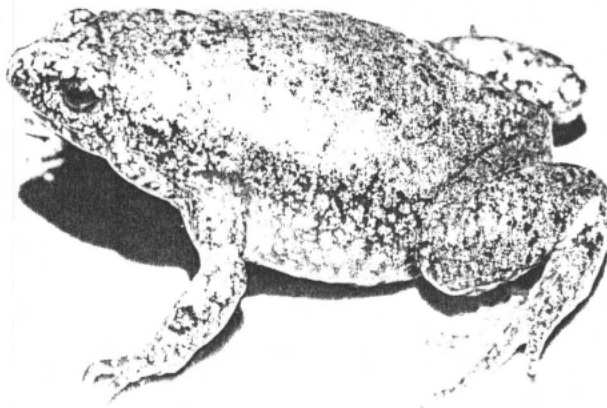


**STUDY OF THE EASTERN NARROWMOUTH TOAD  
IN SOUTHEAST KANSAS**



**LARRY MILLER**  
524 North Osage Street  
Caldwell, KS 67022  
1-316-845-2680

REPORT TO THE KANSAS DEPARTMENT OF WILDLIFE AND PARKS

FEBRUARY 1991

STUDY OF THE EASTERN NARROWMOUTH TOAD IN SOUTHEAST KANSAS

BY:

LARRY MILLER

INTRODUCTION AND HISTORIC DATA

This project was designed to investigate the range, habits, habitat requirements, and population status of the eastern narrowmouth toad (Gastrophryne carolinensis) in Kansas. The toad had been collected from only one Kansas county (Cherokee) in the past.

The first example of this animal to be collected in Kansas was collected at a location given as four miles north of Baxter Springs in Cherokee County. It was collected on 27 April 1947. This toad, a female, (KU 24414) measured 34mm in total length and remains the largest example of the species ever collected in Kansas.

An example was next collected at a location given as three miles north of Galena (KU 28622) on 24 April 1950. No other examples of this rare amphibian were reported until 29 April 1967. One example was collected from the NW 1/4 of Section 14, Township 33S, Range 25E by D.E. Wilhelm on that date. The Wilhelm specimen is in the Fort Hays State University collection and has been assigned the FHSU number of 3985.

The eastern narrowmouth toad was not reported again from Kansas until May of 1982. One example (KU 192169) was discovered on 1 May 1982 at a location given as the SE 1/4 of Section 3, Township 34S, Range 25E on the east side of the Spring River. On 22 May 1982 two specimens (KU 192170 and KU 192171) were found at a location given as Section 36, Township 33S, Range 25E just north of Turkey Creek. All locations being in Cherokee County, Kansas.

It was during 1985 that the largest number of eastern narrowmouth toads were both observed and collected in Kansas. Between 2 June 1985 and 22 June 1985 a total of 10 specimens of the eastern narrowmouth were collected from Cherokee County, Kansas.

Five of the specimens (KU 203605 - 203609) were collected on 2 June 1985 from a location given as 3.75 miles north of Galena on Section 36, Township 33S, Range 25E. The specimens collected on 2 June 1985 were collected by Larry Miller and Karen Myers.

Five additional specimens were collected on 22 June 1985 from the following locations in Cherokee County, Kansas. Three (KU 203628 - 203630) were collected from a location given as just southeast of Baxter Springs on Section 7, Township 35S, Range 25E. Two other specimens (KU 203631 and KU 203632) were collected from a location given as north of Galena on Section 26, Township 33S,

Range 25E. The five specimens collected on 22 June 1985 were collected by Larry Miller, J.T. Collins, Suzanne L. Collins, and Kelly Irwin.

Collins (1982) reported that nothing was known of the preferred habitat of the eastern narrowmouth toad in Kansas. He also stated that it probably lives beneath large rocks in moist soil in the vicinity of ponds during most of the year.

