Red-stripe ribbon snake by Paul Montgomery

Rough green snake by Paul Montgomery

PART TWO: NONVENOMOUS

Texas Serpents

by Belva McKann

People from all over the country take off from work, load the car, pack up the kids and head for Texas, eagerly looking forward to some of the same attractions that Texans themselves enjoy with great pride: Big Bend, Six Flags, the Alamo and what? Texas SNAKES?

Yes, Texas has a number of unusual snakes that attract scientists and others by the hundreds every year, and no other state has as many snake species. Some people, such as noted Norwegian veterinarian Jens Petter Brastad, travel great distances to observe the complex behavior—results of a very long evolutionary gauntlet—of these fascinating animals.

How Texas snakes, venomous (Part I last month) and nonvenomous, became the creatures they are is an exciting story. The probable ancestor to modern snakes was a lizard similar to the monitor lizard. In order to avoid being eaten by dinosaurs, these lizards most likely went underground where they were safer from their nondigging predators. Some of the trade-offs, through eons of time, were the loss of their limbs (constrictors still have clawlike remnants of hind legs), free breathing, good eyesight and hearing. Eyes grew shut to avoid gathering dirt, the eardrums vanished and the auditory bones became fused to the lower jaw; the evolving snakes could hear only earthborne vibrations and a very narrow range of airborne sounds. Their narrowing snouts required smaller teeth than the lizards' chewing teeth, and the new slender form dictated a long, less efficient heart and only one lung.

During the Mesozoic-Cretaceous era, cataclysmic environmental changes eliminated land animals heavier than 50 pounds and reduced the reptile species to less than a third of their former number. The altered, underground lizard/snakes survived because both they and their prey (worms, spiders, larval insects) were protected from the destructive environmental conditions on the surface. As a result, snakes today are by far the most numerous reptiles, and they occupy a broader range of habitats than any other cold-blooded land animal.

Other modifications were necessary upon the emergence of the serpents some 70 million years ago in order for them to cope with life in the open. Behavior, not structure, was now the important area for change. Snakes bask in the sun to avoid dying from temperatures that might fluctuate too widely (30-odd degrees Fahrenheit in either direction). For the same reason, many species venture out only at night. Sight has been restored, but is not like human sight. It lacks sharp definition of details, but, like the peripheral vision of mammals and birds, quickly detects any movement.

Getting around without legs was accomplished by the miniaturization of the vertebrae to allow as many as possible (up to 435), which greatly increased flexibility of the spinal column. Other modifications, such as high-traction belly scales, allow rat snakes to climb almost straight up a tree, and all species of snakes that live in trees to hold themselves rigid from limb to limb across gaps at least half as great as their own length.

Some adaptation was needed to change the snakes' prey from subterranean worms and insects to surface species of animals. Modern snakes pursue, scent out or ambush their prey, and the vipers (Part I) also evolved sophisticated systems for killing animals with venom. All snakes became expandable-collapsible to allow for swallowing proportionally large animals.

The *mildly venomous rear-fanged snakes*, some species of which live in Texas, retained a saliva lethal primarily to the small animals upon which they feed. One example, the *Northern cat-eyed snake*, is unusual among Texas snakes in that it sometimes uses its venom against snakes much larger than

Coral snake and Mexican milk snake - Parks and Wildlife files

Gray-banded kingsnake by D. Craig McIntyre

The Mexican milk snake is a colorful look-alike of the Texas coral snake. The gray-banded kingsnake is the most variably colored snake in the state.

itself. (The coral snake is the only other snake in Texas to behave this way.) The front teeth of rear-fanged Texas snakes are smaller than the rear teeth, and some rear teeth are grooved to conduct toxic saliva into small prey. Five types of these snakes have vertically elliptical pupils like pit vipers: the *Texas night snake*, *spotted night snake*, *black-striped snake*, *Texas lyre snake* and *Northern cat-eyed snake*.

Another similarity to venomous snakes possessed by some Texas nonvenomous snakes is red and black banding reminiscent of the coral snake. The *Mexican milk snake* has a beautiful jewel-toned coloring. John E. Werler, director of the Houston Zoo, describes newly hatched Mexican milk snakes as "marked with a series of . . . narrow yellow rings bordered by slightly wider black rings . . . so widened over the spine as to nearly completely crowd out the red . . . yellow bands extend onto the [lower] surface, where they are separated by broad areas of black."

