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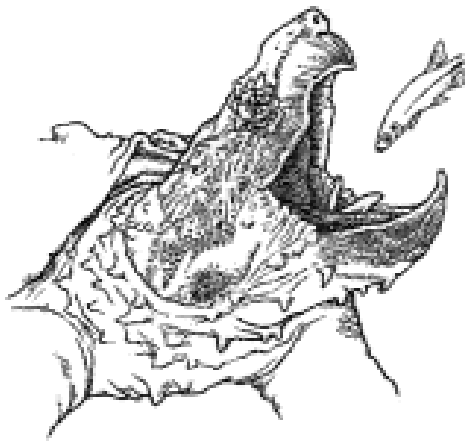

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Front Cover: An Alligator Snapping Turtle *(Macrochelys temminckii)*. Illustration by Marty Capron, Oxford.

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KHS BUSINESS

Results of the KHS Spring Field Trip to Chautauqua County

One hundred and twenty-four Kansas herp-enthusiasts converged on Sedan City Lake (New) on 8-10 April 2011 for the annual KHS spring field trip. The unseasonably warm (yet dry) weather exhibited during the field trip yielded 44 species and 944 individual amphibians, reptiles and turtles.

Field trip participants traveled from Kansas, Oklahoma, Missouri, Iowa, and Nebraska. Universities represented from Kansas included Fort Hays State University, Friends University, Pittsburg State University, University of Kansas, and Emporia State University; and Missouri: Missouri State University and Lincoln University.

Participants began arriving around the campsite late Friday afternoon and spent the evening looking for herps locally as well as road cruising around Chautauqua County.

Saturday morning the group caravaned across US KS 99 to the Butcher Falls area of the Red Buffalo Ranch. The group fanned out along creek beds and rocky hillsides to look for frogs and snakes. By noon, 450 individual herps had been recorded representing 27 species (Table 1). The group was able to document fifteen of the secretive Rough Earth Snakes.

Early Saturday afternoon the group met at the public access area of the Caney River just west of Elgin. Several turtle traps (hoop nets) had been set up the previous day and the group was given the opportunity to check the traps, seine the river, and spend the rest of the afternoon cooling off from the 90° F temperatures.

A Common Musk Turtle was collected in a turtle trap and represented the first record from the county. Other turtles caught in the trap included the Ouachita Map Turtle, Slider, Spiny Softshell, and Common Snapping Turtle.

Saturday night was spent road-cruising around the campsite and within Chautauqua County. Several thunderstorms in the area just missed the campsite, but got the herps moving.

Sunday morning those participants that stuck around were kindly provided access to the Sproul Ranch. Twenty-five species and 224 individuals herps were recorded.

Overall, conditions were a little dry and that hindered the discovery of many of the smaller herp species in greater numbers.

Many specimens were graciously donated to museum collections. Those specimens not only help to unequivocally document what exists where and when; but the tissues taken from the specimens allow researchers from all over the country to better define and delineate the herpetofaunal diversity of Kansas.

Travis W. Taggart and Dan Murrow,
Field Trip Co-Chairpersons

Table 1. Results of the KHS Spring 2011 Field Trip in Chautauqua County by species and time period/location. Fri (Other) = road cruising; Sat (AM) = Red Buffalo Ranch; Sat (PM) = Caney River/Elgin; Sat (Other) = road cruising; Sun (AM) = Sproul Ranch.

Species	*Fri (Other)*	*Sat (AM)*	*Sat (PM)*	*Sat (Other)*	*Sun (AM)*	*Total*
American Toad	25	2	1	10	34	72
Bullfrog	0	3	5	1	18	27
Blanchard's Cricket Frog	8	190	82	5	62	347
Gray Treefrog	1	2	0	0	0	3
Great Plains Narrowmouth Toad	0	0	0	4	1	5
Plains Leopard Frog	0	0	0	28	1	29
Southern Leopard Frog	8	5	3	0	1	17
Five-lined Skink	0	14	1	0	10	25
Coal Skink	0	0	0	2	0	2
Eastern Collared Lizard	6	28	0	4	23	61
Great Plains Skink	0	1	0	2	18	21
Ground Skink	1	7	2	2	3	15
Northern Prairie Skink	0	0	0	0	2	2
Prairie Lizard	0	0	0	1	2	3
Western Slender Glass Lizard	1	1	0	0	0	2
Texas Horned Lizard	0	0	0	0	2	2
Brown Snake	0	1	1	0	0	2
Coachwhip	0	5	0	1	1	7
Common Garter Snake	0	9	0	2	0	11
Copperhead	0	6	0	1	0	7
Diamondback Water Snake	0	0	1	4	1	6
Flathead Snake	0	6	0	3	1	10
Lined Snake	0	1	0	1	10	12
Massasauga	1	0	0	2	1	4
Milk Snake	0	0	0	0	5	5
Northern Water Snake	0	5	6	0	0	11
Plainbelly Water Snake	0	2	1	0	1	4
Prairie Kingsnake	2	0	1	0	3	6
Racer	0	0	0	3	6	9
Ribbon Snake	0	4	1	0	0	5
Ringneck Snake	7	112	6	14	0	139
Rough Earth Snake	2	15	2	1	0	20
Rough Green Snake	1	4	2	0	0	7
Speckled Kingsnake	1	0	1	0	12	14
Timber Rattlesnake	1	12	0	20	0	33
Western Rat Snake	0	8	0	3	1	12
Common Musk Turtle	0	0	1	0	0	1
Common Snapping Turtle	0	0	1	0	0	1
Eastern River Cooter	0	2	0	0	0	2
Eastern Box Turtle	0	3	0	0	0	3
Ornate Box Turtle	0	0	0	2	1	3
Ouachita Map Turtle	0	0	3	0	0	3
Slider	0	2	21	2	6	31
Spiny Softshell	0	0	4	2	0	6
Totals						
Species	13	25	18	22	24	41
Individuals	53	473	163	132	216	1037

Image by Larry Miller.

Grayson Coulter shows off a Plainbelly Water Snake and Five-lined Skink he found around Butcher Falls.

Image by Larry Miller.

Participants seine the Caney River in hopes of turning up turtles, snakes, and frogs. Several hoop net turtle traps were set up nearby.

Image by Larry Miller.

Back at the campsite, the group gathers around Suzanne Collins as she photographs a large Timber Rattlesnake found earlier in the day.

Image by Larry Miller.

Brayden Aylesworth explains the role of the male Sliders long claws on a specimen collected along the Caney River.

Image by Larry Miller.

Katelin Brunson-Hutto points out the identifying marks of the Eastern Collared Lizard to her son, Paxon.

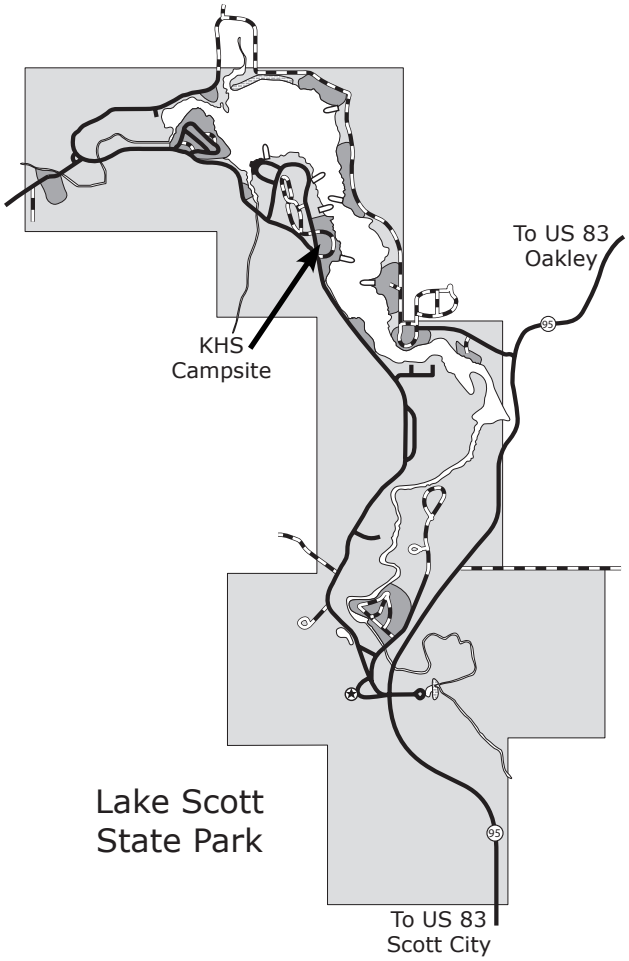
Image by Larry Miller.

