

KANSAS HERPETOLOGICAL SOCIETY NEWSLETTER NO. 77

September 1989

THE SIXTEENTH ANNUAL MEETING of the Kansas Herpetological Society 11-12 November 1989 in the Education Building Sedgwick County Zoo and Botanical Garden Wichita

PROGRAM

Saturday, 11 November 1989

- 8:30am **COFFEE and REGISTRATION** (\$2.00) in the Education Building at the Sedgwick County Zoo & Botanical Garden —Please pay dues by mail when you receive your annual dues notice; the KHS Treasurer will not take dues at the Annual Meeting.
- 9:30am **WELCOME, INTRODUCTION** of KHS officers, and **ANNOUNCEMENTS** by KHS President **Jim Marlett**.
- 9:40am **HERPETOLOGICAL MEDICAL CASES**, **William Bryant**, DVM (Sedgwick County Zoo, Wichita).
- 10:00am **GROUP PHOTOGRAPH AND BREAK**. Location to be announced.
- 10:30am **BREEDING SCHELTOPUSIKS**, **Dan Schupp** (Sedgwick County Zoo, Wichita).
- 11:00am **A VISIT TO A CHINESE SNAKE RESTAURANT**, **Larry Hatteberg** (KAKE TV, Wichita).
- 11:15am **HERPETOLOGY AND THE KANSAS WILDLIFE LAWS**, **Bob Hartman** (Kansas Department of Wildlife and Parks, Pratt). This will be followed by a panel discussion, and question and answer session.
- Noon **LUNCH**. Many eating establishments are located within easy driving distance of the Zoo. A list of restaurants will be provided at the meeting.
- 1:30pm **KHS BUSINESS MEETING & ELECTION OF OFFICERS FOR 1990**, KHS President **Jim Marlett** presiding.
- 2:00pm **AMPHIBIANS AND THEIR LARVAE**, **Stanley Trauth** (Arkansas State University, Jonesboro).

- 2:30pm AMPHIBIANS IN OKLAHOMA — PROBLEMS WITH NO ANSWERS, **Jeffrey H. Black** (East Central University, Ada, Oklahoma).
- 3:00pm BREAK and TOUR of SEDGWICK COUNTY ZOO HERPETARIUM led by the Herpetarium Staff.
- 4:00pm A REPORT ON THE FIRST WORLD CONGRESS OF HERPETOLOGY, **Joseph T. Collins** (KU Museum of Natural History, Lawrence).
- 4:30pm FREE-FOR-ALL HERP SLIDE SHOW! Bring your ten (10) best or most interesting color slides and be prepared to tell us about them.
- 5:00pm **DINNER.** On your own again.

7:00pm **SOCIAL AND AUCTION** in the Zoo Educational Building. Please bring items to auction. We need photos of herps and herpers, artwork, cages, snake sacks, snake sticks, books on herps, hide boxes, herp reprints, T-Shirts, color slides, herp badges & bumper stickers, etc. Items should be herp-oriented! **NO LIVE ANIMALS ALLOWED!**

Sunday, 12 November 1989

- 8:30am Coffee in the Zoo Educational Building.
- 9:00am MAP TURTLES IN KANSAS, **Martin Capron** (Oxford, Kansas).
- 9:30am KHS FIELD TRIP VIDEO (Rated R), **Olin Karch** (Emporia).
- 10:00am THE FIRST ANNUAL KHS SPRING HERP COUNTS. **Joseph T. Collins** (KU Museum of Natural History, Lawrence).
- 10:20am BREAK.
- 10:35am PRACTICAL METHODOLOGY: HUMANE HANDLING AND LAB TECHNIQUES FOR SNAKES. A video tape with comments by **Jeffrey Whipple** (KU Animal Care Unit, Lawrence).
- 11:15am THE AMAZONIAN TOURIST, A multimedia show opening with THE MIGHTY AMAZON, by **Duane Graham** (Hesston, Kansas), followed by a brief herpetological slide show presented (with commentary) by **Jim Marlett** (Sedgwick County Zoo, Wichita).
- Noon **ADJOURNMENT** (Have a good trip home, and drive carefully).

NOTE: The Sedgwick County Zoo and Botanical Garden is at 5555 Zoo Boulevard in west Wichita, and is most easily located from the intersection of I-235 and Zoo Boulevard. Regardless of which direction you are traveling on I-235, the Zoo Boulevard Exit Ramps are arranged so that, reaching the bottom of the ramps, a left turn will bring you to the Zoo. For those requiring overnight accommodations, there are many motels near the Zoo on West Kellogg Avenue (U. S. Rt. 54) between West Street and Ridge Road. For further information, call Jim Marlett or any of the SCZ Herpetarium Staff at 316-942-2213



ANNOUNCEMENTS

Plans Being Made for 1990 KHS Field Trip

Plans are being made at this time to hold the 1990 KHS field trip in Hodgeman County, Kansas. Tentative dates for this event have been set for 4-6 May 1990.

Hodgeman County is located north of Ford County, the home of Dodge City. It is bordered on the north by Ness County, on the west by Gray and Finney counties, and on the east by Edwards and Pawnee counties. The largest city in Hodgeman County is Jetmore, with a population of about 800. A motel is available in Jetmore. Fuel and several places to eat are also available in Jetmore.

A small state fishing lake is located to the southeast of Jetmore about five miles by road. Camping should be available at this lake.

Very little is known about the amphibians and reptiles of Hodgeman County. Well over two dozen county records might be found on this trip. Also, very little is known about Pawnee and Edwards counties. There are dozens of possible county records for these counties also. Both county lines are only about 20 miles east and southeast of Jetmore.

Mark the first weekend of May 1990 on your calendars. More information on this adventure will be available at the annual meeting, and in future newsletters.

— Larry Miller, Caldwell
KHS Field Trip Chairperson

KHS Members Win Chickadee Checkoff Photo Contest

KHS members Suzanne L. Collins and Joseph T. Collins have won the 1989 Chickadee Checkoff Photography Contest, sponsored by the Kansas Department of Wildlife and Parks. Their winning entry, one of hundreds submitted from across Kansas, is of a Northern Crawfish Frog (*Rana areolata circulosa*) found near the Marais des Cygnes Wildlife Area in Linn County, Kansas. This frog has been designated a threatened species in Kansas by Kansas Department of Wildlife and Parks. The winning photograph is part of an exhibit, "Amphibians in Kansas," currently showing on the 6th floor of the Museum of Natural History, University of Kansas, Lawrence. As first place winner in the contest, the color photo will also appear in *Kansas Wildlife and Parks* magazine, and will be reproduced as a color print for distribution during 1990 to promote the Chickadee Checkoff program.