The distinction between milk snakes and coral snakes is that in milk snakes red and yellow (or white) rings touch only black rings, never each other. The coral snake has both red and yellow rings that touch and very broad black rings (as wide as the red rings), all of which completely encircle its body. And the coral snake is considerably more slender than other snakes that resemble it.

Why would a brilliantly colored snake be called a "milk" snake? Slow-moving milk snakes used to be found inside dairy barns, where they went to look for baby mice, while bull snakes and rat snakes were found out in the open pursuing the faster adult rodents. The popular explanation for milk snakes' presence in the barns (which is untrue) was that they slithered up cows' legs to drink milk from their udders, as if any cow would stand still for that. The scientific name *Lampropeltis*, meaning "gleaming shield," is more accurate.

The *Mexican milk snake* is the largest species of milk snake in Texas, averaging 20 to 32 inches in length. It lives in both the semi-arid thorn brush woodland of South Texas and on the coastal barrier islands. A group from Chicago's Lincoln Park Zoo, during an annual field trip to South Texas many

years ago, found several under old railroad ties and construction materials on the Matagorda Island beach. Milk snake hatchlings often are reluctant to leave their shells and have been observed, over the course of two days, peeping out through the slits in the eggshells. Until they are ready to emerge (they are nourished by means of abdominal yolk sacs), their bright little red, black and white heads duck back into their shells at the slightest nearby movement.

The red-, black- and yellow-banded *Texas longnose snake*, the only nonvenomous snake in Texas with undertail scales that occur in a single row, uses a defensive strategy of waving its tail in the air to fool predators into thinking they are seeing the about-to-strike head of a coral snake. Another occasional defense behavior is to hang limply as though dead and emit bloody fluid from its vent.

The most brilliantly colored snake in the state is the *gray-banded kingsnake*, found in Trans-Pecos Texas. It is unique in that no two are alike in coloring, although most follow a general pattern: in the lower Pecos River and Devil's River drainages most have broad orange saddles and black bands with thin white edges against a light gray background. In the Davis Mountains, the typical specimen has white-edged black bands that might be split with red and separated by broad areas of gray. In the farthest reaches of West Texas, gray-banded kingsnakes appear pale gray with a few charcoal bands across the back.

Because of its spectacular coloring and because it can be seen almost nowhere else in the country except Texas, the gray-banded kingsnake is a popular attraction for snake enthusiasts. Other West Texas snakes that draw attention to the state are the *Bairds' rat snake*, the *Trans-Pecos rat snake*, the *New Mexico milk snake* and the West Texas *Tantillas* (small burrowing snakes).

The golden-tinted *Baird's rat snake* is the only native serpent to change from cross-barred patterning to a striped pattern during the course of its life.

The *Trans-Pecos rat snake*, recorded up to five feet in length, is so gentle that it almost never defends itself against human beings. It is unique among all North American snakes because of its 40 pairs of chromosomes instead of the typical 36 or 38. No other snake resembles the Trans-Pecos rat snake's rusty-tan to yellowish-gray coloration with H-shaped markings along the back. A tick first identified in 1965 afflicts this snake and no other living creature.

All of the species of *Tantilla* found in Texas are relatives of tropical, subterranean snakes that live as far south as western South America. They have evolved such slender bodies that the left oviduct has been rendered rudimentary and their pinpoint eyes are virtually useless.

Tantillas are thoroughly adapted to living below ground and, like other small snakes, have almost no resistance to extreme changes in temperature. They will die within a very short time if placed in a glass jar or metal can, and can wriggle out of hands that capture them no matter how tightly they are held.

The *Devil's River blackhead snake* is the only *Tantilla* that grows large enough to bite if handled (members of the other five species are so small that they are unable to bite a human). This rare subspecies was first described in 1961 by M.J. Fouquette and Floyd Potter, the latter currently of the Texas Parks and Wildlife Department.

