to the future use of their winning photograph. Prints must be mounted on stiff board for display purposes (no frames) and should be no larger than 11 x 16 inches. The back of each photograph must bear the name of the photographer, address, telephone number, and entry number (1-5). The identity of the photographer will not be revealed to the members of the KHS Awards Committee. Photographers are responsible for their entries at all times. The KHS assumes no responsibility or liability for any photographic entries.

### NOTES

Register in the Schmidt Museum (across from Room 72) with the KHS Treasurer on Saturday and Sunday: Students (6th through 12th Grade) \$5.00 per person; all others \$10.00 per person.

The annual KHS auction will be held on Saturday night (8 November) in Emporia, Kansas, at the Ross Natural History Reservation. All proceeds from the auction go to the KHS. BEER, SOFT DRINKS, AND SNACKS WILL BE FREE.

**LIVE EXHIBIT.** A live exhibit of U.S. Amphibians and Reptiles has been assembled and will be available in Room 47 of the ESU Science Building for viewing and photography. Times for members to conduct herpetological photography on Saturday and Sunday are listed below.

**Note to speakers:** We will adhere to a strict schedule for talks. Please plan your talks for no more than 15 minutes with an additional 5 minutes for questions from the audience. After 20 minutes the session moderator will "terminate" your talk! Speakers using the computer should load their talk onto the computer no later than the break session before their talk. Any talk not already pre-loaded onto the computer will not be shown.

## Saturday, 8 November 2003

**8:00 am REGISTRATION** for both days: **Mary Kate Baldwin** (KHS Secretary) and **Eric Kessler** (KHS Treasurer) in the Schmidt Museum (across from Room 72) in the ESU Science Building (Building Number 15 on the ESU Campus Map), Emporia State University, Emporia, Kansas. Free coffee and donuts will be available in the Schmidt Museum, compliments of **Rod Sobieski**, Acting Dean of Arts & Sciences at Emporia State University and **Marshall Sundberg** Chairperson of the Department of Biological Sciences at Emporia State University.

**9:00 am - 4:00 pm LIVE EXHIBIT** in Room 47 of the ESU Science Building.

**8:40 am WELCOME** by **Marshall Sundberg**, Chairperson of the Department of Biological Sciences at Emporia State University.

8:45 am **WELCOME** by Greg Sievert (KHS President).

**Note:** Papers marked with an \*\* are eligible for the 2004 The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology.

### **Scientific Paper Session 1**

Room 72 of the ESU Science Building, Emporia State University

Moderator: **Greg Sievert**, Emporia State University, Emporia

9:00 am **FROM CLIMATE CHANGE TO CLIMBING SNAKES: LONG TERM STUDIES ON TIMBER RATTLESNAKES IN THE OZARKS**

**KEYNOTE SPEAKER: Steven J. Beaupre**

University of Arkansas, Fayetteville

A major challenge facing animal population ecologists is understanding and predicting the effects of climate change. Long-term effects of climate change on biological systems will manifest themselves through mechanistic connections among environmental factors (e.g., food, temperature), time-energy budgets of individuals, and life history. Large pitvipers are excellent model systems for the study of environmental influence on time-energy allocation and life history. I describe the results of a long-term mark-recapture and radio telemetry study of the responses of the timber rattlesnake (*Crotalus horridus*) in northwest Arkansas to critical environmental factors. Specifically, I describe (i) an array of measurements made possible by radio-telemetry, (ii) a modeling exercise that attempts to integrate complex physiological responses to environmental factors, and (iii) an experimental manipulation of food availability (supplemental feeding). Long-term monitoring of body temperature, feeding rates, energy expenditure, and behavior allows an assessment of the effects of natural environmental variation on growth and reproduction. Although a work in progress, results to date suggest an over-riding influence of food limitation on growth and reproduction. Imperiled timber rattlesnake populations may benefit most from landscape management practices that enhance small mammal availability.