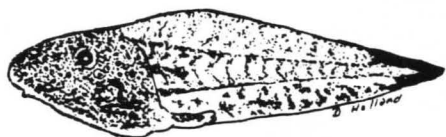


NEWS OF THE WORLD NEWS

Loose Python Found

Oldsmar, Florida. — The seventh large python found slithering around the same neighborhood has officials puzzled.

Experts are not sure where the snakes have come from, but say rodents are in far more danger than residents. Debbie Parker of Wildlife Rescue and Rehab Inc., a St. Petersburg facility that cares for injured or abandoned wild animals, said that because the snakes are not aggressive and appear well-fed, she suspects they may have been turned loose by their owner.



— Wichita Eagle-Beacon, 9 December 1988.
(Submitted by Larry Zuckerman)

Snake Puts Squeeze on Owner

The scenario was familiar: An early morning scuffle leaves one hospitalized and another behind bars. But this time the players were different.

Tom Ortiz was rendered unconscious about 4 a.m. Saturday when Tina, his 15-foot, 40-pound-plus python, constricted him. By wrapping around Ortiz, the snake cut off his oxygen and blood flow.

"Our treatment at the scene was for a severe constricting injury," said Jerry Overton, executive director of Metropolitan Ambulance Services Trust. "When we arrived, the patient was in critical condition."

Ortiz, 24, was taken to St. Luke's Hospital, where he was in satisfactory condition Saturday afternoon. A hospital spokesman said Ortiz had not suffered internal injuries but was under observation to make sure circulation and oxygen flow were back to normal.

And for giving her owner the big squeeze, Tina was taken into custody by Kansas City Animal Control officials. She was placed at Troost Animal Hospital.

Tina was incarcerated less than 24 hours after she was returned home by animal control officers for a previous brush with the law.

The snake had escaped early last week and was missing for about a day, said Jarvis Taylor, a field supervisor for animal control. While officers and Ortiz looked for the python, neighbors were more than a little worried about Tina's disappearance.

"I have little kids, so we were really concerned," said Mary Jackson, who lives across the street. "We were in turmoil wanting to know where that snake was."

When Tina was found in Ortiz's front yard, animal control took the snake until Ortiz could get a better cage, Taylor said. Kansas City requires that pythons and other snakes be confined in an escape-proof, locked container except when they are being handled, he said.

Taylor returned Tina to Ortiz on Friday after he had inspected the new container to make sure it met city codes, he said.

Ortiz had the python out of the container when it wrapped around his and began squeezing, Ortiz's roommates said. They called an ambulance when Ortiz fell to the ground.

Officials are unsure of Tina's motive. She may have meant to harm Ortiz or just give him a hug. Pythons are non-poisonous and crush their prey to eat.

Pythons usually do not attack humans if they are handled properly, said Larry Niederschulte, a ranger with the Jackson County Parks Department and an expert on snakes. A snake might attack if it is hungry, scared or threatened, Niederschulte said. Tina could have been upset because she had been moved so much last week, he said.

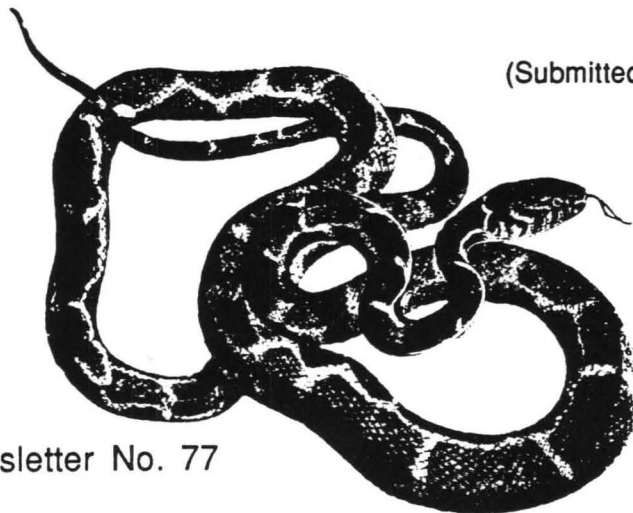
"The circumstances would have to be just right," he said. "It's rare, but it can happen."

"The snake maybe felt scared or unstable; she might have squeezed to hang on and maybe she squeezed too tightly for this individual. I've seen that happen."

Ortiz should be released from the hospital soon, but animal control officials are uncertain what will become of Tina.

"It's too bad," said neighbor Julie Mattson. "It was his pet, and he really liked that snake."

— Kansas City Star, 2 July 1989
(Submitted by Suzanne L. Collins, Lawrence)



Where Did the Toads Come From?

Dublin, California — Toads have invaded a street in this Alameda County town and no one seems to mind.

Thousands of thumbnail size toads have taken over Spruce Lane. They cover driveways, back yards, patios and the street. There are so many that residents have to take special care when walking and have given up mowing the lawn.

"They're just babies and we are afraid we'll run over them," said Jeanne Ferguson. "When we go out, we just tip-toe out of our house so we don't step on them."

Officials say the toads are nothing to worry about.

"They carry no diseases that we know of and they don't particularly harm anything," said Hal Rice, a vector control supervisor.

Besides, toads enjoy dining on the same insects that can be pests to homeowners and gardeners, he said.

— Kansas City Star, 2 July 1989
(Submitted by Suzanne L. Collins, Lawrence)

Ohio Zoologist Recommends 'Road Pizza'

Everglades National Park, Florida — A zoologist frustrated by a lack of live animal specimens has found a unique path to scientific discovery — the Everglades roads.

Eric Juterbock scours roads in the park every night for flattened frogs, splattered snakes and other wildlife that couldn't make it in the fast lane.

Juterbock, an assistant professor on sabbatical from Ohio State University at Lima, says he turned to the roads after failing to find enough specimens of salamanders for a study.

"I just got tired of working on things that you can't find many of," he said recently.

His new search for what sanitation workers call "road pizza" is proving more successful. The 41-year-old scientist has found as many as 358 dead frogs on a one-mile stretch of highway.

Many specimens are too squashed to be of use, but others are almost intact. Juterbock keeps a cooler for his better finds, including coiled, jewel-colored snakes and a frog crouched in an action pose.

"This one got its head squashed, but the rest is in pretty good shape," he said, unwrapping a frozen garter snake at his research residence in the park.

Juterbock will stop for living creatures, too.

He stopped his van one night when his sharp eyes spotted a shining green object. He found a pair of mating walking sticks, insects which he says are in almost permanent copulation during the mating season.

— Lawrence Journal World, 10 May 1989
(Submitted by Suzanne L. Collins, Lawrence)

Texans Seek Gator Aid

Dallas (AP) — Gator gawkers have been gathering at two Dallas suburbs to see the creatures known more for their swamp escapades than for carousing through Texas.