A budding herpetologist doesn't shy from getting wet while trying to scoop up Blanchard's Cricket Frogs along the Caney River.

KHS to Conduct Summer Field Trip to Western Kansas

For the first time in many years, the Kansas Herpetological Society will sponsor a summer field trip.

From 29 through 31 July KHS members and other interested persons are invited to meet and explore the Scott Lake State Park and environs.



Lake Scott State Park is located west of Highway 83 between Oakley and Scott City on K-95.

Hidden within a western Kansas prairie, the park is a startling oasis of natural springs, deep wooded canyons, and craggy bluffs. A 100- acre lake, created by a dam constructed in 1930, is nestled among the picturesque hills. Groves of hackberry, ash, elm, willow, walnut, and cedar trees complement its banks, and several majestic cottonwoods as old as the lake also accent the area.

Rich in history and scenic splendor, Lake Scott State Park and Wildlife Area provides a perfect recreational setting for the 2010 KHS Summer Field Trip.

We will camp at the Circle Drive Campground where showers, toilets, and utilities are available. Fuel, restaurants, and other lodging are availble in Scott City (12 miles south) and Oakley (30 miles north).

The field trip will offer a special opportunity to help clarify the distribution of several species:

Image by Travis W. Taggart

The Longnose Snake is known from a single record in west-central Kansas.

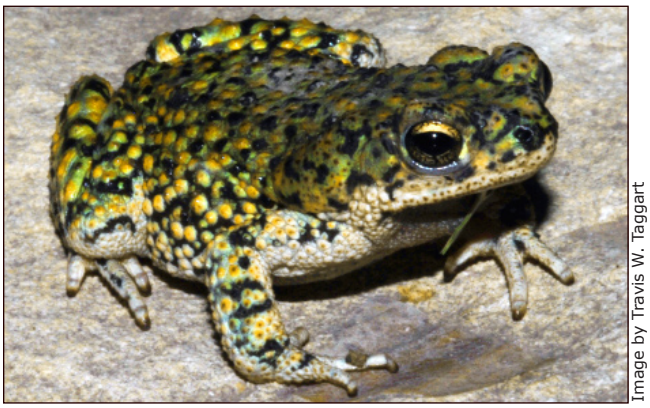


Image by Travis W. Taggart

The Green Toad is presently known only from the system of canyons north and west of Lake Scott State Park. But as yet, has not been recorded from the vicinity of the Lake.

Other noteworthy species may reveal themselves:

Eastern Glossy Snake, Eastern and Western Hognose Snakes, Speckled Kingsnake, Milk Snake, Coachwhip, Barred Tiger Salamander, Plains Spadefoot, Lesser Earless Lizard, Yellow Mud Turtle, Plains Blackhead Snake and Prairie Rattlesnake.

Travis W. Taggart and Dan Murrow,
Field Trip Co-Chairpersons

KHS 2011 CONTRIBUTIONS

Donation
In appreciation of Kathy Ellis
and Dan Murrow

BOB CLARK
11207 West 140th Terrace
Overland Park, Kansas 66221

Fitch-Platt Award
In memory of James E. Gubanyi

MARY KATE BALDWIN
and ERICA PETERSON
5438 SW 12th Terrace #4
Topeka, Kansas 66604

Fitch-Platt Award
In memory of Henry S. Fitch

MARY KATE BALDWIN
and ERICA PETERSON
5438 SW 12th Terrace #4
Topeka, Kansas 66604

Fitch-Platt Award
In memory of James E. Gubanyi

M. NEIL BASS
208 Lakota Lane
Lees Summitt, Missouri 64086

Gloyd-Taylor Scholarship

BRADFORD F NORMAN
380 Cooper Avenue
Crescent City, California 95531

Image by Larry Miller.

The KHS wishes to express its sincere thanks to Ed Miller. Ed was instrumental in gaining permission to the privates lands we explored during the Spring Field Trip.

PAY YOUR 2011 KHS DUES

If you have not already done so, send your calendar 2011 dues ($15.00 regular, $20.00 contributing) to:

Eva A. Horne
KHS Secretary
Division of Biology, Kansas State University
Manhattan, Kansas 66506

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

KHS 2011 FALL FIELD TRIP

The KHS 2011 Fall Field Trip will be to Jewell County on 16-18 September. For tentative information as it develops, be sure to check the KHS web site regularly at:

www.cnah.org/khs/FieldTripFallInfo.html

For immediate information, contact:

Travis W. Taggart or Dan Murrow
KHS Field Trip Co-Chairpersons
(see inside front cover of this issue)

KHS ANNUAL MEETING
CALL FOR PAPERS

The KHS 39th Annual Meeting will be held at the Great Plains Nature Center, Wichita, Kansas, on 4-6 November 2011. Participants wishing to present a talk should contact Derek Schmidt (dschmidt@ksbroadband.net) and Joseph T. Collins (jcollins@ku.edu) no later than 1 October 2011. Details about the meeting are on the KHS web site.

KHS SCHOLARSHIP
AND GRANT DEADLINE

Members are reminded that the deadline is 15 September 2010 for submission of applications for the Howard D. Gloyd-Edward H. Taylor Scholarship and the Alan H. Kamb Grant for Research on Kansas Snakes. Self-nominations for the Gloyd-Taylor Scholarship are encouraged. Submission for both the scholarship and grant should be sent to Dan Fogell, Chairperson of the KHS Awards Committee (see inside front cover). Both the scholarship and grant awards are $300.00 each year.

GEOGRAPHIC DISTRIBUTION

LAMPROPELTIS TRIANGULUM (Milk Snake). KANSAS: Lane Co: 38.300365°N, 100.2630 81°W. 2 May 2011. Matt Nordgren and Chad Whitney. MHP 15711. New county record (Taggart, Collins, and Schmidt. 2011. Kansas Herpetofaunal Atlas; webcat.fhsu.edu/ksfauna/herps).

MATT NORDGREN and CHAD WHITNEY, Fort Hays State University, Hays, Kansas 67601.

HETERODON PLATIRHINOS (Eastern Hognose Snake). KANSAS: Rice Co: 38.23182°N, 98. 19433°W. 3 June 2011. Daniel G. Murrow. MHP 15707. New county record (Taggart, Collins, and Schmidt. 2011. Kansas Herpetofaunal Atlas; webcat.fhsu.edu/ksfauna/herps).

DANIEL G. MURROW, 1606 North Plum Street, Hutchinson, Kansas 67501.

SISTRURUS CATENATUS (Massasauga). OKLAHOMA: Rogers Co: 36.58301°N, 95.77613°W. 10 April 2011. Matt Nordgren and Curtis J. Schmidt. MHP 15714. New county record (Sievert, G, and L. Sievert. 2011. A Field Guide to Oklahoma's Amphibians and Reptiles, Third Edition. Oklahoma Department. of Wildlife Conservation. 211 pp.).