Conant (1975) stated that a wide variety of habitats are utilized by the eastern narrowmouth toad throughout its range in North America, but that all have two things in common - shelter and moisture. He pointed out that margins of bodies of water are good places in which to look for them, and that they are often found as a result of overturning boards, logs, or other shelters.

Miller (1985) reported that many eastern narrowmouth toads were heard calling at several locations in Cherokee County, Kansas between 2 and 22 June 1985. He stated that they seemed to prefer warm temperatures to call, and at times the toads were heard calling during daylight hours. He also reported that they were very hard to find when calling and often called from clumps of vegetation along the waters edge or from vegetation in the water at the surface. One was observed under a board at the waters edge near a small pond at Section 36, Township 33S, Range 25E.

#### METHODS

A total of seven days were spent in Cherokee and surrounding Kansas counties between 4 and 24 June 1990 in search of the eastern narrowmouth toad. Trips to the area were made on the following dates 4-7 June 1990 and 22-24 June 1990. A total of 1791 miles were driven in my personal vehicle.

I was accompanied on the first trip by Karen Toepfer of Hays. During the second trip I was assisted by Keith Coleman of Topeka and Doris Phipps of Lawrence. Their vehicles were used for some of the research driving. However, no records were kept of the miles they drove during the project.

During the study past information in regard to the eastern narrowmouth was used to located known sites where the amphibian had been recorded in Cherokee County. Other potential sites based on habitat were also visited on a regular basis in other areas of Cherokee County. A few possible sites were visited in parts of southern Crawford County and Labette County as well.

Sixteen sites in Cherokee County were visited on a regular basis. During the day efforts were made to discover the toads by turning rocks, logs, and other objects. At night time was spent listening for calling male toads at each study site. Toads were heard calling at four of the sites. Live toads were discovered by turning material at one of the sites.

Two of the three toads discovered by turning rocks and logs were sent to the Museum of Natural History at the University of Kansas as voucher specimens.

Field notes and maps were kept during the study. Photographs were taken of habitat and live toads. Audio tapes were made of calling toads by Kieth Coleman. Maps and photographs are provided at the end of this report.

#### LOCATIONS STUDIED IN CHEROKEE COUNTY

Each of the sixteen sites studied in Cherokee County between the dates of 4 June 1990 and 24 June 1990 were assigned a letter of the alphabet from "A" to "P". Eastern narrowmouth toads were heard calling at sites "A", "D", "E", and "I" during the study. Each location is marked on the map provided with this report. Information about each site is given as follows.

SITE "A" consists of an area just to the south of Turkey Creek on the west side of the road in Section 36, Township 33, Range 25E, Cherokee County, Kansas. The first eastern narrowmouth toads to be recorded from this location were collected on 22 May 1982. It is the same location in which four additional specimens were collected on 2 June 1985.

Site "A" was visited on a regular basis during the 1990 field work. Three examples of the toads were discovered the afternoon of 5 June 1990. Two were found under rocks in moist soil and one was found under a rotting log in moist soil. All three were found within 10 meters of standing water near many large trees. Two of the three toads (KU 216101 and KU 216102) were kept as voucher specimens. The third was returned to the area where found. The depth of the water was from only a few centimeters to less than one meter. Most of the water was about 5-10 centimeters deep. There was vegetation around the edge of the pool and also grass and other vegetation growing in the shallow water.

The water temperature at the pool was recorded as 32 degrees Celsius at the time the toads were found on 5 June 1990. The pH of the water was recorded at 8.5 in the pool near where the toads were found the same date. Hundreds of very young tree frogs were observed near the pool. Several small American toads were also observed in the area. A number of cricket frogs were observed and heard calling from the edges of the pool. No eastern narrowmouth toads were heard calling the afternoon of 5 June 1990.

Site "A" was visited the evening of 5 June 1990 at 2000 hours. At that time about five male eastern narrowmouth toads were heard calling from the edges of the pool. The water temperature was still 32 degrees Celsius. It was a clear evening with very little wind. The air temperature was 24 degrees Celsius at the time of the visit. Many tree frogs and cricket frogs were heard calling in the same area. No animals of any species were

collected from the area the evening of 5 June 1990.