Big reptiles spotted in Irving and Plano have created quite a stir in recent weeks. The latest rage are T-shirts and special drinks, such as the "Gatorade" served at an area bar.

But Texas alligators, which trek the 250 miles up the Trinity River from the Gulf of Mexico, are certainly not new to the area and are more abundant in Dallas County than most think, said an official of the Dallas Museum of Natural History.

Richard Fullington, deputy director of the museum, said recent discoveries of gators in Irving and Plano reminded him of an incident in 1987 when residents of southeast Dallas believed that some kind of green-skinned swamp creatures inhabited a gravel pit.

"We got calls from people out there. They were in a panic," Fullington recalled. "One statement was that there was a three-toed Martian out there eating dogs."

Well, how about alligators, instead?

Lately, a 5-foot-long alligator has been lurking in the murky depths of Lake Carolyn in the Las Colinas development at suburban Irving.

And on Wednesday, animal control workers in Plano caught an alligator-like reptile in a pond.

— Lawrence Journal World, 29 May 1989
(Submitted by Suzanne L. Collins, Lawrence)

Hays High School Biology Club Enjoys Visit to Caldwell

Twenty high school students and their sponsors from the Hays, Kansas, High School Biology Club spent Thursday evening the 4th of May and Friday the 5th of May in the Caldwell area learning about the amphibians and reptiles found in the Caldwell area. The trip was planned by Mrs. Donna Cooper, biology teacher at Hays High School. It was one of several trips the club takes each year to learn about plants and animals in Kansas and other states.

Upon their arrival Thursday evening everyone attended a slide program about the amphibians and reptiles of the area by Larry Miller of the Kansas Herpetological Society. They also had a chance to view some of the native animals that were displayed that evening.

Friday morning, after breakfast at the Corner Cafe, the group headed south of town to observe and collect some of the native wildlife. It was perfect day, and animals were plentiful. Chris Wolf of Hays was the first to make a find. He found a very young Ornate Box Turtle near a cactus, and a few moments later he collected a Texas Horned Lizard near a prairie dog hole. Soon almost every student and sponsor had found critters. By noon more than a dozen species of reptiles and one amphibian had been found.

The group photographed many of the animals and then set most free. Malin Fredrikson, a foreign exchange student from Sweden, said she would have liked to take the adult Ornate Box Turtle she found back to Sweden, but due to the problems with international wildlife laws she decided to take a Caldwell box turtle t-shirt instead. A few of the Kansas animals were kept for later study in Mrs. Cooper's classroom in Hays.

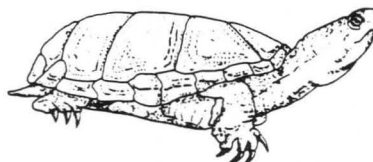
Everyone made one final stop in downtown Caldwell before returning to Hays that Friday afternoon. A group photograph was taken and many of the students bought Caldwell souvenirs. Mrs. Cooper stated that everyone had enjoyed their stay in Caldwell, and that the townspeople were very friendly. Christy Zimmerman, one of the Hays students, stated as she paid for her box turtle t-shirt and Caldwell postcards at Cleda's, "I had a good time. Caldwell is a neat little town."

— Caldwell Messenger, 17 May 1988
(Submitted by the Caldwell Sixth Grade Class)

One of a Kind Beats Straight Flush

Coconut Creek, Florida — The next time Kathy Rogers goes to the bathroom, she will look before she sits.

After flushing her toilet Thursday night, she looked into the bowl and saw the head of a six-foot-2-inch long Boa Constrictor pop out.



"When you realize that you just sat there. . . well, that can frighten you a bit," said Rogers. "It sure gives you a phobia about going to the bathroom."

After noticing the snake, Rogers yelled out to her husband, Ed, who was in another bathroom taking a bath. The couple, who had no idea where the snake came from, called police, who then called the Florida Game and Fresh Water Fish Commission.

"The snake kept coming up for air and then going back down again," Ed Rogers said. "To me, it was a little amusing.

"I've gone on snake calls before, but not with one coming out of the toilet," said licensed trapper Joe Samseo.

Samseo said he looked in the toilet but did not see a snake. He said he thought it might have been a joke until he began filling the tank with water so the snake would have to come up for air.

"Sure enough, this little head came out," he said.

The trapper used a pole with a noose to trap the snake and pulled it out.

"I thought there was no end to this fellow," Samseo said. "He came out very easily. He didn't try to bite. He was very docile."

"It was a big one," Ed Rogers said. "I mean it was a big one. If you saw the size of that snake, you wouldn't believe it was in the toilet."

He said the snake was about 5 inches in diameter. "I'll tell you, it was a gorgeous animal," he said. "I kind of felt sorry for the thing."

No one knew where the snake came from, but they had theories.

"People flush little snakes down the toilet and they grow up and come out again," said police spokesman Judie Weinflash.

The boa was turned over to a police officer, who took it home.

The Rogers' landlord offered to move them into another apartment.

— Kansas City Star, 28 May 1989
(Submitted by Larry Zuckerman, Pratt;
Jack L. Shumard, Wichita;
and Suzanne L. Collins, Lawrence)

Supply and Demand Problem Brings Protection for Frogs

Amphibian hunters beware! Believe it or not, three species of frogs have been added to the list of birds and animals protected by Quebec's hunting and fishing regulations. The Bullfrog, Green Frog and Leopard Frog are all now subject to hunting season limits.

You might think this slippery subject would be mainly of interest to small boys, some of whom catch frogs more than they catch colds. But this is apparently not the case.

The Ministry of Recreation, Hunting and Fishing announced this week that effective immediately the Bullfrog, Green Frog, and Leopard Frog may only be legally hunted from July 15 to November 15. As well, anyone out to catch these frogs must have in his or her possession a Quebec resident's frog-hunting permit. Unlike other hunting permits, you don't have to take a firearms handling course or pass the test to get a frog hunting card. A dollar of the fee will go to the Quebec Wildlife Foundation.

Frog hunting licenses are not the result of still another pipe dream by still another civil servant with nothing to do. It's a question of supply and demand.

In recent years commercial frog harvesting has grown beyond the ability of the frogs to supply themselves for the market. There aren't enough of the critters to go around.

Green and Leopard Frogs are used mainly in research and teaching, says the ministry. They're the ones caught for biology students to learn the skills of dissection. The students, in high school and college, pin the frogs to their dissecting boards with shiny chrome-plated dissecting pins, then cut them apart with razor-sharp dissecting knives and scalpels.

I'm not sure if this is still the case, but way back when I was a student, in some schools the frogs were dissected alive, and the students went home after class with chilling tales of cutting their amphibian apart and watching its little bare heart beat itself to death on the cold white laboratory slab. Anyway, dead or alive, there must be more students taking biology courses these days. This is apparently the main reason that numbers of the little green and leopard frogs are diminishing.