MATT NORDGREN and CURTIS J. SCHMIDT, Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

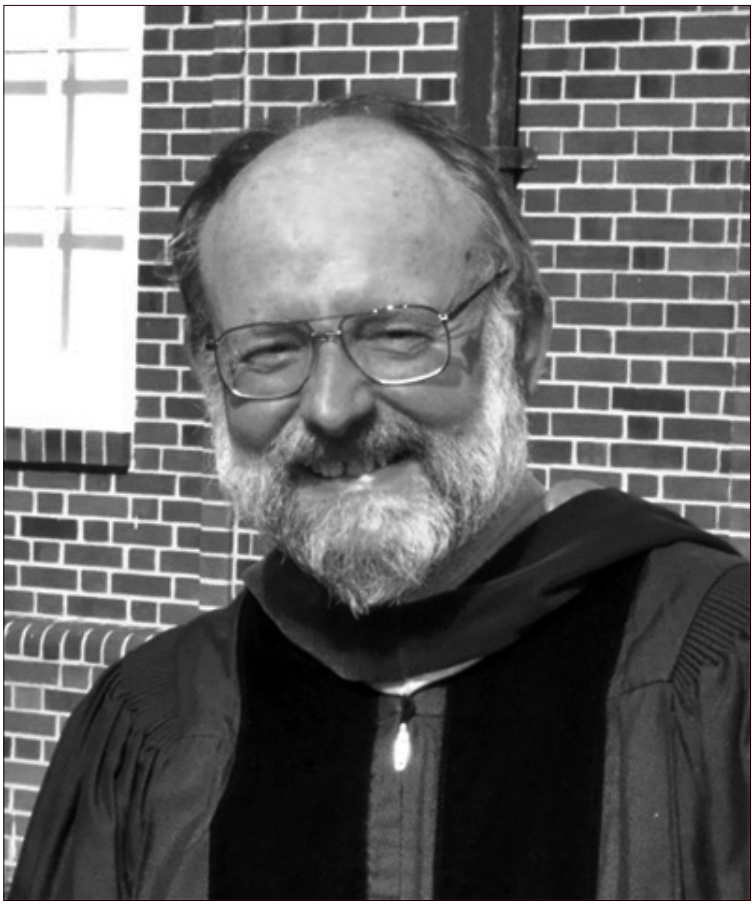
SUBMIT YOUR FIELD REPORTS

JKH is interested in publishing field reports on your travels within and outside of Kansas. Of course, we are always interested in your geographic and natural history notes, original articles, and artwork. Contact the Editor (see inside of front cover).

IN MEMORIAM

DARYL R. KARNS (1949-2011)

Former KHS member Dr. Daryl Karns, well-known herpetologist and a professor of biology at Hanover College, Hanover, Indiana, died at the age of 61 of a sudden heart attack on the morning of 7 June 2011 near his home in Madison, Indiana. Daryl was an active and vibrant teacher. Since his arrival at Hanover in 1984, Daryl was a dedicated faculty member who brought his passion for research into the classroom. He will be remembered not only as an outstanding teacher and colleague, but also for his wide-ranging research and contributions on herpetofauna. His record of service to the Hanover College campus community was significant; he will be greatly missed.



Daryl R. Karns, Photograph courtesy of Hanover College.

Daryl R. Karns 1949-2011

Daryl received his Bachelor's Degree from the University of Wisconsin, his Master's Degree from the University of Kansas, and his Doctorate from the University of Minnesota; his teaching areas at Hanover covered evolution, ecology, and zoology. Daryl earned The Hanover College Faculty Award for Excellence in Scholarship and Creative Activity, a new award first given this year to a member of the faculty in recognition of sustained scholarly or creative achievement.

While at the University of Kansas, Daryl co-authored (with the late Ray E. Ashton, Jr. and Tom Swearingen) a children's key to the herpetofauna of Kansas entitled *Illustrated Guide to Amphibians and Reptiles in Kansas* (1974. University of Kansas Museum of Natural History Public Education Series Number 2: viii + 18 pp.).

Memorial contributions can be sent to the Hanover College Foundation for Student Travel or Research Development. Contributions can be sent to:

Department of Biology
Hanover College
Hanover, Indiana 47243

Members and officers of the Kansas Herpetological Society extend their sympathies to the family and friends of Daryl Karns. He gave many of us pleasant memories during his short time in Kansas.

Joseph T. Collins
Kansas Biological Survey
Higuchi Hall
University of Kansas
2101 Constant Avenue
Lawrence, Kansas 66047

NOTES

Longevity and Growth in the Shorthead Garter Snake, *Thamnophis brachystoma*

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brachystoma@hotmail.com

On 4 June 2004, an adult female *Thamnophis brachystoma* was collected from a debris pile at a site near Wattsburg, Erie County, Pennsylvania. On 7 August 2004, this female produced a litter comprised of two live young (both males), three stillborn, and two infertile eggs. One of the live neonates, along with the adult female, was released at the Wattsburg capture site; the other neonate was retained. The retained specimen was maintained in a plastic shoebox style container, with shredded paper as a substrate, and water provided daily. It was initially fed pieces of night crawlers, *Lumbricus terrestris,* several times a week until it was large enough to take whole worms (mainly *Aporrectodea* spp.). The specimen was also offered and consumed guppies *(Poecilia reticulate),* pieces of yellow perch fillet *(Perca flavescens),* and Northern Redback Salamanders, *Plethodon cinereus* (Gray 2008). This snake was maintained as per conditions of a live reptile or amphibian possession permit (#13-07) issued by the Pennsylvania Fish and Boat Commission. About a week after birth, the specimen was 94.6 mm Snout-Vent Length (SVL) and 123.6 mm Total Length (TL). On 22 October 2004, the snake shed its skin for the second time (BG 253). By 5 February 2007, approximately 2.5 yrs later, the snake had increased to 237 mm SVL and 305 mm TL, an approximate growth rate of 75.6 mm per year. During that year, due to retained stratum corneum on the tail, a small portion of the tail tip was lost.

In early March 2010 the specimen developed a swelling near midbody, at approximately 140-160 mm from the tip of the snout. By the first week of April, a second swelling began to develop 35-45 mm anterior to the vent (figure 1). Despite the swellings, the specimen fed and defecated normally. On 24 April 2010, the specimen was found dead in its enclosure. At the time of its death, the snake had attained 285 mm SVL, and 356 mm TL. Approximate rate of growth during this second period was approximately 16.1 mm per year. The difference in the rates of growth between the first and second periods, from 72.56 to 16.1 mm per year, is expected. Barton

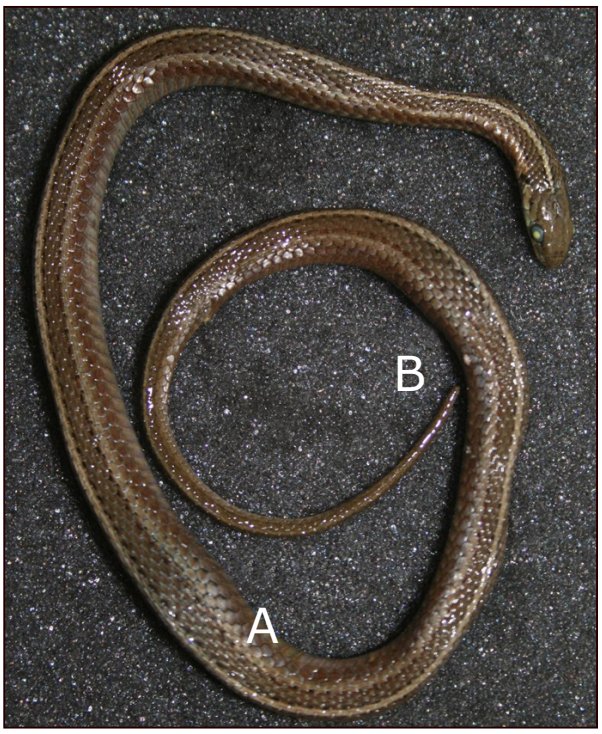

Figure 1. Postmortem photograph of Shorthead Garter Snake, *Thamnophis brachystoma* that lived in captivity for over 5 years and 8 months. A indicates the location of midbody swelling; B indicates the location of posterior swelling.

(1956) concluded that *T. brachystoma* approximately doubles its natal length during the first year, reaches maturity at the end of the second year, and then increases in length slowly after that.