9:45 am **TRAILING TIMBER RATTLERS IN LEAVENWORTH COUNTY: CONTRASTS WITH EASTERN POPULATIONS\*\***

**Henry Fitch**

University of Kansas

In northern New York near the range limits of *Crotalus horridus*, females take 9 or 10 years to reach sexual maturity, and then reproduce only at intervals of years. In the time required of one New York generation a pair in Kansas could become great great grandparents with hundreds of descendants. In New York hibernacula are on talus slopes and the snakes make long and purposeful migrations, concentrating these in fall and dispersing in spring, but ours move about casually when they emerge, and there is no migration. All five adults of our telemetered snakes were consistent in keeping to timbered outcrops, with an abundance of dead brush, logs and loose rocks for hiding places, but the two immature snakes were most often found away from rock outcrops coiled in the grass. One of them was found climbing in trees on many occasions.

10:05 am **TELEMETRIC STUDY OF TIMBER RATTLESNAKES (*Crotalus horridus*) \*\***

**George R. Pisani and Henry Fitch**

University of Kansas

Six timber rattlesnakes were trailed for an entire activity season, beginning within days of Spring emergence when transmitters were implanted. Young and adults show markedly different movement patterns, with young ranging over far wider areas and very different habitats. Aspects of orientation and hypotheses for 2004's season will be discussed.

10:25 am **BREAK**

## Scientific Paper Session 2

Room 72 of the ESU Science Building, Emporia State University

Moderator: **David Saunders**, Emporia State University, Emporia

### 10:40 am THE COPPERHEAD IN SOUTHEASTERN NEBRASKA

**Daniel Fogell**

University of Nebraska at Omaha

Demographic and morphometric data for copperheads (*Agkistrodon contortrix*) in Gage County, Nebraska have been collected since 1998. Since southeast Nebraska represents the northwestern boundary of their total distribution, copperheads are confronted with resource limitations that may not be as severe at the center of their range. Suboptimal habitat may result in smaller animals and reduced reproductive success. Demographic and morphometric statistics will be presented for the Gage County copperhead population, and these data will be compared with published data for a less peripheral population in Kansas.

### 11:00 am THE SEARCH FOR THE COTTONMOUTH (*Agkistrodon piscivorus*) IN SOUTHEAST KANSAS \*\*

**James Daniel**

Pittsburg State University

The cottonmouth (*Agkistrodon piscivorus*) is a medium to large pit viper that is dark in color and has a banding pattern that fades in adults. It is a semi-aquatic snake often found away from water. It can be found in almost any aquatic situation within its range and is often very abundant. The habitat of southeast Kansas differs from the rest of Kansas due to its close proximity to the Ozark Plateau. The cottonmouth is one of several species that is on the edge of its range in southeast Kansas due to this transition in geography, habitat, and climate. However, the cottonmouth has not been seen in Kansas since 1991. In 1991, two specimens were found about two weeks apart and about three miles apart near where Highway 96 crosses the Spring River in Cherokee County. Since then, there have been no documented sightings of the cottonmouth in Kansas. There have been other reports than these two but those have been discredited. There is a large interest among herpetologists to find more cottonmouth's and to find out whether those two snakes in 1991 were not a normal occurrence (possibly two snakes from Missouri that wandered across the state line) or if the cottonmouth does naturally occur in southeast Kansas and is just elusive. It is believed by some, including myself, that the cottonmouth is in southeast Kansas, but there have not been any long-term studies that spend the whole length of the cottonmouth's season looking for it. In my research I will be using GIS to come up with a model to predict where to find the cottonmouth in Cherokee County, Kansas, using information about its habitat requirements found in the literature and from state herpetologists in surrounding states where the cottonmouth is known to exist.

### 11:20 am HOME RANGE AND MOVEMENTS OF TEXAS INDIGO SNAKES IN THE WESTERN RIO GRANDE PLAINS, TEXAS

**Todd Y. Montandon and Richard T. Kazmaier**

Department of Life, Earth and Environmental Sciences, West Texas A&M University, Box 60808, Canyon, TX 79016

The state-threatened Texas indigo snake (*Drymarchon corais erebennus*) has been poorly studied throughout its geographic range in southern Texas. In May 2002, we initiated a radiotelemetry based study on Chaparral Wildlife Management Area in southern Texas. The area is typical of the Mesquite-Acacia thornscrub communities that dominate the western Rio Grande Plains ecoregion. Monitoring of 13 radiotransmitted Texas indigo snakes from 19 May 2002 to 4 September 2003 (4,058 radiodays) resulted in 3,108 radiolocations that were incorporated into a GIS for spatial analysis. Across all locations, distance moved per day averaged 51 m for males and 86 m for females. Maximum daily distance moved was 1.5 km. Home ranges estimated by the minimum convex polygon method averaged 173 ha (range 66-270 ha) for six individuals monitored for greater than one year. Our data highlight the need for long-term monitoring of Texas indigo snakes to establish stable home range estimates and indicate large areas of suitable habitat are required for management of this very mobile species.