As for the bigger Bullfrog, it's mainly because of the legs. The Bullfrog is on the disappearing list on account of Quebecers' taste in food. "An increase in demand for Bullfrogs for the consumption of their meat (frogs' legs)" is behind the need to protect them, says the ministry.

Under the new regulations frog hunters may use nets, hooks, ditches, dams or their bare hands to catch their prey. Or they may beat them to death with clubs.

So far, the government has decided not to limit the sale of frog meat. That may be down the line, but first the ministry wants to use its new licence to see how many hunters are catching how many frogs.

The closed season from November 16 to July 14 is intended to protect the amphibians during the times of year they are hatching, hibernating and laying their eggs.

— Quebec Record 22 April 1988
(Submitted by Jeffrey Whipple, Lawrence)

Den Din and Drought Threaten Famed Canadian Snake Pits

Last year's drought has taken its toll on the famed Narcisse snake pit area.

The pits, located about 85 kilometres north of Winnipeg, are home to hundreds of thousands of Red-sided Garter Snakes and they draw increasing numbers of tourists each year.

However, officials fear that the population of some of the larger dens could be down by as much as 50 per cent.

"It was nothing for my wife and I to see 40 or 50 snakes come and go through our yard," said Peter Masniuk, a local reeve. "But in the last two years, it's been declining like you wouldn't believe."

The snakes survive Manitoba's cold winters by hibernating in limestone dens located several meters underground. During the first warm days of spring, the reptiles emerge in large numbers.

In the past, their population was so great that they created slippery traffic hazards on roads. They are considered a unique natural phenomenon because of the large number of snakes concentrated in one area.

In recent years, snake hunters, den damage, floods, and drought have killed them off by the thousands.

Wildlife experts say lack of rain in the past few years may have been hardest on the snakes.

"Quite a number of the snakes appear to be very soft, as if they are dehydrated," said Dr. Merlin Shoesmith, a spokesman for the Natural Resources Department.

"Like any animal, it's very serious when you're dehydrated."

Shoesmith said swarms of gnats were detected at the entrances of dens this spring, indicating that a large number of snakes may have perished due to the lack of moisture while hibernating over the winter.

He noted many more snakes have been trapped in the pits and died after tourists trampled entrances to the dens.

Tourists have also been known to pick up the snakes while they are locked in mating balls — in which several male snakes wrap around a female snake.

"When you pick up a mating ball and disrupt what's going on, the snakes don't get back together and do their thing," Shoesmith said.

Another hazard to the animals are snake hunters — people who harvest the snakes and sell them for research purposes.

Last year, harvesters bagged about 82,000 and got about 50 cents a snake.

Shoesmith said the department is drawing up recommendation aimed at increased protection of the snake dens.

— Edmonton Journal, July 1989
(Submitted by Irving Street, Sibleyville, Kansas)

Copperhead Killer Fined

A man used a boat paddle to kill a poisonous snake that he says threatened a friend, but was fined \$50 for molesting and killing wildlife in a protected area.

David McDonald, 23, and Kellyn Barnes, 24, were among seven people on a rafting trip Sunday on the Chattahoochee River near Atlanta when Barnes nearly stepped on the copperhead on shore.

"The snake was the same grayish-green color as the ground so I didn't see him until he drew his head back like a cobra does when he's about to bite. He was inches away from my foot," she recalled. "I panicked and screamed."

McDonald then killed the reptile. A park ranger who was watching through binoculars issued the ticket.

"All I'd done was kill a poisonous snake, which could have bitten someone," McDonald said.

Beverly Summers of the U.S. attorney's office in Atlanta said the ranger was acting under a federal statute that bans killing any wildlife on national park land.

— Topeka Capital Journal, 18 June 1989
(Submitted by Keith Coleman, Lawrence)

Water Woes Plague Cheyenne Bottoms Refuge

By Dave Ranney

Great Bend, Kansas (HNS) — A federal agent responsible for protecting habitats visited by endangered whooping cranes wants to know why Cheyenne Bottoms, a state wetland refuge of international importance, has legal claim to 50,000 acre feet of water each year, but finds itself in a constant search for water.

"If a private entity was in Cheyenne Bottoms' situation, they'd be screaming bloody murder," said L. Ronel Finley, state supervisor with the U.S. Fish and Wildlife Service Office in Manhattan.

Finley has blocked construction of 21 small dams proposed for the neighboring Wet Walnut Watershed District pending a review of their impact on the refuge's water supply.

The Wet Walnut Watershed District has spent \$9 million in federal and state grants building 27 small dams within the creek basin, an area roughly 16 miles wide and 100 miles long. The dams, estimated to be holding back 44,000 acre-feet of water, are designed to prevent a repeat of the disastrous floods of 1959 and 1967. Annual streamflows on Wet Walnut Creek averaged 60,000 acre feet through the 1960s but fell to 12,000 acre feet by 1982.

An acre foot is the amount needed to cover an acre with a foot of water.

The 21 dams still on the district's agenda are expected to cost roughly \$21 million. Kansas water laws are designed to protect a user's access to water based on legally assigned rights that rely on a principle of "first in time, first in right." Cheyenne Bottoms has a right,

posted in 1948, to 20,000 acre feet of surface water annually from Wet Walnut Creek, and 30,000 acre feet from the Arkansas River posted in 1954.

Cheyenne Bottoms covers eight square miles northeast of Great Bend, and is considered critical stopover habitat for millions of waterfowl during spring and fall migrations. They include rare or endangered species such as whooping cranes, least terns, piping plovers, Hudsonian godwits, whimbrels, red knots, and ruddy turnstones.

Surveys have shown that 45 percent of the shorebirds in North America stop at Cheyenne Bottoms during spring migration, including 90 percent of the population of five species.

Historically, Cheyenne Bottoms has been dry one out of every three years, but in 1948 officials began stabilizing flows into the refuge, successfully attracting legions of hunters and birdwatchers. Much of the supplemental water came from a canal built to divert water 22 miles from the nearby Arkansas River, and Dry Walnut and Wet Walnut creeks.

Since the mid-1970s, however, less water has been reaching Cheyenne Bottoms. This spring, for example, one of the refuge's five pools barely has three inches of water; the rest are empty.

A portion of decline is blamed on the current drought and on significant losses along the canal route. But state officials openly speculate that most of problem stems from an over-appropriation of irrigation rights throughout the Arkansas River basin, and upstream conservation practices that trap much of the area's rainfall rather than letting it flow into Cheyenne Bottoms.

John Reh, an administrator with the federal Soil Conservation Service office in Salina, has drafted a position paper offering Finley assurances that existing dams actually help Cheyenne Bottoms by slowing flood waters, giving the refuge access to water that otherwise would have passed it by. The refuge, he says, also is helped by more of the area's stored water reaching the aquifer.