No necropsy was performed, so the cause of death was not determined. Cryptosporidiosis can cause midbody swellings (Bernard and Upton 1994). However, specimens with this condition usually regurgitate frequently, are anorexic, experience extreme weight loss, and have mucus-laden stools (Klingenberg 1993). As noted above, my specimen did not display any of these symptoms. Intestinal impaction caused from accidentally ingesting substrate material is unlikely, as this specimen was fed — at least for the past couple years — in a perforated zipper-type plastic bag (see Gray 2007).

Ernst and Ernst (2003) note that *T. brachystoma* had survived more than three years in the laboratory. The specimen described above lived more than 5 yrs and 8 months in captivity, and currently is the oldest known-aged specimen. However, Lethaby (2004) reported a record size *T. brachystoma* from Erie, Pennsylvania, that may have been even older. In *T. brachystoma*, both sexes reach sexual maturity in the second spring after birth — 220 mm SVL for males, and 250 mm SVL for females (Pisani and Bothner 1970). Lethaby's specimen, a female, was 458 mm SVL and 578 mm TL. Extensive age specific growth data are lacking for *T. brachystoma*. In lieu of such data, I used the percentage of increase in SVL from data acquired from *T. sirtalis*. Seibert and Hagen (1947) calculated that female *T. sirtalis* increased only 8 – 15% in their third year. Percentage of growth should steadily decrease with increasing age. Assuming that Lethaby's *T. brachystoma* was ca. 250 mm SVL during its second year, and that it increased in SVL by 15% each of the following years, it would have reached its record size in its seventh year. Lethaby maintained the snake in captivity for approximately a year before it died, and was subsequently deposited in the Carnegie Museum of Natural History (CM 153101). Using the above reasoning, I estimate that the snake reported by Lethaby was at least 8 years old at the time of its death. While the method I have used to estimate the age of Lethaby's snake probably underestimates its true age, it is reasonable to assume that his specimen was older than mine.

ACKNOWLEDGMENTS

Special thanks are offered to Steve Rogers of the Carnegie Museum of Natural History, Pittsburgh, Pennsylvania for providing information regarding CM 153101. I also thank Mark Lethaby, Raymond Novotny and George Pisani for reviewing the manuscript.

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Clutch Characteristics of the Spring Peeper, *Pseudacris crucifer* (Wied-Neuwied, 1838), in Natchitoches, Louisiana

Walter E. Meshaka, Jr.[1] and Samuel D. Marshall[2]

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[2]*Department of Biological Sciences, Northwestern State University of Louisiana* Natchitoches, Louisiana 71497

The Spring Peeper, *Pseudacris crucifer* (Wied-Neuwied, 1838), is a geographically widespread inhabitant of eastern North America, including Louisiana (Dundee and Rossman, 1989; Conant and Collins, 1991; Butterfield et al., 2005).

In Louisiana, calling by this species has been heard from 12 November to 12 May in St. Tammany Parish and eggs were noted during 26 January–16 April (Dundee and Rossman, 1989). In Louisiana, between 250 and 1,000 eggs are laid individually (Dundee and Rossman, 1989). Here, we provide clutch characteristics of nine Spring Peepers from Natchitoches Parish, Louisiana. Specimens were derived from the vertebrate collection of Northwestern State University, Natchitoches, Louisiana, from seven females collected 9 and 22 January 1972 and two females collected on 2 and 12 February 1969. Female body size was measured in mm snout-vent length (SVL). Clutch size was estimated by weighing a subset of mature ova. Means are followed by ± 2 standard deviations. Statistical significance was recognized at $P < 0.05$.

Estimated clutch size for nine females (mean = 32.8 ± 1.80 mm SVL; range = 30.2–35.0) averaged 551.94 eggs (± 380.28; range = 195–1380) and did not co-vary significantly ($P > 0.05$) with female body size. The range of our clutch sizes was larger than that reported for the State (Dundee and Rossman, 1989). Nearby, in Arkansas, clutch sizes of 22 females (< 35 mm SVL) averaged 846.64 eggs (range = 505–1201), and the relationship between clutch size and female body size was not significant (Trauth et al., 1990).

The breeding season of the Spring Peeper begins earlier and ends later in southern populations than in the North (Butterfield et al., 2005), and this holds true for Louisiana (Dundee and Rossman, 1989). Despite its ubiquity and the ease in finding individuals during breeding, much about the reproductive ecology of the Spring Peeper remains unknown in Louisiana, the location of which could shed light on its reproductive response at the southern edge of an otherwise very large geographic range.

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Official Publication of the *Kansas Herpetological Society*

Aspects of a Breeding Aggregation of Hurter's Spadefoot (*Scaphiopus hurteri* Strecker, 1910) in Natchitoches, Louisiana

Walter E. Meshaka, Jr.,[1] Samuel D. Marshall, Millard O. Mangrum,[2] and Thomas E. Hardaway[3]

[1]Section of Zoology and Botany, State Museum of Pennsylvania, 300 North Street, Harrisburg, Pennsylvania 17120 wmeshaka@state.pa.us [author for correspondence]
[2]Department of Biology, Northwestern State University, Natchitoches, Louisiana 71497
[3]1471 Savannah Praire, Seguin, Texas, 78155

Hurter's Spadefoot (*Scaphiopus hurteri* Strecker, 1910) is an inhabitant of eastern sections of Oklahoma and Texas through much of Arkansas and northern and central Louisiana (Dundee and Rossman, 1989; Conant and Collins, 1991; Palis, 2005). In Louisiana, the breeding season extends from 10 February to at least 24 April, and probably longer (Dundee and Rossman, 1989). Although clutch sizes for Louisiana are not provided, at least 200 eggs are laid in strings (Dundee and Rossman, 1989). Here, we provide adult body sizes and estimates of clutch size on a sample of Hurter's Spadefoot from a single site on the evening of a breeding aggregation in northwest Louisiana. Specimens were derived from the vertebrate collection of Northwestern State University, Natchitoches, Louisiana, from individuals collected from a large breeding aggregation on the evening of 5 April 1968 from St. Mary's Catholic School, Natchitoches, Natchitoches Parish, Louisiana. Body size was measured in mm snout-vent length (SVL). Clutch size was estimated by weighing a subset of mature ova. Means are followed by ± 2 standard deviations. An *F*-test was used to compare variances between samples. A two-tailed *T*-test was used to compare mean values between samples. Statistical significance was recognized at $P < 0.05$.

Body sizes of 10 males (mean = 62.5 ± 3.61 mm SVL; range = 58.3–69.4) did not differ significantly ($P > 0.05$) from that of 13 females (mean = 60.9 ± 4.07 mm SVL; range = 52.4–65.8) with respect to variance or mean. Five females were spent. The mean estimated clutch size of eight females (mean = 61.6 ± 3.27 mm SVL; range = 54.8–65.6) was 5737.5 eggs (± 2179.7; range = 2300–9100)

Adult body sizes and degree of sexual dimorphism in adult body size of individuals from Natchitoches were greater than those of males (mean = 58.7; range = 56.0–61.7; *n*= 7) and females (mean = 57.3; range = 50.9–61.2; *n* = 2) from northwest Arkansas (Trauth and Holt, 1993). However, owing to sample size differences, these conclusions are tentative. Female body sizes and their clutch sizes found in Natchitoches were larger than those of northwest Arkansas where clutch sizes of eight females (53.4–62.1 mm SVL) averaged 2494.75 eggs (range = 1961–4847) (Trauth et al., 1990). Our findings conformed to the reported breeding season of this species in Louisiana but were indicative of larger adult and clutch size at our site than in Arkansas.

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ARTICLES

Seasonal Activity and Natural History Observations of Five Snake Species from the Central Lowland Province of Erie County, Pennsylvania

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ABSTRACT: Field notes taken during 1995–2009 were examined to provide a summary of the seasonal activity patterns of five snake species (*Lampropeltis triangulum, Storeria dekayi, S. occipitomaculata, Thamnophis brachystoma*, and *T. sirtalis*) from Erie County, Pennsylvania. *Storeria occipitomaculata* was observed most frequently in September, whereas the other four species were most frequently seen in June. Both *Lampropeltis triangulum, Storeria occipitomaculata,* and *T. sirtalis* had unimodal activity patterns, while *S. dekayi* exhibited bimodal patterns. There were too few data to determine activity pattern for *T. brachystoma*. Of the five species, *S. dekayi* was observed the earliest, on 6 January 1998, whereas *T. sirtalis* was observed the latest, on 1 December 1996. Snakes were found under cover 72.5-97.1% of the time. Data, such as presented herein, provide much needed site-specific information necessary to formulate comprehensive management plans for Pennsylvania ecological systems and their biotic components.