### 11:40 am KHS GROUP PHOTOGRAPH: taken by **Larry L. Miller** (Kansas Heritage Photography, Wakarusa)

Noon LUNCH: at the restaurant of your choice

### **Scientific Paper Session 3**

Room 72 of the ESU Science Building, Emporia State University

Moderator: **Suzanne L. Collins**, The Center for North American Herpetology, Lawrence.

**1:15 pm A HERPETOLOGICAL SURVEY OF THE SMOKY HILL AIR NATIONAL GUARD RANGE, SALINE COUNTY, KANSAS \*\***

**Curtis J. Schmidt<sup>1</sup>, Richard S. Hayes<sup>1</sup>, and Dr. William Busby<sup>2</sup>**

<sup>1</sup>Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas

<sup>2</sup>Kansas Biological Survey, University of Kansas, Lawrence, Kansas

The Smoky Hill Air National Guard (SHANG) Weapons Range is a 33,873-acre military training facility located in southwest Saline County whose primary mission is to provide realistic target arrays to American and allied aircrews. Approximately 144 targets are used for a wide variety of air to ground operations by all divisions of the armed forces. The land is broken up into an impact area surrounded by agricultural leases and wildlife management areas. In 2002, the Kansas Biological Survey was contracted to conduct baseline floral and faunal surveys of the SHANG. We conducted the herpetofaunal inventory from May through October 2003, spending a total of 128 man-hours searching available habitat and 181 vehicle-hours driving the 53 miles of gravel and dirt roads. Drift fence arrays comprised of silt fencing, funnel traps, and pitfall traps also were used. During the inventory, we recorded 822 observations on 34 herp species, including five species previously undocumented in Saline County.

**1:35 pm THE DISTRIBUTION AND STATUS OF THE KANSAS HERPETOFAUNA: A TWO-YEAR STUDY**

**Travis W. Taggart and Curtis J. Schmidt**

Sternberg Museum of Natural History, Fort Hays State University

In the course of the next two years, we will conduct a herpetofaunal inventory throughout Kansas. The objectives of the survey will be to 1.) Identify new localities, determine population status estimates, and characterize habitat preferences for imperiled species of the Kansas herpetofauna; 2.) Collect and curate tissues of these species for use in future genetic research; and 3.) Construct an online database system to record the results and make them available to others as needed. The proposed surveys will enable a greater understanding of the distribution and natural history of the Kansas herpetofauna with a long-term goal of identifying SINC species. Our findings also will provide additional support for policy directive, regulatory decisions, and species management. The internet-based database system will provide instantaneous access of data compiled in this study by wildlife officials, managers, and researchers.

**1:55 pm THE EFFECTS OF FIRE AND GRAZING MANAGEMENT ON REPTILES AT QUIVIRA NATIONAL WILDLIFE REFUGE: PRELIMINARY RESULTS \*\***

**Erik M. Bartholomew and William J. Stark**

Department of Biological Sciences, Fort Hays State University, 600 Park Street, Hays, KS 67601-4099