Site "A" was visited the afternoon of 6 June 1990, and one male eastern narrowmouth toad was heard calling at 1430 hours. It was a clear afternoon. The air temperature was 26 degrees Celsius. No animals were collected. The site was revisited the same evening at 2030 hours. Three to five toads were heard calling at that time. None were collected.

Site "A" was visited the afternoon and evening of 22 June 1990. Between four and five male toads were heard calling each visit. None were collected. At 1600 hours the afternoon of 23 June 1990 no toads were heard. At 1900 hours one toad was heard calling, and by 1930 hours 20-25 toads were heard calling from the location. Recordings of the calls were made the evening of 23 June 1990 by Keith Coleman. The toads continued to call past 2100 hours the evening of 23 June 1990. The water temperature was recorded at 32 degrees Celsius at the time the most toads were calling. The last visit to the site was at 1200 hours on 24 June 1990. There were from six to eight toads calling at that time.

SITE "B" consists of the area just across the Spring River from the Spring River Inn in Riverton. This location being Section 17, Township 34S, Range 25E, Cherokee County, Kansas. It is a rather large area on the north side of the highway just to the east of the bridge that crosses the Spring River. It was visited several times during the project from 4-24 June 1990. It consists an area covered with water from only a few centimeters deep to over a meter in depth. There is much vegetation and many large trees in the area. The pH of the water measured 7.0 when tested on 5 June 1990. The water temperature ranged from 26 degrees Celsius in the deep pools to 30 degrees Celsius in the shallow pools on 5 June 1990.

Eastern narrowmouths toad may have been heard calling from the area the evening of 23 June 1990. However, due to continued noise from the busy highway and noise from Riverton, the call could not be confirmed. No specimen was found by turning rocks, logs, and other objects in the area.

Site "B" is in the same general area as the location given for the first recorded specimen of the eastern narrowmouth collected in 1947. No detailed information is available for that specimen. However, a location of four miles north of Baxter Springs is given. Riverton is about four miles northeast of Baxter Springs.

Site "B" is one of the locations where research in regard to the green frog has been conducted. It was visited several times from 2-22 June 1985 during that project. Green frogs have been recorded from the area. Also, possible eastern narrowmouth toads were heard calling in the area the night of 22 June 1985. However, the same problems with noise prevented confirmation.

SITE "C" consists of the area near Shermerhorn Park along Shoal Creek. The location being Section 35, Township 34S, Range 25E, Cherokee County, Kansas. Several small pools of water were monitored in this area during the study. However, no toads were ever heard calling in the area and none were found by turning rocks, logs, and other objects. Very few amphibians were found in the area. One bullfrog was observed near a pond on the south side of Shoal Creek near the bridge. A dark-sided salamander and two cave salamanders were observed in the twilight zone of the cave located at the north end of the park.

SITE "D" consists of the area just north of site "A" in the same section (Section 36, Township 33S, Range 25E), and is located just south of the Spring River bridge on the east side of the road. It is on the north side of Turkey Creek.

Site "D" is an area where green frogs, central newts, and eastern narrowmouth toads have been collected and/or observed in the past. It is a small pond with the depth of water ranging from only a few centimeters to well over a meter in depth. It was an area abundant with wildlife during the green frog study of 1985.

Since 1985 human encroachment has greatly changed the site. During the first visit on 5 June 1990 it was discovered that a trailer park had been created next to the small pond. The pond was fenced and several domestic ducks lived in the enclosure. However, five to six eastern narrowmouth toads were heard calling from inside the enclosure next to the waters edge at 1600 hours that date. One toad was observed as it called from a clump of grass at the west edge of the pond. Other toad called from the same area. The west edge of the pond was the only area that still had some vegetation along the waters edge. However, there was very little vegetation and that was the reason the calling toad was spotted and observed as he called.