INTRODUCTION

Dodd (1993) noted that the greatest constraint in conservation planning for either individual species or entire snake assemblages is the fundamental lack of basic biological information. In Pennsylvania, the lack of information pertaining to the current status of most species, as well as lack of basic life history data, are recognized as challenges to conserving the Commonwealth's amphibians and reptiles (Hulse et al. 2001; Maret 2010). Furthermore, Meshaka (2010a) pointed out that basic life history information is lacking even for some of the common and easily observable species of snakes in Pennsylvania (e.g., *Thamnophis sirtalis*). Gray and Lethaby (2008) provided earliest and latest dates of observation, along with other natural history information, for amphibian and reptile species known to occur in Erie County, Pennsylvania. In this paper, I present information regarding the natural history and seasonal activity of five snake species (*Lampropeltis triangulum, Storeria dekayi, S. occipitomaculata, Thamnophis brachystoma*, and *T. sirtalis*) from the Central Lowland Province of Erie County, Pennsylvania. Such information, as presented here, not only augments our knowledge of the region's snake fauna, but also serves as a baseline that will hopefully lead to more detailed and focused studies, especially those aimed at determining present status or drafting management plans.

MATERIALS AND METHODS

Data were obtained from my field notes for the period 1995-2009 for two Erie County, Pennsylvania sites: date, locality, air temperature, habitat, and species found. Also recorded were whether or not a snake was in shed as noted by opaque cast to its skin, and whether or not an individual was found under cover. Data for both sites were pooled to increase sample sizes. Pooled data provided summaries of the activity periods of *Lampropeltis triangulum, Storeria dekayi, S. occipitomaculata, Thamnophis brachystoma*, and *Thamnophis sirtalis* from the Central Lowland Province.

The first site was ca. 6.25 ha of old field habitat and adjacent palustrine woodland located near West Springfield in Springfield Township (Gray 2004). Elevation at the site was ca. 700 ft. The old field was composed primarily of goldenrod (*Solidago* sp.), grasses, and other herbaceous vegetation. The second site, in Millcreek Township, is located 33.5 km to the east of the West Springfield site, and was 32.4 ha of old field, deciduous woods, and swamp forest.

A small park and an unpermitted landfill were also present prior to 2002 (Gray 2007; 2009). Elevation at the Millcreek Township site was ca. 725 ft. At both sites, snakes were found opportunistically by searching beneath preexisting man-made debris (e.g., boards, corrugated metal sheeting, tires, roof shingles, carpeting, etc.) and natural cover objects such as bark and logs. In some instances it was necessary to estimate search effort, as during some visits herpetofauna other than snakes (e. g., turtles) were sought. The non-uniform sampling effort may have significantly influenced the interpretation of activity patterns as presented in this paper. Therefore, it is possible that as additional data become available, activity patterns derived from subsequent studies may differ from those presented here.

RESULTS

During 1995-2009, 216 visits with approximately 722 search hours yielded 636 observations of five snake species: Milk Snake (*Lampropeltis triangulum*), Brown Snake (*Storeria dekayi*), Redbelly Snake (*S. occipitomaculata*), Shorthead Garter Snake (*Thamnophis brachystoma*), and Common Garter Snake (*T. sirtalis*). Two additional species, Smooth Green Snake (*Liochlorophis vernalis*) and Northern Water Snake (*Nerodia sipedon*) occur at the West Springfield site, but were left out of the analysis because of too few data, and are reported elsewhere (Gray and Lethaby 2004; Gray and Lethaby 2008).

Lampropeltis triangulum (Milk Snake)- With 44 observations, the Milk Snake comprised 6.9% of the 636 observations, and had a unimodal activity pattern, with most observations occurring in June (N=25) at a frequency of 0.13 snakes/hr search (Table 1). Individuals were found under cover 95.45% (42 of 44 observations) of the time (Figure 1) and were observed in the open on only two occasions: 23 June 1996 at 1730 hr and 23 July 1998 at ca. 1500 hr. Both observations occurred at the Millcreek Township site. Each observation involved a single adult—one moving about along a trail, the other crossing a trail. Specimens in pre-ecdysis represented 45.45% (20 of 44) of the total number of *L. triangulum* observed. The highest number of pre-ecdytic Milk Snakes were found in June (N=12) and represented 48% of the total number of Milk Snakes observed in that month (Figure 1). Air temperatures for all Milk Snakes observed ranged between 10ºC and 30ºC (mean=19.7, SD=5.71, N=16).

Storeria dekayi (Brown Snake)- With 243 observations, the Brown Snake comprised 38.2% of the 636 observations, and had a bimodal activity pattern, with a major peak occurring in June (N=87) with 0.64 snakes/hr search (Table 1) and a second, minor peak in September (N=27) with 0.38 snakes/hr search. Individuals were found under cover 97.12% (236 of 243 observations) of the time (Figure 2) and were observed in the open seven times (three in January, three in March, and one in October). Specimens in pre-ecdysis represented 47.74% (116 of 243) of the total number of Brown Snakes observed. The highest number of pre-ecdytic Brown Snakes were found in May (N=45) and represented 73.77% of the total number of Brown Snakes observed in that month (Figure 2). Air temperatures for all Brown Snakes observed ranged between 2.8ºC and 30ºC (mean=16.8, SD=5.26, N=66).

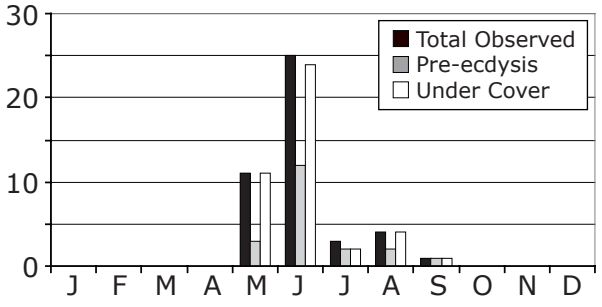

Figure 1. Monthly distribution of *Lampropeltis triangulum* found in pre-ecdysis and under cover compared to total number found (*n*=44) in the Central Lowland Province of Erie County, Pennsylvania.

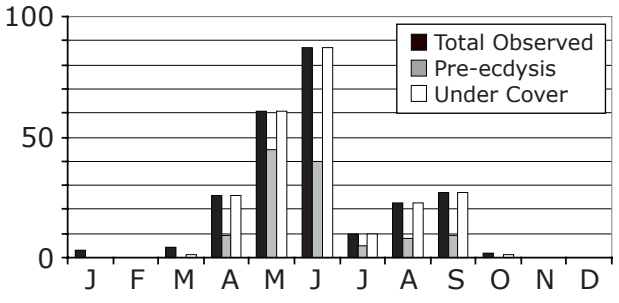

Figure 2. Monthly distribution of *Storeria dekayi* found in pre-ecdysis and under cover compared to total number found (*n*=243) in the Central Lowland Province of Erie County, Pennsylvania.

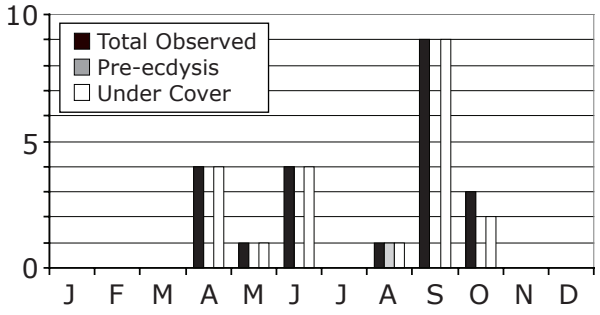

Figure 3. Monthly distribution of *Storeria occipitomaculata* found in pre-ecdysis and under cover compared to total number found (*n*=22) in the Central Lowland Province of Erie County, Pennsylvania.