The *Mexican blackhead snake*, an extremely rare *Tantilla*, is found north of the Rio Grande only in Texas' Duval County. Almost nothing is known about this snake's natural history.

Prior to extensive agricultural and commercial development, Texas' Rio Grande Valley was a living tapestry of exotic and subtropical species of wildlife, and it still draws the interest of birders and other wildlife enthusiasts. Among the nonvenomous Texas snakes included in this area are the Mexican milk snake, Texas indigo snake, cat-eyed snake, speckled racer, black-striped snake and Ruthven's whip snake.

The largest snake in the state (with the possible exception of the biggest diamondback) is the *Texas indigo*, a reptile that also has the heaviest scales of any North American serpent. Recorded more than 8½ feet in length, Texas indigos are almost identical to West African spitting and whitelipped cobras. They are shiny brown-black in color with cloudy orange and blue-gray bellies. Their habitat is the thorn brush thicket and grassy plains of South Texas, where they are valued for their role in controlling rats and other snakes.

Like other wildlife flourishing in the palm groves of South Texas, the *speckled racer* is in great danger from habitat destruction. It is now among the

Spotted night snake by D. Craig McIntyre

Protected Species

Sixteen of Texas' snake species and/or subspecies are currently protected by state law from taking, possessing and transporting:

- Speckled racer
- Harter's water snake
- Trans-Pecos copperhead
- Gray-banded kingsnake
- Rock rattlesnake
- Black-striped snake
- Northern cat-eyed snake
- Texas indigo snake
- Texas lyre snake
- New Mexico milk snake
- Central Plains milk snake
- Louisiana milk snake
- Mexican milk snake
- Louisiana pine snake
- Baird's rat snake
- Trans-Pecos rat snake

Harter's water snake by D. Craig McIntyre

Harter's water snake is the only species found nowhere but Texas. It is greatly endangered, bordering on extinction, resulting from dam-building in its Hill Country creekbed environment.

Texas Herpetological Societies

Texas Herpetological Society
Route 3, Box 3225
Bulverde, Texas 78163

Dallas Herpetological Society
Post Office Box 163672
Irving, Texas 75015

El Paso Herpetological Society
7505 Dempsey
El Paso, Texas 79925

Greater San Antonio
Herpetological Society
9708 Braes Valley
Austin, Texas 78729

North Texas Herpetological Society
c/o Fort Worth Museum
of Science and History
1501 Montgomery Street
Fort Worth, Texas 76107

Southern Texas Reptile
and Amphibian Society
Post Office Box 233
Angleton, Texas 77515

rarest reptiles in Texas, living only in the southern tip of the state, under fallen palm fronds from the few Texas palm trees that are left in the formerly lush Rio Grande Valley.

This is an extremely beautiful snake, having dorsal scales with yellow-orange centers, blue margins at the base and black rims. Low on the sides, the scales become broad and green and the snake's neck scales are tinted turquoise.

The slender, foot-long *black-striped snake* now lives near houses and other buildings since most of its original habitat has been obliterated. It is a secretive little serpent that hides under things such as cacti, logs and construction materials. The three black stripes running down the back and both sides of its smooth-scaled brown body give it its name and differentiate it from all other Texas snakes.

Ruthven's whipsnake is another South Texas snake that has suffered drastic habitat reduction in recent years. It is a very slender animal, 40 to 56 inches in length, blue-green in color on top, with ventral coloring of bright yellow, blue-gray and bright red progressing from head to tail.

There is one snake, the *Harter's water snake*, that is found nowhere else in the world except Texas. Reservoir construction in the Hill Country has made this snake one of Texas' two most endangered serpents. It measures about two feet long and is grayish-tan in color with a faint brown stripe down the back, brown spots along the sides and a bright orange streak down the belly. Harter's water snake can hide from predators under submerged rocks for as long as 15 minutes, and can swim downstream diagonally toward the opposite shore like a shot in order to escape them. Six other snakes apparently restricted to Texas are the *Texas garter snake*, *red-striped ribbon snake*, *Texas lined snake*, *South Texas scarlet snake*, *Devil's River blackhead snake* and the *Trans-Pecos copperhead*.