Fire and grazing are important management tools used for the maintenance of native vegetation in the Quivira National Wildlife Refuge (QNWR). These techniques have been in place for 30 years; however, within the last 15 years a more structured protocol has been in place. The refuge is subdivided into grazing/fire units with the objective of burning each unit on a three-year rotation. Currently, little information on relative abundance of reptiles is available on QNWR. The response of reptiles to fire is not well understood. Thus, we want to provide a quantitative assessment of the reptiles at QNWR and determine the effects of the current management regime. We have identified 12 units that have been burned this year, one year ago, two years ago, three years ago, and more than three years ago, with 3 replicates each. We will establish Y shaped-drift-fence arrays in all units using funnel traps on the ends and a pitfall in the center. In 2003, in 1057 trap nights, 160 individuals were captured, marked, and released in 11 units. 24 animals in zero year burns, 28 in units burned one year ago, 39 in units that were burned two years ago, 11 in units burned 3 years ago, and 58 in units burned more than 3 years ago. Average catch per trap night was 0.15 animals. 191 animals were encountered and processed during road surveys and incidental capture. A total of 14 animals were recaptured either by driving or in traps. In 2004 we plan to increase the number of traps per unit and develop a standard protocol for monitoring breeding calls of amphibians.

**2:15 pm COMMUNITY STRUCTURE OF REPTILES AND AMPHIBIANS IN A FIRE-DISTURBED TALLGRASS PRAIRIE \*\***

**Dustin Wilgers**

Kansas State University

Herpetofauna is known to change with the presence of fire in many ecosystems. Little is known on how herpetofaunal communities may change in a tallgrass prairie, not only with presence of fire, but also with differing frequencies of fire in the landscape. Two areas of three different burn frequencies were analyzed for differing herpetofaunal communities: annually burned areas, areas burned every four years, and areas burned every twenty years. Funnel traps (n=216) and coverboards (n=132) were organized in twelve transects, two transects per area. These preliminary data were compiled from a total of 15,444 total individual trap nights (9504 trap nights, 5940 board nights). A total of 132 individuals were captured, including 11 reptile and 5 amphibian species. Funnel traps accounted for 38 captures, while coverboards accounted for the majority of the herpetofaunal captures (94). Traps and coverboards captured similar species totals (traps= 12, boards=11), but the species numbers were more even in the trap captures (Shannon-Weaver Index for traps= 6.11, Shannon-Weaver Index for boards= 3.77). The different fire frequencies also produced differences in total individuals captured (1-yr.= 41, 4-yr.= 51, 20-yr.= 45), total number of species captured (1-yr.= 12, 4-yr.= 8, 20-yr.= 9), and species evenness (1-yr. SWI= 6.39, 4-yr. SWI= 2.79, 20-yr. SWI= 4.04). Amphibians represented the largest difference in species composition, all five species were found in the annually burned area, while none of the species were captured in the four-year area, and only one found in the twenty-year area. Many other species were recognized to be burn area specific, which leads to some of the differences in community structure data between differing burn frequencies in the tallgrass prairie.

**2:35 pm SEX RATIOS IN SAMPLES FROM EIGHT SNAKE POPULATIONS IN SOUTH CENTRAL KANSAS \*\***

**Dwight R. Platt**

Dept. of Biology, Bethel College

Sex was determined for individuals in samples taken from eight populations of snakes in Harvey County in south central Kansas in the 14 years, 1959-63 and 1966-74. Sex ratios of neonates or hatchlings of *Coluber constrictor* (N=85), *Pituophis catenifer* (N=247), *Heterodon platirhinos* (N=73), and *Thamnophis radix* (N=890) did not differ significantly from a 1:1 ratio. A neonate sample of *Thamnophis sirtalis* (N=644) had a slight but significant excess of males (1.20:1). Trapping samples taken from the populations of *C. constrictor* (N=1086), *P. catenifer* (N=720), *Heterodon nasicus* (N=520), *H. platirhinos* (N=228), *Arizona elegans* (N=81), *T. radix* (N=2209), and *T. sirtalis* (N=2288) all had a statistically significant excess of males (1.20 to 2.12:1). The May-June samples, taken during the spring mating season, were heavily biased for males (1.37 to 5.00:1). Samples taken in July and August did not differ significantly from a 1:1 ratio. Samples taken in September and October from *T. sirtalis* and *H. platirhinos* populations had a significant excess of males (1.17 to 1.91:1, but September-October samples from the other populations did not differ significantly from 1:1. A trapping sample of 100 *Lampropeltis calligaster* did not differ from a 1:1 ratio.

**2:55 pm BREAK**

**Scientific Paper Session 4**

Room 72 of the ESU Science Building, Emporia State University

Moderator: **Eva Horne**, Kansas State University, Manhattan.