No specimens were collected from the site on 5 June 1990. A sample of the water showed a pH of 7.5 with a water temperature of 32 degrees Celsius.

The site was visited several other times during the project. From one to six eastern narrowmouth toads were heard on several occasions. None were collected during the project. No green frogs were ever observed or heard at the site during the project. No central newts were ever observed during the project.

SITE "E" is an area located just to the southeast of Baxter Springs along the Spring River. The legal location is the NW 1/4 of Section 7, Township 35S, Range 25E in Cherokee County, Kansas. A large wooded area is located next to farmland in the area. Most of the area is a marsh, and there is much standing water in the area most of the time.

Eastern narrowmouth toads were first discovered in the area in 1985. That year a total of three were collected on 22 June.

All three were collected from a cut wheat field next to a large wooded area. They were found in standing water at the corner of the field. Several dozen male toads were heard calling from the area the afternoon of 22 June 1985. The day was sunny and hot with high humidity.

Site "E" was visited several times during June of 1990. Toads were heard calling at the same location as in 1985. From one to five toads were heard calling on 22 & 23 June 1990. However, no specimens were collected. On 5 June 1990 the water temperature was recorded as 28 degrees Celsius. The pH ranged from 7.0 to 7.5 depending on the exact location. On 22 June 1990 the water temperature was recorded as 31 degrees Celsius. No pH measurement was taken on that date.

SITE "F" consists of an area next to the Spring River in Section 27, Township 33S, Range 25E, Cherokee County, Kansas. There was standing water in the area between 4 and 24 June 1990. The temperature of the water ranged from 25 degrees Celsius to 33 degrees Celsius during the period. The pH of the water measured 7.0 on 5 June 1990. No eastern narrowmouth toads were discovered at the site by turning rocks, boards, logs, and other objects. No toads were heard calling at the site during the study.

SITE "G" consists of the area where an example of the eastern narrowmouth toad was collected on 29 April 1967 (FHSU #3985). The legal location of the area is the NW 1/4 of Section 14, Township 33S, Range 25E, Cherokee County, Kansas.

Site "G" was visited on 5, 6, 22, & 23 June 1990. Some standing water was found in the area. However, no eastern narrowmouth toads were discovered either by turning rocks, boards, logs, and other materials or by listening for the calls of males. The was visited both during daylight and night hours.

SITE "H" consists of the area where roads cross dividing four sections. The locations are the SE 1/4 of Section 36, Township 33S, Range 24E; the NE 1/4 of Section 1, Township 34S, Range 24E; the SW 1/4 of Section 31, Township 33S, Range 25E; the NW 1/4 of Section 6, Township 34S, Range 25E, Cherokee County, Kansas. A railroad track cuts through the very northeast corner of Section number 1.

Standing water was found in the area in what appeared to be good habitat for the eastern narrowmouth toad. The temperature of the standing water was recorded as 29 degrees Celsius on the afternoon of 5 June 1990. The pH of the water in the area ranged from 7.0 to 8.0 the same day.

No toads were found by searching under rocks, logs, boards, and other objects in the area on 5 June 1990. No toads were heard calling on either 5, 6, 22, or 23 June 1990 in the area.

SITE "I" consists of an area along the Spring River in Section 26, Township 35S, Range 25E. It is the area in which a total of two eastern narrowmouth toads were collected on 22 June 1985. It consists of wooded areas with other areas of standing water with much vegetation.

Site "I" was visited the afternoon of 5 June 1990 and water temperature was measured at that time. The temperature was recorded as 29 degrees Celsius. The pH of the water was measured at 8.0 on that date also.

No eastern narrowmouth toads were heard calling on 5 June 1990 at site "I". However, ten to twelve male toads were heard calling from the area the evening of 22 June 1990. Tree frogs and cricket frogs were also heard calling from the area. Attempts to collect specimens of eastern narrowmouth toads were unsuccessful.