Storeria occipitomaculata (Redbelly Snake) - With 22 observations, the Redbelly Snake comprised 3.5% of the 636 observations, and had a unimodal activity pattern, with most observations occurring in September (N=9), at a frequency of 0.13 snakes/hr search (Table 1). Individuals were found under cover 95.24% (21 of 22 observations) of the time (Figure 3) and were observed in the open once, on 25 October 1996, when a juvenile was observed crossing a trail at the Millcreek Township site. Specimens in pre-ecdysis represented 4.54% (1 of 22) of the total number of Redbelly Snakes observed. The only pre-ecdytic Redbelly Snake found was observed 4 August 1997 under an automobile tire inner tube in West Springfield and represented the only Redbelly Snake observed in that month. Air temperatures for all Redbelly Snakes observed ranged between 11.1ºC and 28.9ºC (mean=15.4, SD=4.62, N=17).

Thamnophis brachystoma (Shorthead Garter Snake) - With 14 observations, the Shorthead Garter Snake comprised 2.2% of the 636 observations, with most observations occurring in June (N=5), and with a frequency of 0.04 snakes/hrs search (Table 1). *Thamnophis brachystoma* was observed under cover 92.86% of the time (13 of 14 observations) (Figure 4). An individual was observed moving about in the open on 7 June 2001 at the West Springfield site. Specimens in pre-ecdysis represented 57.14% (8 of 14) of the total number of Shorthead Garter Snakes observed. The highest number of pre-ecdytic Shorthead Garter Snakes were found in June (N=4) and represented 80% of the total number of Shorthead Garter Snakes observed in that month. Two observations were made at an air temperature of 15.6ºC.

Thamnophis sirtalis (Common Garter Snake) - With 313 observations, the Common Garter Snake comprised 49.2% of the 636 observations, and had a unimodal activity pattern, with June containing the greatest number of observations (N=92), at a frequency of 0.67 snakes/hr search (Table 1). The Common Garter Snake was found under cover 72.52% of the time (Figure 5). Individuals in pre-ecdysis represented 23.32% (73 of 313) of the total *T. sirtalis* observed. The greatest number of individual *T. sirtalis* in pre-ecdysis were found in May (N=31) and represented 44.28% of the total number of Common Garter Snakes observed in that month (Figure 5). Air temperatures for all Common Garter Snakes observed ranged between 3.9ºC and 30.0ºC (mean=15.5, SD=5.67, N=160).

DISCUSSION

Lampropeltis triangulum (Milk Snake) - The observed unimodal pattern was similar to that described by Hulse et al. (2001) for Pennsylva-

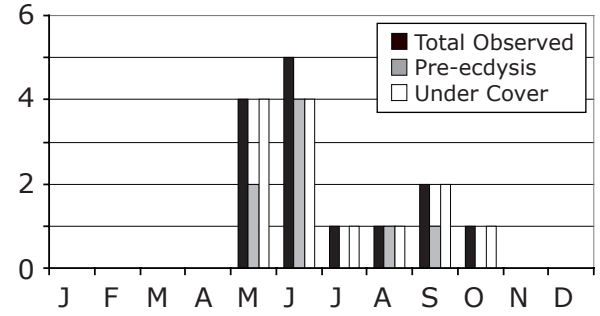

Figure 4. Monthly distribution of *Thamnophis brachystoma* found in pre-ecdysis and under cover compared to total number found (*n*=14) in the Central Lowland Province of Erie County, Pennsylvania.

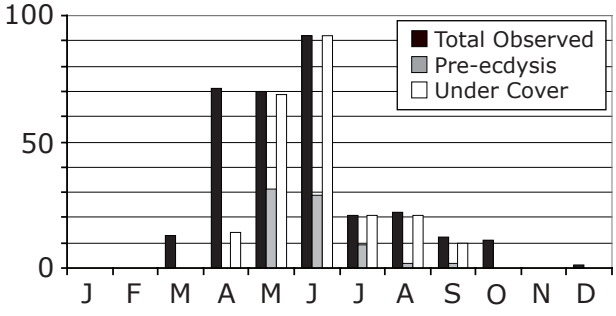

Figure 5. Monthly distribution of *Thamnophis sirtalis* found in pre-ecdysis and under cover compared to total number found (*n*=313) in the Central Lowland Province of Erie County, Pennsylvania.

nia Milk Snakes in general. Meshaka (2010b), at a site in Westmoreland County, Pennsylvania, also observed a peak in June. Although a unimodal pattern is the norm in Pennsylvania, Ernst and Ernst (2003) note that in part of the range of *L. triangulum* surface activity is bimodal, with most activity being in April–June, with a second peak in August–October. The earliest and latest dates of observation (8 May 1995 and 13 September 2007, respectively) are within the observed range of 28 April to 10 October reported for Erie County *L. triangulum* by Gray and Lethaby (2008), and similar to that observed by Hulse et al. (2001) and Meshaka (2010b). The high percentage of *Lampropeltis triangulum* found under cover (95.45%) in the present survey corroborates statements made by Hulse et al. (2001) and Ernst and Ernst (2003) that *L. triangulum* is most often found under cover and seldom encountered in the open. Fitch and Fleet (1970) observed that this species does not bask in direct sunlight, but instead obtains heat via conduction from sun-warmed objects. This partly explains why this species was so often found within shingle piles (N=12), which offer a range of temperatures suitable for thermoregulation. The significant percentage (45.45%; 20 of 44) of Milk Snakes found in pre-ecdysis coincides with data (mostly from Pennsylvania) for collected shed snake skins, which are found in greatest numbers in June (Gray 2005). Air temperatures for which *L. triangulum* were observed were similar to the air temperature range (10º-29º C) observed by Clarke (1958 cited in Ernst and Ernst 2003).

Storeria dekayi (Brown Snake) - Hulse et al. (2001) reported a unimodal annual activity pattern in female Brown Snakes, but a bimodal one in males. Klemens (1993) also suggests a bimodal activity pattern. It is possible that the slight increase in numbers of snakes seen in September (this survey) was caused by increased activity of males, or by snakes migrating and aggregating near hibernacula (Ernst and Ernst 2003). Since I did not separate my data by gender, it is not possible to determine if differences in male and female activity were present. As for aggregating near hibernacula, at the Millcreek Township site, *S. dekayi* were frequently observed along a stream where this species was known to hibernate. As with *L. triangulum*, *S. dekayi* were observed most frequently in June (N=87). The earliest and latest dates of observation were 6 January (1998) and 25 October (1996), respectively. Hulse et al (2001) reported Brown

Table 1. Summary of observations of five snake species from the Central Lowland Province of Erie County, Pennsylvania, from 1995-2009. Capture rates are provided in parentheses (no. individuals/hr searched). *L. t., Lampropeltis triangulum*; *S. d., Storeria dekayi*; *S. o., Storeria occipitomaculata*; *T. b., Thamnophis brachystoma*; and *T. s., Thamnophis sirtalis*.