Finley declined comment on Reh's assertions, but said they'll be weighed against arguments that the dams also prevent the refuge from getting much runoff from normal rainfall.

"I'm not saying it will, but this could get very hot politically," Finley said. "Cheyenne Bottoms depends on flows from within the basin—a basin that's also heavily dependent on agriculture. Things can get pretty sticky when you start putting the interests of one against the other. But my job is to look out for the endangered species that rely on habitat provided by Cheyenne Bottoms, which has senior water rights but can't get any water."

Finley says he's pushing the issue because federal regulations give him a role in approving funds for projects within the watershed district. Those regulations, he said, do not give him the authority to question irrigation's toll on the refuge.

The irrigation issue, he said, will have to be promoted by national environmental organizations that, as yet, have not shown an interest in pressing for strict enforcement of Kansas water laws.

—The Kansas Sportsman May 1989
(Submitted by Suzanne L. Collins, Lawrence)

Walk With Wildlife

More than 2,700 people from the Wichita area and a number of other locations spent part of Saturday, June 3, learning about some of Kansas' native animals at the annual "Walk with Wildlife" held at Chisholm Creek Park Nature Trail in north Wichita. Dozens of wild animals were displayed at the 15 stations that were set up along the trail. Animals such as raccoons, opossums, beavers, owls, turtles, snakes, lizards, frogs, fish, and insects were displayed.

The displays allowed people to see many wild animals up close, and in some cases even touch them. Members of groups such as the Audubon Society, the Kansas Herpetological Society, and the Kansas Department of Wildlife and Parks, helped with the animal displays. Volunteers

showed the animals and answered questions about them for the visitors from 9:00 a.m. until 4:00 p.m.

Once again this year, people from Caldwell were invited to help with the Box Turtle display. The popular display not only included our state reptile, the Ornate Box Turtle, but also another species of Box Turtle, the Three-toed Box Turtle. Andrea Burcham, Tami Newkirk, and Larry Miller from Caldwell worked the display and answered questions about Box Turtles for those attending. Ken Brunson of Pratt and Doris Phipps of Winfield (both members of the Kansas Herpetological Society) also spent some time helping at the Box Turtle display.

Some of those visiting the Box Turtle display included persons from England and Mexico, as well as a number of young people that were in Wichita to participate in the Special Olympics. Scout groups and a number of school groups also stopped by the display. The Box Turtle display, and those showing the turtles, were filmed by two Wichita television stations and shown on both that evening's six and ten o'clock news programs.

— Caldwell Messenger, 7 June 1989
(Submitted by Larry Miller, Caldwell)



FEATURE ARTICLES

First Kansas Herp Counts Held in 1989

**Joseph T. Collins
Museum of Natural History
The University of Kansas
Lawrence, Kansas 66045**

The first KHS-sponsored Kansas herp counts, a controlled census of amphibians and reptiles to be held annually during the months of April and May, took place in 1989, and may represent the first of their kind in the nation. Although the efforts were modest when compared with those of birders, herpers throughout Kansas participated in these events with vigor and enthusiasm. The main count was that sponsored by the Kansas Herpetological Society at its annual field trip, traditionally held in May. Several other counts are reported herein, each demonstrating a different approach to a census of amphibians and reptiles.

KHS Holds Herp Count During Annual Field Trip in Morris County

The Kansas Herpetological Society held its traditional annual field trip in Morris County, assembling at Council Grove Reservoir over the weekend of 12-14 May 1989. The nineteen participants also took part in an historic "first" for the Society — the initial KHS Annual Herp Count, which was held on Saturday, 13 May, from 9:00 am to 6:00 pm.

The Herp Count, in which 19 participants worked in teams and maintained a record of all amphibians and reptiles observed in Morris County, got underway after a light overnight light rain left the exposed ground soggy, but failed to moisten the earth beneath flat rocks. All teams broke for an hour at lunch, and resumed observations during a partly cloudy afternoon. At 6:00 pm, everyone gathered at Council Grove Reservoir to tally the day's count, as follows:

Prairie Ringneck Snake	66
Blanchard's Cricket Frog	37
Great Plains Skink	22
Ornate Box Turtle	14
Bullfrog	9
Great Plains Rat Snake	6
Plains Narrowmouth Toad	5
Western Painted Turtle	4
Eastern Yellowbelly Racer	4
Red-sided Gartersnake	3
Common Kingsnake	2
Bullsnake	1
Milk Snake	1
Lined Snake	1

Total

14 species 175 individuals

Participants in this first herp count were (in alphabetical order): Dan Carpenter, Keith Coleman, Joseph T. Collins, Suzanne L. Collins, Gary Cumro, Gus Huey, Kelly J. Irwin, Caleb Karch, Olin Karch, Bill Knighton, Carl Madorin, Dave Reberry, Sarah Reberry, Nancy Schwarting, Jack Shumard, Butch Teppe, Scott Teppe, Jeffrey F. Whipple, and Tim Wray.

If the KHS membership is willing, we will hold the second annual herp count at the KHS field trip in May 1990.

Sumner County Herp Count

Led by Larry Miller, teacher at Caldwell Elementary School and KHS Field Trip Chairperson, a spring Kansas herp count was held on Saturday, 14 April 1989, in Sumner County, Sec. 15, T35S, R3W, from 12:15 to 2:45 pm. The day was clear with moderate temperatures. Thirty-four participants spread out in small parties and searched beneath rocks and logs for specimens. At 2:45 pm all converged at a single site and the afternoon's tally, compiled and verified by Larry Miller and Joe Collins, was as follows:

Prairie Ringneck Snake	74
Ground Snake	20
Northern Prairie Lizard	14
Northern Earless Lizard	10
Southern Prairie Skink	9
Prairie-lined Racerunner	3
Texas Horned Lizard	2
Plains Narrowmouth Toad	1
Ornate Box Turtle	1
Black Rat Snake	1

Total

10 species 135 individuals

Participants in this herp count were (in alphabetical order): Michael Adams, Courtney Akers, Charlie Baker, Cleda Baker, Brice Boyle, Andrea Burcham, Shane Callaway, Joe Collins, Suzanne Collins, Christopher Conrady, David Dameron, Holly Goodman, Cindy Hollis, Corey Koehn, Todd Lowe, Richard Maxwell, Terry McCord, Larry Miller, Wendy Misak, Tami Newkirk, Alissa Overall, Leslie Perry, Jan Peterson, Sarah Powell, Benjie Rowe, Mickey Shaffer, Becky Shoffner, Delilah Subera, Arcine Thompson, Jamie Webster, Tyson Webster, David Wolff, Jeff Wyckoff, Travis York.