SITE "J" consists of the area along highway 66 near Brush Creek on Section 24, Township 34S, Range 24E. The area had standing water and possible habitat for the eastern narrowmouth toad. It was visited several times between 4 and 24 June 1990. However, no examples of the eastern narrowmouth toad was found in the area. No toads were heard calling.

SITE "K" consists of an area in the SE 1/4 of Section 19, Township 34S, Range 25E, Cherokee County, Kansas. No eastern narrowmouth toads were found or heard calling in the area between 4 and 24 June 1990.

SITE "L" consists of an area in the NW 1/4 of Section 29, Township 34S, Range 25E, Cherokee County, Kansas. No eastern narrowmouth toads were found or heard calling in the area between 4 and 24 June 1990.

SITE "M" consists of an area in the SE 1/4 of Section 3, Township 34S, Range 25E, Cherokee County, Kansas. It is located near the Spring River and about three miles north of Galena. It is in the same area as where a specimen of the eastern narrowmouth toad was collected on 24 April 1950.

Site "M" has much habitat that seems to be consistent with the types of habitat where eastern narrowmouth toads are found in Kansas. However, no toads were found or heard calling in the area between 4 and 24 June 1990.

SITE "N" is another location north of Galena that was studied between 4 and 24 June 1990. It consists of the area in the NW 1/4 of Section 12, Township 34S, Range 25E, Cherokee County, Kansas. No eastern narrowmouth toads were found or heard calling in the area between 4 and 24 June 1990.

SITE "O" is located in the SE 1/4 of Section 12, Township 34S, Range 25E, Cherokee County, Kansas. No eastern narrowmouth



toads were found or heard calling in the area between 4 and 24 June 1990.

SITE "P" consists of the area along Short Creek located within Galena. The location being at the north edge of Galena in Section 14, Township 34S, Range 25E, Cherokee County, Kansas. The area was visited the afternoon of 6 June 1990. The water temperature of the stream was 28 degrees Celsius and the pH measured 8.5 at that time. No amphibians, fish, or reptiles were observed in the area. The area was not revisited during the 1990 study.

#### APPARENT RANGE OF THE EASTERN NARROWMOUTH TOAD IN KANSAS

Based on past data, and the results of my field work, it appears the eastern narrowmouth toad has a range limited to the extreme southeast corner of Kansas. All records of this rare amphibian have been collected from an area of less than 75 square miles in the extreme southeastern corner of Cherokee County, Kansas.

All records for the eastern narrowmouth toad have come from areas near the Spring River in southeast Cherokee County, Kansas. Most of the animals have been found at sites less than one mile from either the Oklahoma line or the Missouri line. The range of the eastern narrowmouth frog is very limited in Kansas.

#### HABITAT REQUIREMENTS OF THE EASTERN NARROWMOUTH TOAD IN KANSAS

The eastern narrowmouth toad seems to prefer areas near the Spring River in southeastern Cherokee County, Kansas which have areas of standing water and vegetation. Breeding sites have all consisted of clear water with vegetation growing in the shallow areas. All breeding sites have been near wooded areas. However, the actual sites have been in open areas near many trees. The male toads call from small clumps of grass and other vegetation or from the waters edge at the shallow areas of the pools of standing water. The small toads seem to prefer water temperatures above 30 degrees Celsius for breeding.

Garter snakes and turtles have been observed in and around the breeding sites. However, fish were not observed in the breeding pools used by eastern narrowmouth toads during the 1990 project. Other amphibians such as cricket frogs and tree frogs often share breeding pools with eastern narrowmouth toads.