**3:15 pm DEMOGRAPHY OF THE TEXAS TORTOISE: THE IMPORTANCE OF LONG-TERM DATA**

**Richard T. Kazmaier**

Department of Life, Earth and Environmental Sciences, West Texas A&M University, Box 60808, Canyon, TX 79016

The Texas tortoise (*Gopherus berlandieri*) is the smallest, most sexually dimorphic, and, arguably, least well-studied of the North American *Gopherus*. In the United States, Texas tortoises are primarily restricted to mesquite-acacia thornscrub habitats of the Rio Grande Plains Ecoregion of southern Texas. I initiated a long-term study on Texas tortoises in 1994 at Chaparral Wildlife Management Area in Dimmit and La Salle counties, Texas, to begin collection of the basic ecology and life history data necessary to allow the formulation of better management plans for this state-threatened species. As of September 2003, I have collected data from 2489 captures of 1807 individuals. Adult sex ratio is not different from 1:1 and juveniles consistently comprise about 35% of the individuals captured annually. Age was assessed using scute annuli and 9 years of recaptures support the 1 annulus per year hypothesis necessary to validate this technique for my study population. Sexual maturity is reached in 5-6 years and average clutch size is 2. Annual adult survival rates ranged 73-79% for females and 79-83% for males, depending on method of calculation. I hypothesize that the differential mortality rates between the sexes are the result of a complex interplay between nutrition and reproduction. Texas tortoises appear to have adopted the strategy of rapid growth and early maturity to compensate for high mortality rates. Thus, Texas tortoises have assumed a more r-selected ecological strategy compared to the other North American tortoises and should be managed accordingly.

**3:35 pm RELOCATION OF *Gopherus polyphemus* IN SOUTHERN MISSISSIPPI: WILL IT SUCCEED?**

**Trisha Crabill and Abigail Dinsmore**

Towson University, Maryland

There is a pressing need for well-designed, experimental studies on factors influencing the success of relocations of the gopher tortoise *Gopherus polyphemus*. In this study, 24 tortoises were relocated from nearby development sites to a restored longleaf pine habitat on the Desoto National Forest in southern Mississippi. Tortoises were equipped with radio transmitters and placed into replicated short-term (three month) and long-term (12 month) enclosures to determine if length of penning influences relocation success. Tortoises from short-term enclosures were released in mid-August 2003, and tortoises in long-term enclosures are scheduled to be released in June 2004. To date, about 50% of the tortoises in the short-term enclosures have left the relocation site. Analyses of movement patterns, behavioral interactions in and out of the enclosures, and physiological characteristics are currently being conducted.

**3:55 pm KHS General Business Meeting** with KHS President **Greg Sievert** presiding in Room 72 of the ESU Science Building, Emporia State University

**AGENDA**

- Introduction of current KHS officers by **Greg Sievert**
- KHS Treasurer's Report for 2003 by **Eric Kessler**
- KHS Secretary's Report for 2003 by **Mary Kate Baldwin**
- KHS Editor's Report for 2003 by **Travis W. Taggart**
- Report on Plans for the 31st Annual KHS Meeting at Manhattan, Kansas, in 2004 by KHS President-Elect **Eva Horne** (Kansas State University, Manhattan, Kansas).
- Election of KHS Officers for 2004. The 2003 KHS Nominating Committee is composed of **Dwight R. Platt** (Bethel College, North Newton), and **Joseph T. Collins** (Kansas Biological Survey, Lawrence), and **Eva Horne** (Kansas State University), and offers the following slate of candidates:

For President

**Eva Horne**, Kansas State University, Manhattan, Kansas

Serving as president-elect during 2003, and automatically assumes the KHS presidency on 1 January 2004.

For President-Elect

**Jay Kirk**, Friends University, Wichita, Kansas.

**David Oldham**, Labette County Community College, Parsons, Kansas.

For Treasurer (unopposed)

**Eric Kessler**, Blue Valley North High School, Overland Park.

For Secretary (unopposed)

**Mary Kate Baldwin**, Topeka Collegiate School.

- Announcement of the results of the KHS election by the Elector, **Mary Kate Baldwin**.
- Presentation of the *Howard Kay Gloyd-Edward Harrison Taylor Scholarship* for 2003 by **Travis Taggart** (KHS Awards Committee).
- Presentation of the *Alan H. Kamb Grant for Research on Kansas Snakes* for 2003 by **William Busby** (KHS Awards Committee).