Belvidere Atea Herp Count

Led by Ken Brunson, a spring herp count was held on Saturday, 29 May 1989, in the area of Belvidere, Kansas, encompassing portions of Barber, Kiowa, and Pratt counties. Weather was hot and windy, starting about 75 degrees F and peaking at about 85 degrees F in late afternoon, few clouds, winds from the south at 15 to 25 mph — not a particularly good day for herping. The count was divided into morning and afternoon sessions, with different participants in each.

The morning count took place at a site 3 miles south of Elm Mills, Barber County, from 10:00 am until noon. Habitat consisted of pond, pond margins and rangeland in the Red Hills physiographic province, and observation techniques were seining (1 hour) and flipping cow patties (1 hour). Participants were Ken Brunson, Lee Ann Brunson, Jessica Brunson, Andi Brunson, and Katelin Brunson. The species list that follows was compiled and verified by Ken Brunson:

Western Painted Turtle	12
Yellow Mud Turtle	10
Red-eared Slider	5
Blotched Water Snake	3
Common Snapping Turtle.....	1
Lined Snake	1
Bullfrog	1

The afternoon count took place from 4:00 pm until 10:00 pm. Location: Driving route beginning on the south side of Pratt (Pratt County) on Route 281, south to Coats road, west to Coats, past Coats and then south to Sun City (Barber County), then on sand and gravel road to Belvidere blacktop (site of junkpile), west to Belvidere (Kiowa County), northwest of Belvidere on sand and gravel road approximately 7 miles and return to northwest of Belvidere about 2 miles (site of rock flipping for about 2 hours), back to Belvidere, north to Route 54, back to Pratt. Habitat ranged from row-cropped land with grassy roadsides to Red Hills rangeland, to riparian corridor. Observation techniques were by driving, rock flipping, flashlight and hand, and by call. Participants were Ken Brunson and Scott Hillard. The species list that follows was compiled and verified by Ken and Scott:

Driving (82 miles)

Great Plains Toad (from Belvidere to Route 54).....	5
Spotted Chorus Frog (4 mi NW Belvidere).....	2
Bullsnake (1 mi S Pratt, DOR).....	1
Plains Narrowmouth Toad (4 mi NW Belvidere)	1
Woodhouses's Toad (from Belvidere to Route 54).....	1

Identified by call

Blanchard's Cricket Frog (4 mi NW Belvidere).....	35
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Plains Narrowmouth Toad (4 mi NW Belvidere)6

Rock flipping

Eastern Collared Lizard (2 mi NW Belvidere)3

Great Plains Skink (2 mi NW Belvidere).....2

Total (Both Counts)

15 species..... 89 individuals

Allen County Herp Count

A one-day count of amphibians and reptiles encountered in Allen County was made by Suzanne and Joe Collins on 28 May 1989. Observations took place from 8:00 am to 7:30 pm, with about two hours devoted to rock-lifting and the remainder to road-cruising. The day was sunny and mild. The following were recorded:

Ornate Box Turtle 13

Red-eared Slider.....6

Eastern Collared Lizard5

Common Snapping Turtle4

Great Plains Skink.....3

Black Rat Snake.....3

Western Slender Glass Lizard.....2

Northern Water Snake.....2

Smallmouth Salamander1

Bullfrog.....1

Blanchard's Cricket Frog1

Three-toed Box Turtle.....1

Prairie-lined Racerunner.....1

Eastern Yellowbelly Racer.....1

Rough Green Snake.....1

Bullsnake1

Western Ribbon Snake.....1

Red-sided Garter Snake1

Massasauga.....1

Total

19 species..... 49 individuals

STATE TOTAL FOR 1989
(includes all of the above herp counts)

36 species..... 448 individuals

Rattlesnake Roundups

Henry S. Fitch
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Oklahoma's rattlesnake roundups have become an emotionally charged issue. The traditional attitude towards the Western Diamondback Rattlesnake, and probably still the most prevalent, is that these snakes constitute a hazard to humans and domestic animals and ought to be exterminated. In contrast, pro-snake sentiment with appreciation of the Western Diamondback Rattlesnake as part of the nation's priceless wildlife heritage deserving full protection, is a relatively recent and enlightened attitude which still has few proponents. However, there is a third point of view common among the roundup organizers and participants in which the Western Diamondback Rattlesnake is regarded as a exploitable resource to be hunted for both sport and profit, managed on a sustained yield basis and treated as a game animal. When George Pisani and I applied to the Oklahoma Department of Wildlife Conservation for a research grant to attend the 1988 roundups it was not our intention to defend or oppose any one of these viewpoints, but instead we hoped to obtain hitherto unknown facts concerning the biology the Western Diamondback Rattlesnake (*Crotalus atrox*), and facts concerning the economic and sociological bearing of the roundups that might be useful to the Department in developing its own policy. Our report to the Department after attending the 1988 roundups was preliminary but parts of it have been cited by local newspapers.

Articles by J. B. Bittner and Bob Ball in the February KHS Newsletter referred to the Fitch-Pisani roundup study and to our report submitted to the Department of Wildlife Conservation, but the information was third-hand with so many misstatements that I thought it would be well to provide our members with my own version of the facts. I attended all five Oklahoma roundups in 1988, and in 1989 I attended roundups at Okeene and Apache. Incidentally, my own expenses in attending the 1989 roundups were out-of-pocket, as were part of my expenses in 1988.

Some of the articles' statements with which I must disagree are the following: "*They [Fitch and Pisani] attended five snake roundups and examined all the snakes turned in by the hunters.*" Actually, our limited time permitted examination of only relatively small samples of the snakes brought in, as many measurements were recorded from each live snake. After butchering, viscerae were saved from some for additional information on food habits, reproduction, and parasitism. My procedure was to dunk the snakes in icewater for at least five minutes before handling them — not very sporting, but an effective method of calming them, so that I was able to handle more than a thousand live Western Diamondback Rattlesnakes with no accidents or close calls. "*A four-foot diamondback. . . can earn its captor \$35.*" Actually, the disassembled parts — skin, head, rattles, gall bladder, and meat are all salable, retailing for a combined total that is usually more than \$35, but for the individual hunter the going rate in 1988 was \$3.50 per pound of live snake. In 1989 the price increased to \$7.50 per pound, and this must be cause for concern. However, the increase seems to be due to new methods of processing the leather and the resulting increased demand by bootmakers, rather than scarcity of snakes. "*The snake population has not been hurt by the annual hunts.*" Our actual statement was much more guarded and qualified: "In general, the roundup samples do not suggest stressed population of second-year snakes and none that approach maximum size or age. . . perhaps an incipient stage of overhunting is indicated here."