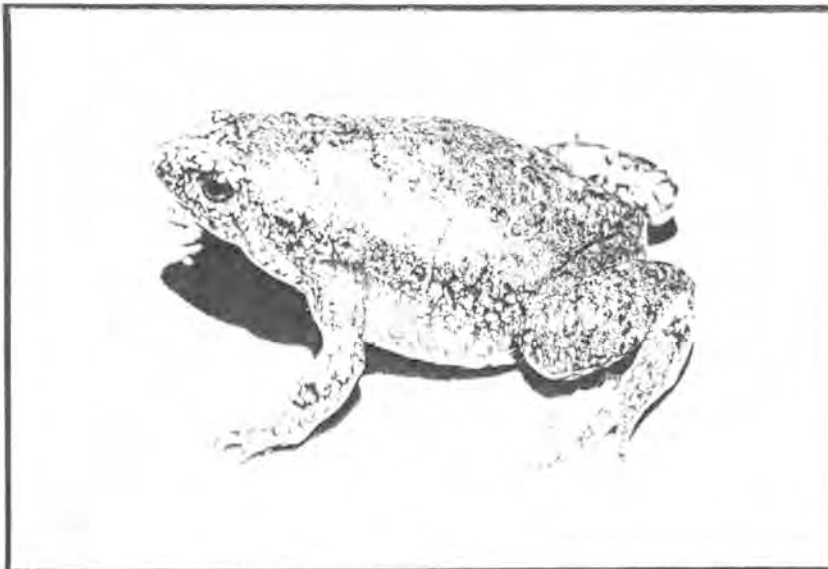
Eastern narrowmouth toads seem to spend much of their life under rocks, logs, and other materials near the breeding sites. No observations were made of either male or female toads foraging for food or moving about in any manner other than the times males were observed calling and times when females were observed swimming in the breeding pool. Mating toads were not observed.

## SUMMARY

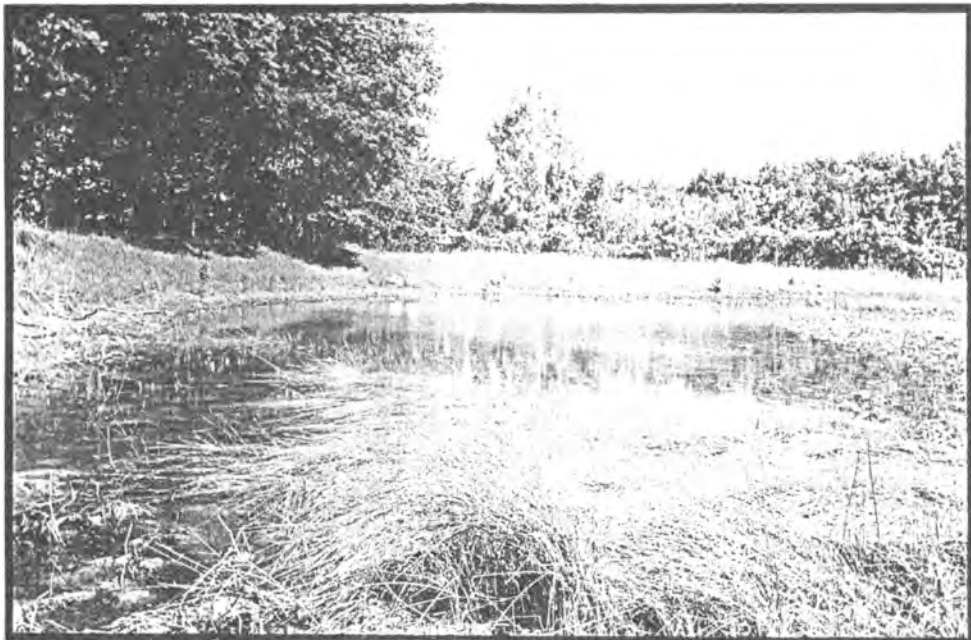
The range of the eastern narrowmouth toad is very limited in Kansas. It also appears that the continued survival of this species in the state could be in danger due to human activities such as agriculture and other development in Cherokee County.