**5:00 pm ADJOURN:** Dinner at the restaurant of your choice. *Please allow time to travel to the Ross Natural History Reservation. The drive takes approximately 20 minutes. See attached map for directions.*

**6:30 pm KHS AUCTION AND SOCIAL** at Ross Natural History Reservation. At approximately 6:45 pm, the presentation of *The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology* for 2003 by **Dan Fogell**, former recipient of the award, will take place. The recipient of The Collins Award receives a commemorative certificate and a check for \$1000.00.

At approximately 7:00 pm, the KHS Auction will be conducted at the Ross Natural History Reservation by **Joseph T. Collins**, ably assisted by KHS Secretary **Mary Kate Baldwin** and KHS Treasurer **Eric Kessler**, and featuring many excellent books and other items (of questionable value). The KHS takes cash, credit cards, and checks. Be sure and get a bidding number before the auction commences. Bid vigorously, and support the KHS.

## **Sunday, 9 November 2003**

**8:30 am REGISTRATION** for participants that did not register on Saturday: **Mary Kate Baldwin** (KHS Secretary) and **Eric Kessler** (KHS Treasurer) in the Schmidt Museum (across from Room 72) in the ESU Science Building, Emporia State University, Emporia, Kansas. Free coffee and donuts will be available in the Schmidt Museum, compliments of **Rod Sobieski**, Acting Dean of Arts & Sciences at Emporia State University and **Marshall Sundberg** Chairperson of the Department of Biological Sciences at Emporia State University.

**9:00 am - 11:00 am LIVE EXHIBIT** in Room 47 of the ESU Science Building.

### **Scientific Paper Session 5**

Room 72 of the ESU Science Building, Emporia State University  
Moderator: **Dwight R. Platt**, Bethel College, North Newton, Kansas.

**9:00 am ECOLOGY, BEHAVIOR AND CONSERVATION IN JAPANESE MAMUSHI, *Gloydius blomhoffii*: DEFENSIVE PATTERN AND VARIATION IN COMPROMISED AND NON-COMPROMISED POPULATIONS**  
**Kiyoshi Sasaki**  
Oklahoma State University, Stillwater, Oklahoma

The mamushi, *Gloydius blomhoffii*, is a little known member of the so-called 'Old World' pit vipers, occurring only in the Japanese archipelago. There is little doubt that the necessary and thus routine use of live mamushi in the production of important pharmaceuticals in Japan has been a major force driving their declines. However, it is not the only one. Ever-increasing habitat loss due to human uses such as residential and agricultural development is another. Accordingly, I have gathered baseline data for my conservation effort of this species. Along with cultural background of this creature, I report sexual size dimorphism, reproduction, habitat association, and defensive behavior in free-ranging mamushi studied in northernmost island of Japan, Hokkaido. Pattern and variation in defensive behavior in compromised versus non-compromised populations are also discussed.

**9:20 am THE MISSOURI HERPETOLOGICAL ATLAS**  
**Brian Edmond and Richard Daniel**  
Missouri Herpetological Association

Detailed locality maps for Missouri's amphibians and reptiles have not been summarized for more than a generation, and for amphibians have never been published in a standard format. As part of an effort to remedy this situation, we introduce the Missouri Herpetological Atlas Project (MOHAP). The goals of the project are to 1) summarize all collections in a common database format, 2) use the database to produce an atlas of locality and county maps for each species, 3) identify and collect in areas around the state that need further field work, and 4) provide technical assistance to researchers embarking on similar projects. Microsoft Access serves as a database engine and ESRI ArcView is used to create a current atlas on-demand, which is then published in Adobe's PDF format. Sample maps are used to demonstrate the flexibility and possible research applications using this combination of tools. The authors should be contacted directly with data in new specimens or to request existing data or custom maps. The atlas is updated on an annual basis using data from current fieldwork and additional collections data. A current version can be downloaded at <http://www.moherp.org/pubs/atlas.pdf>.