Bob Ball writes that he is baffled at our suggestion that the Western Diamondback Rattlesnake population can be reproducing satisfactorily and holding up under hunting pressure "when they are harvested year after year at the peak of their mating season," and when trophy snakes — the oldest and largest — have become scarcer. However, the facts as presented in the report need not cause bafflement; each hunt is distributed over hundreds of square miles and probably the

snakes harvested are only a small percentage of those present. Western Diamondback Rattlesnakes are long-lived and trophy-sized snakes are those that have survived many breeding seasons. Specific traits that have made it possible for the Western Diamondback Rattlesnake to survive years of exploitation in each of the roundup areas are early maturity (typically at about three years), frequent reproduction (it seems to be annual in many females), large litters (about a dozen young), and dispersed populations of *Crotalus viridis* and *C. horridus*. Our report was filled with facts and figures but I think it contained no "biological paradoxes."

Doubtless the roundups have undergone changes in the 18 years since Mr. Ball observed the Okeene hunt, as he seems to have many erroneous impressions, for instance, the idea that large numbers of snakes are released to be hunted by participants. It is customary to release a specially marked snake (or several such snakes, depending on which roundup), and the finders receive cash awards. There are also prizes for the collector of the longest snake and the collector of the heaviest bag. Certainly there are no mass releases of snakes brought from Texas; it would be uneconomical to release large numbers of animals worth \$35 to \$40 apiece. Other interesting ideas that require verification are Mr. Ball's assertions that many of the roundup snakes are brought from Texas, and that many are captured in fall and held all winter. The Waurika, Apache, and Mangum hunts all include parts of the Red River bluffs on both the Oklahoma and Texas sides of the river, and perhaps some snakes from more remote parts of Texas are brought to Oklahoma roundups.

One objective of our 1988 project was to involve the Oklahoma Herpetological Society in monitoring the roundups and in obtaining data from them. Bob Clark and Neil Garrison of OHS both helped in our 1988 project and we thank them, but officially OHS has been aloof from the roundups, missing the unique opportunity to collect important biological data, to encourage a better understanding of snakes by the public, and to promote of conservation policies. It is encouraging indeed, that Mr. Ball has called upon all OHS members to become involved in helping to educate Oklahomans about snakes and to monitor roundup activities. One of the several recommendations in our report was that OHS ought to become involved in regular monitoring of the roundups.

Table 1. Sizes of Western Diamondback Rattlesnakes at Okeene and Apache.

A = Apache 1988 (N=168); B = Apache 1989 (N=139); C = Okeene 1988 (N=204); D = Okeene 1989 (N=139);
E = Combined samples (N=650).

Snout-vent Length in mm.	Percentages of samples				
	A	B	C	D	E
400-699*	0	2	6	10	4
700-799	5	8	15	9	9
800-899	12	8	17	6	11
900-999	32	26	22	23	26
1000-1099	23	38	19	22	26
1100-1199	18	16	13	19	16
1200-1299	8	2	7	9	7
1300-1399	2	0	1	1	1
1400-1499	0	0	0	1	-
	100	100	100	100	100

*Includes first-year and the smallest second-year snakes; these juveniles usually are not taken by the hunters and so are poorly represented in the samples.

Table 2. Estimated age structure of Western Diamondback Rattlesnake populations at Okeene and Apache.
 A = Apache 1988 (N=168); B = Apache 1989 (N=139); C = Okeene 1988 (N=204);
 D = Okeene 1989 (N=139); E = Combined sample (N=650).

Year of age	Percentages of samples				
	A	B	C	D	E
First*	0	0	2	2	1
Second	13	15	17	20	15
Third	24	30	23	13	23
Fourth	21	14	21	11	18
Fifth	12	19	10	14	13
Sixth	8	7	5	9	8
Seventh	9	7	6	9	7
Eighth or older	13	8	16	22	15
Combined sample	100	100	100	100	100

*First-year snakes are usually not taken by the hunters and so are poorly represented in samples.



More on the Kansas Threatened and Endangered Species List

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In reference to Marty Capron's article in the last newsletter concerning the Kansas Threatened and Endangered Species List, I would like to take this opportunity to provide some insight about some obvious misconceptions.

The latest lists for Kansas T&E species along with Species In Need of Conservation (SINC) were developed through an extensive effort of information gathering and objective evaluations. This contrasts with the way the first list was devised in 1975 which did not utilize any form of numerical rating system. A total of 153 Kansas experts (mostly knowledgeable and good people) provided numerical ratings and other useful information and references for 183 new species besides those already listed. There was a standard set of variables evaluated by these raters for the species they each chose to rate. These criteria included the general categories of species and habitat status both in Kansas and continentally along with evaluations of species' vulnerabilities. Specific elements in the first generalization included: population trends, rarity, taxonomic status, breeding biology, range distribution and loss of suitable habitats. Vulnerability concerns included such things as specialization, sensitivity to environmental contaminants and exploitation. There was also an "other" category for criteria that a rater wanted to address but was not on the rating form. This method was used (a similar rating form used by Texas) as an attempt to provide an objective assessment.

Once all the scores were calculated, the list committee (which I participated on) went through a statistical exercise to determine where numerical breaks were apparent between the threatened, endangered and SINC categories and also used this to judge if we felt the numerical score logically placed a species in an appropriate category. Sometimes changes were made subjectively to account for some known important considerations about a species that may not

have been addressed through the numerical assessment. Sometimes there was an insufficient number of raters to give us good mean values. The point to all this was to try and develop a list by a process that is potentially strong enough to survive court tests and political pandering.

Regarding Marty's feelings about the proper placement of certain species, I probably shouldn't take a lot of space to respond here except perhaps in relation to the Eastern Hognose Snake and the Alligator Snapping Turtle, two species which I have heard comment about before. I do know that 12 people provided a rating for the Eastern Hognose Snake. This matched the other high number of raters for a reptile species — Western Hognose Snake. The Eastern Hognose Snake rating (4.66) fell out slightly higher than the Western Hognose Snake (4.42) but high enough to "make the cut" for the T&E list. I think Marty's arguments based on collection records and first hand observations are valid but we will probably always be faced with this problem, especially when it comes to species that seem to teeter between categories because of their rankings. However, I think you can see the worth in trying to maintain as credible a ranking process as possible by following some type of structured, objective process along with what subjective judgments we are forced to make when placing a species.

The Alligator Snapping Turtle was another story. It was inadvertently left off of the original ranking list (yes, we are still subject to human frailties which cannot be left blamed to computer mistakes). This doesn't mean it wasn't evaluated. The committee's assessment of available information concerning this species led us to believe that we were dealing with a more transient species that occasionally wandered into this state rather than one that may be calling Kansas home. Through this process, we tried to rank species based partially on the premise that they were not just transient and that there were enough records through the last 35 years (since 1950 in 1985) to substantiate the species as a member of the state's fauna in more than just an accidental circumstance — at least sometime during the more recent past. With the Alligator Snapping Turtle and certain others, it was felt that although its categorization as a normal Kansas species may be in question because of so few sightings or collection records, we did not want to delete it entirely because as a SINC species because it could then receive emphasis for research to aid in assessing its true status.