## RECOMMENDATIONS

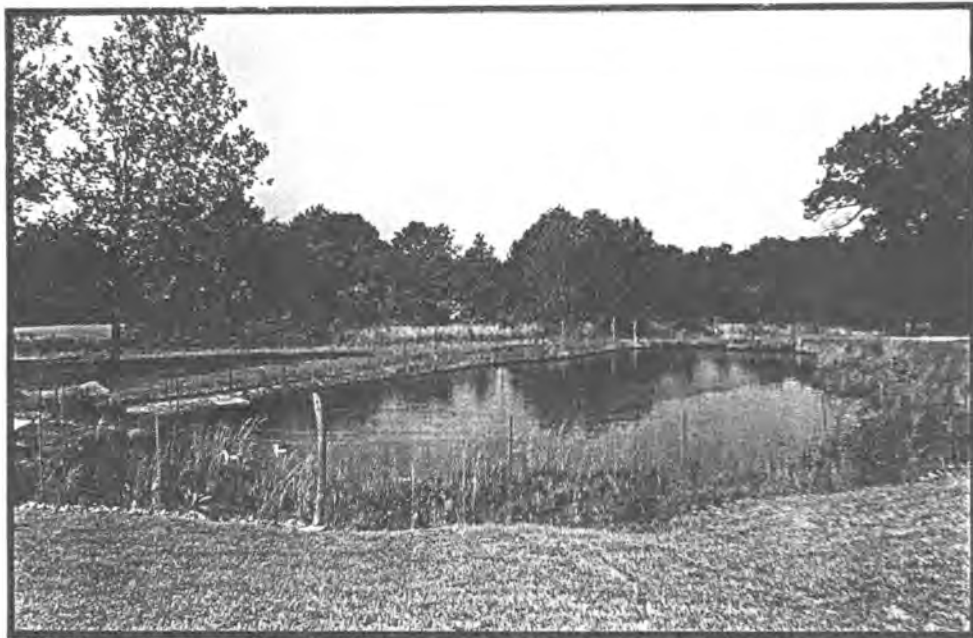
Due to the very limited range of the eastern narrowmouth toad in Kansas, and due to the fact that other rare native Kansas animals are found in the same areas as this toad, I strongly urge some type of legal protection for the known breeding sites of this animal. The establishment of sanctuaries for the continued preservation of breeding populations of eastern narrowmouth toads is highly recommended. Also, continued monitoring of the status of the eastern narrowmouth toad in Kansas is needed.



Eastern narrowmouth toad collected by Larry Miller and Karen Toepfer on 5 June 1990 from Section 36, Township 33S, Range 25E, Cherokee County, Kansas.



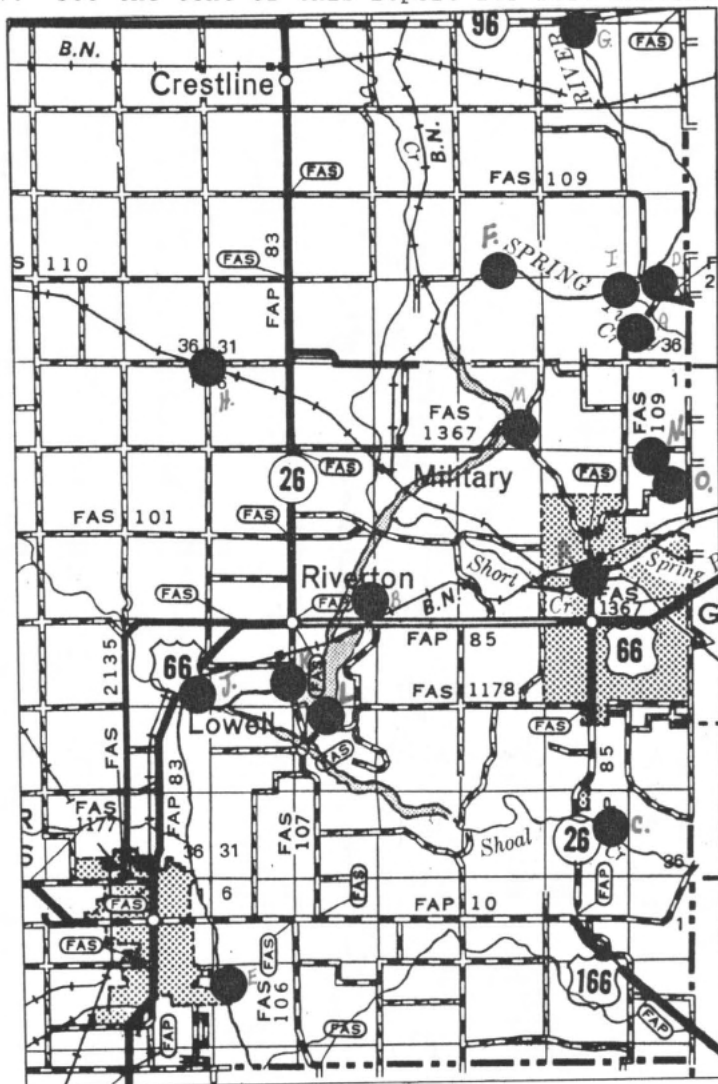
Site "A" (above) and site "D" (below) are both located in Section 36, Township 33S, Range 25E of Cherokee County, Kansas. Both photographs were taken on 6 June 1990. Examples of the eastern narrowmouth toad have been found at each site.