**9:40 am HERPETOFAUNAL POPULATION RESPONSE TO GLADE RESTORATION IN DADE COUNTY, MISSOURI**

**Neil Bass**

Whiteman AFB, Missouri

Due to fire suppression, glade habitats in southwest Missouri have been overtaken by eastern red cedars. Cedar invasion of glades has been blamed for the decline of certain herptile species that inhabit glades. I have conducted herpetological surveys on two glades in Dade County Missouri since 2000. One glade has received no management and has approximately 90 % coverage by eastern red cedar. While the other had approximately 41 ha cleared and burned in 1999. A comparison of the herptile populations on these two limestone glades and the effects of glade restoration were conducted.

**10:00 am AGONISTIC BEHAVIOR OF THE GREAT PLAINS SKINK \*\***

**Eva A. Horne and Natalie Pheasant**

Kansas State University

Courtship and agonistic behaviors of only a few skink species from the genus *Eumeces* have been studied and described. In 2000, we randomly paired 20 adult Great Plains skinks (*Eumeces obsoletus*) in 30-minute trials to gain a basic description of behavioral interactions. Animals spent the majority (74-95%) of their time either motionless in a resting posture or in exploratory/escape behaviors. However, a number of interactions were observed, including move-toward (MT), run-away (RA), back-arch (BA), chase, bite, and touch. Also observed was a behavior we call nose-down-back-arch (NDBA), in which the animal performs an exaggerated BA with the tip of its nose in contact with the substrate. Skinks were most often stationary (41%) or in BA (26%) before attaining this posture. NDBA was performed 63% of the time in response to the approach of the other lizard and 19% of the time in response to a BA in the other lizard. Skinks most often ran away or returned to a resting posture after an NDBA. In contrast, skinks were most often moving toward (61%) the other animal before initiating a BA, BA was performed only 24% of the time in response to an approach by the other individual and RA occurred after only 8% of BAs. A total of 15 bites were observed, 40% directed toward individuals fleeing (RA) and 20% toward individuals in the NDBA posture. Bites were never directed toward skinks approaching (MT) or in the BA posture. The number of bites and BAs were also correlated ( $p = 0.04$ ). From these results, we conclude that NDBA may be a defensive display while BA is more likely aggressive. Other novel, but less common, behaviors are also discussed.

**10:20 am BREAK**

**Scientific Paper Session 6**

Room 72 of the ESU Science Building, Emporia State University

Moderator: **David Saunders**, Emporia State University, Emporia

**10:35 am RESISTANCE TO LYSING OF ERYTHROCYTES IN BULLFROGS (*Rana catesbeiana*) ADAPTED TO MULTIPLE TEMPERATURES \*\***

**John T. Ewing and David K. Saunders**

Emporia State University

Osmotic fragility is the ability of a cell to resist lysing. Research has shown that there is a significant relationship in erythrocyte osmotic fragility of room temperature bullfrogs (*Rana catesbeiana*) when tested at 25°C and 5°C with erythrocytes being more resistant to lysing at 25°C. There has been little research done on cold adapted frogs to determine the osmotic fragility of their erythrocytes. The purpose of our investigation was to determine what differences, if any, occur between erythrocyte osmotic fragility in room temperature frogs, cold adapted frogs, and cold adapted frogs that were allowed to rewarm to room temperature over a period of six hours. Cells were exposed to different gradients of NaCl solutions to determine the concentration at which 50% of the erythrocytes lysed, at temperatures of 25°C and 5°C. Three groups of frogs were tested, with group A being held at room temperature, group B being cold adapted at 5°C for two months, and group C being cold adapted at 5°C for two months and then rewarmed to room temperature over six hours. Our results showed that there were significant differences between the rewarmed group when tested at both 25°C and 5°C when compared to the room temperature group tested at 25°C ( $p = 0.011$ ) with rewarmed frogs having higher erythrocyte osmotic fragility, thus being less resistant to lysing. There were no significant differences within any group when tested at 25°C and 5°C. Plasma osmolarity values were determined using plasma samples from each frog in the three groups. There were no significant differences in plasma osmolarity between any of the groups ( $p = 0.57$ ). The difference in osmotic fragility cannot be explained by differences in plasma osmolarity between the groups. Thus we believe that erythrocyte membrane structural components could be involved.