The list is not etched in stone and specific listings may be changed if enough experts feel it warranted. Petitions may be presented at any time to recommend a species for listing, change its current category, or delete it from the T&E and SINC lists. At the end of the year, all proposed listings are evaluated through a similar structured process that involves experts on the species in question. To date, there has been no petition requesting that the Alligator Snapping Turtle be elevated to a T&E species. If anyone is interested in getting this started, please contact me or Bill Layher at the Pratt office of the Department of Wildlife and Parks. However, this does not necessarily guarantee that a listing will change.

Some of Marty's letter dealt with a feeling of futility in dealing with habitat alteration, particularly as it relates to our state's T&E list, the Department's regulation of projects that affect these species, and a perceived valueless nature of our T&E list. This is a totally wrong perception. *On the contrary, the Kansas Department of Wildlife and Parks has more authority through our T&E permit system than any other state in protecting habitats of T&E species.* Cases in point include the Northern Crawfish Frog in the Baker Wetlands near Lawrence, the Broadhead Skink in the Bone Creek Reservoir project near Fort Scott, and many others. The fact is, the department has uncharacteristically strong powers to force modification of or stop projects that may have negative affects on these species. The real truth is, contrary to Marty's last statement, that we *are* able to protect the habitat and the environment, *only because* we have a list for T&E species and SINC species. This doesn't mean we are going to win every battle. We don't. But we certainly win many more than we used to when we had absolutely no powers of oversight or authority to require mitigation or project modifications affecting sensitive species.

Our Environmental Services section, which administers our T&E permit system, reviews about 1600 projects a year ranging from small bridge replacements on county roads to large

reservoirs. Since 1980, the Department has issued 113 T&E permits for such projects. We have been able to modify or stop some projects that would have had a negative impact on species on our T&E list. I know that Bill Layher, Supervisor of Environmental Services Section, or his staff can provide many instances of habitat protection based solely on this permit system and would be happy to share this any time. We do not believe that our State's T&E list has no value. Nor will you find anyone in Kansas with more dedication to environmental protection than our Environmental Services Section. These people wage war daily on habitat destruction and sometimes our T&E list is their only weapon. They need our help and support if they are to withstand the relentless barrage of habitat changes brought on by economic and political interests.

One important way to help is by reporting new locality records for any species on the state's T&E list and the SINC list. This is one way we have of designating critical habitats and thus providing some degree of protection of any listed species. Contact the Environmental Services Section at Pratt (Telephone 316-672-5911) for recording sheets and other information relative to this program.

The Rubber Snake Award

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Often it seems that the most blatant wastes of energy can materialize from a base of ignorance. When combined with fear, the fruitless outcome can astonish even the most seasoned naturalist. Sometimes, direct confrontation seems to be the only realistic option. Such was the case for the person this writing is about. His deed, quite out of place in a world of fear and ignorance, was that of saving a bullsnake — saving it from a crushing blow by a shovel of tempered metal with a hardness rivaled only by the alloys encased in its handler's skull.

Larry was driving towards Wichita on a sunny spring morning. Only a mile had passed when he noticed two snakes innocently sunning themselves. He stopped to play good Samaritan. Recognizing them as bullsnakes, he approached to persuade them off the blacktop, then saw a truck pull up in front of him. A guy jumped out, digging weapon in hand, proceeding to pummel one of the bullsnakes. Larry was in awe as he attempted to reason with this hard head. Said the guy: "I've been killing snakes all my life and there ain't no fish and game law says I can't."

Confrontation set--determined snake killer crusader against Larry who wants only to save the remaining animal. What to do? Larry, being only recently fond of snakes in fairly close quarters, cast away any latent fear and grabbed the remaining live bullsnake and threw it into the cab of his truck exclaiming: "Well, you aren't going to kill this one!" Point and apparently adequate protection of the bullsnake being made, the metal-head jumped into his truck and faded quickly. Larry picked up the dead snake for what scientific or educational value it may serve and proceeded to his destination, sharing road and time with two snakes, one lividly irritated behind his seat. The dead snake ended up at the Milford Wildlife Education Center as a possible display specimen. The live one is now back in the wild.

Many times we can be held up to ridicule for doing something as outlandish as saving a snake. The societal rewards for such actions are few. But next time you see Larry Zuckerman, you might make his day by saying thanks for this small but particularly exciting and noble contribution.



BOOK REVIEW

Salamanders of Ohio. Edited by Ralph A. Pfungsten and Floyd L. Downs. xx + 315 pp. + 29 color plates. Available for \$30.00 + 15% for postage from: Ohio Biological Survey, 484 West 92nd Avenue, Columbus Ohio 43210

Although the editors are the principal authors, 14 authors have contributed to this extensive treatment of the 25 species of salamanders recorded in Ohio. A dedication and preface are followed by an overview of salamander biology, a checklist, a chronology of earlier publications dealing with the state's salamanders, a section on education and conservation, and an explanation of the format of the species accounts. Subsequent introductory materials presented include summaries of Ohio's geology and physiography, a chapter on the often neglected larval stage, and, finally, identification keys for both adults and larvae.

The bulk of the book consists of the individual species accounts. Species are arranged by family. Each family is introduced by a brief commentary on its content, distribution, and its way of life. Each species account is headed by the scientific name, standardized common name (SSAR Common Names List), and a black-and-white photograph, all of which is followed by a description, information on size and sexual dimorphism, and, when relevant, variation within Ohio. The distribution within Ohio, and the overall geographic range of the species, are described and illustrated by distribution maps. Each symbol on the Ohio maps represents a township with at least one known locality, and these townships are listed at the end of each account. The largest section of each account deals with the natural history of the species, and includes such topics as habits, diet, various aspects of reproductive biology, survivorship, and development to maturity. Information gleaned from studies in Ohio is supplemented by that obtained from the herpetological literature to present as detailed a life history as is presently possible. Some accounts also have a section dealing with unique behaviors, and one noting special attributes, controversies, or gaps in our knowledge particular to that species.

There are 29 pages of color plates, some of which illustrate a variety of habitats occupied by salamanders, but most of which illustrate life history stages. The latter features paintings of the adult stage by David M. Dennis, an internationally acclaimed wildlife artist, and photographs of eggs, larvae, and juveniles.

The text concludes with a notation of species which have been reported erroneously in the state, and those which, although not yet recorded in Ohio, might some day be discovered. There is a glossary of unfamiliar terms, a bibliography with an excess of 500 entries, and three appendices which list regional herpetological societies within the state, the abbreviations of county names used in the listing of localities, and the codes used to identify the museums the collections of which house the specimens used to compile the locality data.