At 2½ to 11 inches in length, and looking like an earthworm, Texas' smallest snake is the *Plains blind snake*. This snake is found from North to South Texas, often in compost heaps and flower beds. Plains blind snakes exhibit fascinating throwback characteristics to their lizard ancestors in the form of their tiny pelvic bones and vestigial rear claws.

Other small burrowing snakes of interest are the *marsh brown snake*, the typical "garden snake" found around houses on the coastal islands; the *ground snake*, which can eat black widow spiders in spite of the spiders' powerfully neurotoxic venom; and the *rough earth snake*, the small "flower bed snake" turned up in gardening and often found in residential areas.

One of the most familiar snakes living in Texas is the *rough green snake*, an animal so obviously harmless that it usually escapes destruction upon discovery. Found throughout the eastern two-thirds of the state, this bright, emerald-toned, little serpent tends to hold perfectly still regardless of what is going on around it, making it one of the easiest snakes to photograph. The rough green snake spends almost 100 percent of its waking time foraging for prey: caterpillars, spiders, grasshoppers, crickets, dragonflies and mayflies.

The stocky, slow *hognose* snake's well-known defensive behavior is quite dramatic: first, this blotchy snake tries to avoid detection by blending into its surroundings. Failing this, it heads for cover, crawling in wide convulsive loops. Next, it might feign a strike pose and raise the scales on the neck, revealing new skin colors beneath them. Forcibly inhaling and exhaling, the hognose (formerly known as the "puff adder") expands and contracts its entire forebody. The snake, now highly emotionally charged, may hide its head and, if touched, writhe convulsively, regurgitate, emit anal fluids, go limp and turn belly up. Should it be righted, the snake will immediately flop back over, crawling away only after the danger withdraws.

Anyone interested in wildlife as part of the immense and colorful biological world we all share can enjoy learning about Texas' native snakes. It can be satisfying to look for and identify the most common forms (earth snakes, ground snakes and Texas lined snakes); to be able to differentiate the myriad forms of water snakes from each other (out of 18 species and subspecies of water-living snakes in Texas only one, the *cottonmouth*, is venomous); to know for sure that any Texas snake with a pale stripe down the back is a garter or ribbon snake and therefore harmless; and to know that hognose

snakes instinctively mimic aggressive snakes, and bull snakes also are aggressive bluffers in order to pursuade predators not to eat them (nearly all snakes vibrate the tail tip defensively when frightened).

There are several good field guides to help in the identification of Texas snakes. Among them are *A Field Guide to Texas Snakes* by Alan Tennant; *A Field Guide to Reptiles and Amphibians of Eastern and Central North America* by Roger Conant; and *A Guide to Texas Snakes* by Gerald G. Raun. Also available to provide assistance and information are local science and nature centers and herpetological societies located throughout Texas (see sidebar).

Snakes have come a long way through time against formidable odds, but are now in worldwide decline. In Texas, some of the constraints to their existence have been obliteration of the Rio Grande Valley's native thorn brush and palm forest; Southeast Texas' chemical effluent and fire ant control programs; death on sight at the hands of people who are afraid of all serpents, no matter how small or vulnerable; and destruction resulting from pumping gasoline into every hole in the ground during "rattlesnake roundups" (this practice also obliterates every form of sub-surface plant and animal life in the area. *Western coachwhips* frequently den with *diamondback* and *prairie rattlesnakes* and are one of the most numerous of the many nonvenomous snakes poisoned in this manner. Ironically, rattlesnakes are occasional prey for *coachwhips*, which are resistant to rattlesnake venom.)

Out of 113 kinds of Texas snakes, 98 are nonvenomous. This means that the odds of seeing a nonvenomous snake far outweigh the chances of sighting one that is venomous. Also, many nonvenomous snakes eat their venomous relatives. And, every form of wildlife has intrinsic value as a vital part of the natural world. State law currently protects 16 species and/or subspecies of snakes against taking, possessing and transporting.

This state's diverse collection of serpents shares well-known characteristics of Texas itself: uniqueness, color, complexity and a history filled with adventurous twists and turns beginning at the dawn of time. • •

Texas rat snake by Grady Allen

Texas longnose snake by D. Craig McIntyre