**10:55 am THE REPRODUCTIVE ECOLOGY, HABITAT REQUIREMENTS, AND DISTRIBUTION OF THE NORTHERN SPRING PEEPER (*PSEUDACRIS CRUCIFER CRUCIFER*) IN BOURBON COUNTY, KANSAS \*\***

**Joshua Lynn Jagels**

Pittsburg State University

The northern spring peeper (*Pseudacris crucifer crucifer*) was first discovered in Bourbon County in 1996 and little was known about its reproductive status and ecology in that county. Two sites were evaluated in Bourbon County to determine the reproductive ecology and habitat requirements of the spring peeper. Sampling took place during the spring of 2002 and 2003. The number of calling males, females, amplexed pairs, egg clutches laid, and behavioral observations were observed, as well as tadpoles and metamorphosed spring peepers. Environmental parameters, an aquatic predator evaluation, water quality analysis, and vegetative analysis of both the pond edge vegetation and the wooded area were also performed. Males began calling in late February and activity of the males increased as temperatures increased. Twelve females and twelve amplexed pairs were found during the study. The presence of tadpoles and 180 newly metamorphosed spring peepers were found at site two; none were found at site one. One of the two sites was designated as an optimal breeding site for the spring peeper. The presence of dense pond edge vegetation and close proximity of a wooded area appeared to greatly affect spring peeper abundance and breeding success. In addition the distribution of the spring peeper in Bourbon County was evaluated and five new breeding sites were discovered.

**11:15 am HERPETOLOGICAL OBSERVATIONS OF 2003 \*\***

**Chad Whitney**

Johnson County Community College, Olathe, Kansas 66061

A summary of observations made during the year of 2003 will be presented, including slides of reptiles and amphibians counted in Kansas, Nebraska, Oklahoma, and Missouri.

**11:35 am THE ENVIRONMENTAL ENRICHMENT OF REPTILES AND AMPHIBIANS IN CAPTIVITY**

**Jason T. Moore**

Topeka Zoological Park, Topeka, Kansas

Species are adapted to a specific environment. The captive environment is an incomplete substitute. The critical role environmental enrichment plays in high quality husbandry and exhibitry of amphibians and reptiles – and, indeed, all animals – cannot be underestimated. Environmental enrichment is a fairly new formalized practice, used widely only in the last few decades. Herpetoculturists have long tried to simulate natural environments to decrease mortality and increase reproductive success, and have therefore long offered at least haphazard enrichment. For maximum benefit, however, enrichment should be tailored to the needs of the individual animal. Considerations for a successful program include individual and natural histories of the specimen, health risks to the specimen, practical constraints and resource limitations, containment, and keeper and public safety. General examples and several anecdotal cases of successful (though not always intentional) enrichment provide illustration of enrichment and its benefits.

**Note:** Papers marked with an \*\* are eligible for the 2004 The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology.

**Have a safe trip home.** See you in November 2004 in Manhattan, Kansas, for the 31st Annual KHS Meeting!!

**30th Annual Meeting Committee**

Greg Sievert, Chairperson

Jill Jones, Executive Secretary

David Edds

Lynnette Sievert

Suzanne L. & Joseph T. Collins

### **Notes:**

The *Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology* will be given at this KHS 30th Annual Meeting in Emporia, Kansas, to the KHS member judged to have taken the best photograph of a native species of the Kansas herpetofauna. The KHS Awards Committee will select the recipient. During odd-numbered years (photography competition), only KHS members are eligible. During even-numbered years (scientific presentations or publications), candidates are strongly encouraged to join the KHS, because preference will be given to KHS members.

Nominations for the *Howard Kay Gloyd-Edward Harrison Taylor Scholarship* for 2004 will be accepted after 1 January 2004. Submit your nominees to the KHS Awards Committee Chairperson (see the inside front cover of the latest Journal of Kansas Herpetology)

Applications for the *Alan H. Kamb Grant for Research on Kansas Snakes* for 2004 will be accepted after 1 January 2004. Submit your application to the KHS Awards Committee Chairperson (see the inside front cover of the latest Journal of Kansas Herpetology).