Monthly Search Effort		*L.. t.*	*S. d.*	*S. o.*	*T. b.*	*T. s.*	Total
Jan	3 hrs	0 (0.00)	3 (1.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (1.00)
Feb	0 hrs	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Mar	43 hrs	0 (0.00)	4 (0.09)	0 (0.00)	0 (0.00)	13 (0.30)	17 (0.40)
Apr	117 hrs	0 (0.00)	26 (0.22)	4 (0.03)	0 (0.00)	71 (0.61)	101 (0.86)
May	186 hrs	11 (0.06)	61 (0.33)	1 (<0.01)	4 (0.02)	70 (0.38)	147 (0.79)
Jun	137 hrs	25 (0.18)	87 (0.64)	4 (0.03)	5 (0.04)	92 (0.67)	213 (1.55)
Jul	53 hrs	3 (0.06)	10 (0.19)	0 (0.00)	1 (0.02)	21 (0.40)	35 (0.66)
Aug	59 hrs	4 (0.07)	23 (0.39)	1 (0.02)	1 (0.02)	22 (0.37)	51 (0.86)
Sep	70 hrs	1 (0.01)	27 (0.38)	9 (0.13)	2 (0.03)	12 (0.17)	51 (0.73)
Oct	51 hrs	0 (0.00)	2 (0.04)	3 (0.06)	1 (0.02)	11 (0.22)	17 (0.33)
Nov	0 hrs	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Dec	3 hrs	0 (0.00)	0 0.00)	0 (0.00)	0 (0.00)	1 (0.33)	1 (1.00)
Total	722 hrs						
Totals		44 (0.06)	243 (0.34)	22 (0.03)	14 (0.02)	313 (0.43)	636 (0.88)

Snakes to have been found in every month except January, making the current observation of interest. On 6 January 1998, when the earliest observation was made, the temperature was 57ºF (13.9ºC), twenty-three degrees above the normal daily high temperature of 34ºF (1.1ºC) for that date at the Erie International Airport (NOAA 2011), which is located just to the west of the Millcreek Township site. Excluding the 6 January record, the next, and more typical, earliest date was 20 March 1995. The Brown Snake has been observed as late as 4 November in Erie County (Gray and Lethaby 2008). My data agree with the range of early April to mid-October given by Hulse et al. (2001) for Pennsylvania *S. dekayi*. The drop in observations during July and August may be a result of a decrease in activity due to increased temperatures. Prey of *S. dekayi*, slugs and earthworms, are also less active during periods of increased temperature and lower soil moisture (Runham and Hunter 1970; Chichester and Getz 1973; Curry 2004). Of the summer months at Erie, Pennsylvania, July is the warmest (avg. monthly temp. 72.1ºF) and driest (avg. monthly precipitation 3.28 in.) (NOAA 2011). The observations of Brown Snakes basking in the open during the cooler months were typical for Temperate Zone snakes. The air temperatures for which *S. dekayi* were observed (2.8ºC and 30ºC) are similar to body temperatures (18.9 ºC-29.5ºC) reported by Ernst and Ernst (2003).

Storeria occipitomaculata (Redbelly Snake) - The Redbelly Snake is not only secretive, but also predominately crepuscular or nocturnal during most of the year (Ernst and Ernst 2003), making it a difficult species to acquire sufficient data using the methods employed here. The observed unimodal pattern is likely a result of the small sample (N=22). As more data become available, it may be found that the Redbelly Snake resembles its close relative, *S. dekayi*, in having a bimodal activity pattern. This would be expected, considering that these two species have similar prey preferences (e.g., slugs and earthworms). The earliest and latest dates of observation (5 April and28 October) fall within the range of 30 March–28 October for Erie County *S. occipitomaculata* reported by Gray and Lethaby (2008). At the West Springfield site, on 15 April 2002, a *S. occipitomaculata* was among an aggregate of eleven *Liochlorophis vernalis* and a *Nerodia sipedon* found at the entrance to a hibernaculum under corrugated metal sheeting (Gray and Lethaby 2004). Although *S. occipitomaculata* were found predominately under cover, the percentage of individuals in pre-ecdysis was relatively low (4.54%). It is possible that *S. occipitomaculata* may seek areas such as within logs or in burrows for ecdysis; such areas were not regularly searched. The air temperatures for which *S. occipitomaculata* were observed (11.1ºC and 28.9ºC) are similar to body temperatures observed for active Redbelly Snakes. For instance, Brattstrom (1965) observed body temperatures of 24.3ºC and 28.2ºC for two *S. occipitomaculata*.

Thamnophis brachystoma (Shorthead Garter Snake) - The Shorthead Garter Snake was observed too infrequently (N=14) at both sites to make any definitive statements regarding its annual activity pattern. Hulse et al (2001) described a bimodal activity pattern for Pennsylvania Shorthead Garter Snakes, with a peak in mid-June and a second peak in August. The earliest observation for this survey, 29 March (2007), is the earliest date for which this species is known to be active in Pennsylvania. The latest date of observation for *T. brachystoma* is 8 November (2009) (Mark Lethaby, pers. comm.), twenty-nine days later than the previous known latest date Shorthead Garter Snakes are known to be active in Erie County, Pennsylvania (Gray and Lethaby (2008). As is evident above, there is a dearth of temperature data for *T. brachystoma* and further study is needed. Wozniak and Bothner (1966) noted that all their specimens (N=609) were found under some sort of cover. The only observation made by the author of *T. brachystoma* moving about in the open occurred on 7 June 2001 at the West Springfield site. Although *T. brachystoma* is described as being predominately diurnal (Ernst and Ernst 2003), the high percentage of individuals found beneath cover, as well as this species' predilection for earthworms (which are mainly nocturnal) imply that the Shorthead Garter Snake may be more crepuscular or nocturnal than previously thought. It is possible that *T. brachystoma* feeds under leaf litter, logs or other cover during the day. These snakes may also use these shelters after feeding to digest their meals. Movement data are scarce for this species (but see Asplund 1963), making the following observations of interest. On

28 June 2009, at the Millcreek Township site, a male *T. brachystoma* (253 mm SVL, 343 mm TL) in pre-ecdysis was found beneath a piece of corrugated metal sheeting (207 cm x 75 cm) in old field habitat (predominately goldenrod and sweet white clover), adjacent to a flood retention basin. The specimen was found in pre-ecdysis again on 24 August 2009 (57 days later), 16.5 m southeast of the first capture site, under a wood board (109 cm x 51 cm). Site fidelity during ecdysis has been reported for *S. dekayi* at the Millcreek site (Gray 2008), and based upon the anecdotal evidence above, may occur in *T. brachystoma* as well. The Shorthead Garter Snake is considered a species of special concern in Pennsylvania (Jellen 2010).

Thamnophis sirtalis (Common Garter Snake) - Meshaka (2010b) also observed a unimodal pattern with a June peak in a more southern population of *T. sirtalis* in Westmoreland County, Pennsylvania. A unimodal activity pattern appears to be typical of Pennsylvania *T. sirtalis*; however, bimodal activity has been observed by Meshaka (2009) in Dauphin County, Pennsylvania, and by Klemens (1993) in Connecticut. The relatively high number of observations of *T. sirtalis* in April (N=71) can be attributed to individuals concentrated in the vicinity of a den at the Millcreek Township site. *Thamnophis sirtalis* was encountered as early as 9 March (1998), when a male was observed basking near the entrance to a hibernaculum at the Millcreek site. Two instances of mating were observed at the Millcreek Township site. The first occurred on 11 April 1995 at an air temperature of 12.8ºC, and involved a male and female in copula at the edge of a swamp. The second instance was witnessed on 21 April 1995, and involved a male and female in copula at the edge of the landfill. In addition to the above, attempted copulation by a group of three males and a female *T. sirtalis* was seen 14 April 1997 at the Millcreek site. The female was moving about in the open as the males crawled alongside and over her, undulating their bodies and rubbing her with their chins. One of the males managed to get his tail under the female's, but was unable to insert his hemipenis into her cloaca. The latest date for which *T. sirtalis* was observed was 1 December (1996), when a female was seen entering the Millcreek hibernaculum. Air temperatures during November, prior to this observation, fell below freezing on a few occasions. Like the January observation of *S. dekayi* described above, the December record of *T. sirtalis* can be attributed to abnormally high temperatures. The normal high temperature for 1 December is 44ºF (6.7ºC) (NOAA 2011). At the time the above observation of *T. sirtalis* was made, the air temperature was 62ºF (16.7ºC). *Thamnophis sirtalis* was found in the open relatively more often than *L. triangulum, S. dekayi*, or *S. occipitomaculata*, the most likely reason being the high number of basking individuals observed in spring at hibernacula. Also, *T. sirtalis* is primarily diurnal, whereas *L. triangulum, S. dekayi*, and *S. occipitomaculata* are reported to be more nocturnal (Ernst and Barbour 1989). However, Wozniak and Bothner (1966) found *T. sirtalis* in the open only 9.5% of the time. Individuals in pre-ecdysis represented 23.32% (73 of 313) of the total *T. sirtalis* observed; much less than the other two species in this study. As with *S. occipitomaculata*, the significance of this is unknown, but may be due to *T. sirtalis* seeking out areas during ecdysis (e.g., in moist logs or burrows) that were not normally searched. At the West Springfield site, I have found *T. sirtalis* shed skins in mammal burrows. Also, at the Millcreek Township site, an adult *T. sirtalis* was found within a burrow under a board. It is also possible that Thamnophis sirtalis may spend less time under cover objects during ecdysis than *L. triangulum* or *S. dekayi*. The greatest number of individual *T. sirtalis* in pre-ecdysis were found in May (N=31) and June (N=29); this corroborates data for field-collected shed skins, which are also highest in these months. Air temperatures at the time *T. sirtalis* were observed (3.9ºC to 30.0ºC) are similar to body temperatures reported by Aleksiuk (1976 cited in Ernst and Ernst 2003).