The map below shows the extreme southeast corner of Cherokee County, Kansas (the extreme southeast corner of all of Kansas). East to west on the map (left to right) shows a distance of about eight miles. North to south on the map (top to bottom) shows a distance of about twelve miles. Missouri is on the east and Okoahoma is on the south.

Each of the sixteen dots on the map mark one of the sixteen sites surveyed between 4 and 24 June 1990. They are identified by letters of the alphabet.

Each letter shown in green represents a location where one or more specimens of the eastern narrowmouth toad has been collected since 1947. See the text of this report for more information.



#### ACKNOWLEDGEMENTS

I was assisted by several individuals during this project. Their assistance made my work much easier and much more enjoyable. I wish to thank J.T. Collins (Museum of Natural History, Lawrence) for providing me with information and encouragement during the project, and John E. Simmons (Museum of Natural History, Lawrence) for providing me with collection data in regard to specimens located at the Museum in Lawrence.

Ken Brunson (Kansas Department of Wildlife and Parks, Pratt) made suggestions and provided encouragement as I undertook this project. Rob Friggeri (Kansas Department of Wildlife and Parks, Pittsburg) provided me with equipment during the project.

I was assisted in the field by Keith Coleman (Topeka), Doris Phipps (Lawrence), and Karen Toepfer (Hays). Keith produced some excellent audio tapes of male eastern narrowmouth toads calling at one of the breeding sites. Doris helped with collecting, field notes, and photography. Karen kept field notes, helped with photography, found one of the first specimens of the eastern narrowmouth toads during the project, and assisted with temperature and pH measurements. She also provided me with information about the eastern narrowmouth toad specimen located in the collection at Fort Hays State University.

Funding was provided by the Kansas Department of Wildlife and Parks Nongame Wildlife Program. Without such funding this project would not have been possible. I wish to express my thanks to that Department at this time.

#### LITERATURE CITED

- Collins, J.T.  
1982 Amphibians and reptiles in Kansas. Second edition. Univ. Kansas Mus. Nat. Hist. Pub. Ed Ser., 8: 1-356.
- Conant, R.  
1975 A field guide to reptiles and amphibians of eastern and central North America. Second edition. Houghton-Mifflin Company, Boston. xvii + 429pp.
- Johnson, T.R.  
1977 The amphibians of Missouri. Univ. Kansas Mus. Nat. Hist. Pub. Ed. Ser., 6: 1-142.
- Miller, L.  
1985 Investigation of the green frog in southeastern Kansas. Report to the Kansas fish and game commission. 16pp.