The five species covered here are cold-tolerant, and with the exception of *T. brachystoma*, have geographic ranges that extend north into Canada. The lowest air temperatures for which these species were observed ranged from 2.8ºC (*S. dekayi*) to 11.1ºC (*S. occipitomaculata*). In the Central Lowland Province of Erie County, *T. sirtalis* is usually the first snake species to resume surface activity; for the two sites sampled here this occurred 9 March–11 April. It is also the last to be observed in autumn, as late as 1 December. *Thamnophis sirtalis* is able to with-

stand partial freezing of its body fluids (Churchill and Storey 1992), and this freeze tolerance may explain why it is active so late in the year. However, the earliest record of surface activity of any snake in the Central Lowland Province was of three *S. dekayi* observed on 6 January 1998. The Northern Brown Snake is usually first observed 20 March–27 April, a little later than *T. sirtalis*, and ends its activity period earlier as well, usually 20 October–25 October. In a snake assemblage in Kansas, Pisani (2009) found that *S. dekayi* and *Virginia valeriae* were consistently the earliest species observed to be active. Although *S. occipitomaculata* in the Central Lowland Province was observed later than *S. dekayi*, 5–27 April, it has been seen as early as 30 March elsewhere in Erie County. Since the Redbelly Snake ranges further north than *S. dekayi*, one could assume that it is just as cold-tolerant as *S. dekayi*. In Nova Scotia, Gilhen (1984) found *S. occipitomaculata* active earlier than *T. sirtalis*. In the Central Lowland Province, the Redbelly Snake was found later (28 October 1996) than *S. dekayi*. Of the five snake species covered here, *L. triangulum* was the latest to resume surface activity in spring (8–18 May), and also the first to cease activity in autumn, usually late September. The Milk Snake has been found as late as 10 October in Erie County (Gray and Lethaby 2008).

The significant number of observations of individuals found under cover during pre-ecdysis (45.45% of *L. triangulum*, 47.74% of *S. dekayi*, 57.14% of *T. brachystoma*, and 23.32% of *T. sirtalis*) brings attention to the need for researchers to take this behavior into consideration when interpreting data obtained from using coverboards. Depending on the species being studied and the research questions being asked, it may be prudent to determine whether or not samples of snakes from under coverboards are biased toward individuals in pre-ecdysis. It should also be noted that coverboards are utilized a great deal by inactive snakes, such as those digesting recent meals, thermoregulating gravid females, etc. On a similar note, based on observations presented here, it may be of interest to determine if primarily nocturnal species (e.g., *S. dekayi, S. occipitomaculata, L. triangulum*, and possibly *T. brachystoma*) are found under cover in greater proportions than are diurnal species (e.g., *T. sirtalis*). However, it may just be that it is easier to observe snakes, especially small species such as *S. dekayi* and *S. occipitomaculata*, under cover than it is to see them moving about "in the open" amongst vegetation. Breckenridge (1970) thought this to be the case with *S. occipitomaculata*, noting that its small size and inconspicuous dorsal color make it difficult to detect among leaves and grass. Snakes may also see or otherwise detect a researcher and flee under cover or escape before being discovered. It should be noted that the observations reported here were made under various types of cover (boards, shingles, linoleum, carpeting, cardboard, etc.) and may not be comparable to studies using only wood coverboards. Such behaviors as mentioned above have implications for studies of relative abundance that utilize only coverboards to obtain samples. Perhaps for the diurnal species, funnel traps and drift fences would provide a more representative sample of these species. Seigel (1993) noted that drift fences and funnel traps can be more effective than hand capture techniques in certain situations; for instance, when sampling semiaquatic snakes. Although a possible explanation was given for the interspecific variation in cover object use during pre-ecdysis, a more in-depth study is needed to determine why some species, such as *S. occipitomaculata* and *T. sirtalis*, in pre-ecdysis appear to be found under cover relatively less often than *L. triangulum, S. dekayi*, or *T. brachystoma*.

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About the Kansas Herpetological Society

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

KHS Meetings

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

Field Trips

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

Editorial Policy

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

Submission of Manuscripts

As space allows, *JKH* publishes all manner of news, notes, and articles. Priority of publishing is given to submissions of Kansas herpetological subjects and by KHS members; however all submissions are welcome. The ultimate decision concerning the publication of a manuscript is at the discretion of the Editor. Manuscripts should be submitted to the Editor in an electronic format whenever possible. Those manuscripts submitted in hard copy may be delayed in date of publication. Manuscripts should be submitted to the Editor no later than the 1st of the month prior to the month of issuance. All manuscripts become the sole possession of the Society, and will not be returned unless arrangements are made with the Editor. In the interest of consistency and comprehension, the standardized common names used in *JKH* will follow those used in *Amphibians, Reptiles, and Turtles in Kansas* (Collins, Collins, and Taggart, 2010).

Reprints & Artwork

JKH publishes original peer-reviewed submissions under the Articles and Notes sections. Upon review, acceptance, and publication, Portable Document File (PDF) copies are provided gratis to the author on request. Figures and photographs submitted with manuscripts are welcome, but must be sized appropriately by authors for this journal's column sizes (i.e., 19.5 or 39 picas wide). Particular attention should be paid to reduction of text on the figures.

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Individuals selected as *Distinguished Life Members* are chosen by the KHS Executive Council based on their distinguished published research papers on Kansas herpetology.

Bronze Salamander Award

Established in 1987, this Award is presented to those individuals whose efforts and dedication to the Kansas Herpetological Society go far beyond the normal bounds. The recipients of this Award have given exemplary service to the KHS, and are presented with an elegant bronze sculpture of a Barred Tiger Salamander.

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KHS members only are eligible to apply for *The Alan H. Kamb Grant for Research on Kansas Snakes,* which was established in 2001. The recipient of the grant will be selected by the KHS Awards Committee. A minimum award of $300 is given annually.

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KHS members only are eligible to apply for *The Henry S. Fitch - Dwight R. Platt Award for Excellence in Field Herpetology,* which was established in 2010. The recipient of the grant will be selected by the KHS Awards Committee. The award will be given annually when sufficient funds have been raised to establish a trust.

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This CNAH Award was established in 2008 in recognition of the scientific career of George Fredrick Toland, whose life-long interest in herpetology was passed on to so many of his students. The recipient of this award will be selected by the KHS Awards Committee. A minimum award of $200 is given annually at the end of the KHS meeting.

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This CNAH Award was established by Westar Energy in 1998 in recognition of the achievements of Suzanne L. Collins and Joseph T. Collins. In even years, the Award is bestowed upon an individual who, in the preceding two calendar years, had published a paper of academic excellence on native species of Kansas amphibians, reptiles, and/or turtles, and in odd years, the Award is given to an individual who, in a juried competition, took the best photograph of a Kansas amphibian, reptile, or turtle. *The Collins Award* is minimally $1,000.00, and is neither a grant nor a scholarship. No nominations or applications can be made for it.

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