Post Oak & Prairie Journal

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Contents

Canebrake (Timber) Rattlesnake

(photo: Michael Smith)

POST OAK & PRAIRIE JOURNAL

A Quarterly Journal of the Cross Timbers and Blackland Prairies Ecosystems

Rob Denkhaus – Editor / Michael Smith – Layout Editor

The *Post Oak & Prairie Journal* is published by Crosstimbers Connection, a 501(c)(3) nonprofit organization whose goal is to connect people with nature in north Texas.

Submissions:

We welcome articles that report observations, research and descriptions of the cross timbers and prairies, as well as articles pertaining to wildlife, plant communities, conservation, and land management within these ecoregions. Articles are peer-edited prior to acceptance.

Manuscripts may be sent in Microsoft Word, Apple Pages, or as documents that can be opened in Word or Pages. The article may also be sent in the body of an email. We regret that we cannot accept handwritten manuscripts.

Photos may be sent by email as JPEG, TIFF, or PNG images. Please send at the highest resolution available and we will compress them as needed. Please do not send photographs to be scanned.

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EDITORIAL

In This Issue

Michael Smith, President, Crosstimbers Connection

Three species are the focus of this issue of the *Post Oak & Prairie Journal*, and what connects them is their vulnerability. The articles in this issue illustrate some ways to better understand these species and their status in the woods and prairies of north Texas. Neither the canebrake rattlesnake, the white rosinweed, nor the eastern spotted skunk are keystone species whose loss would shake the foundations of the ecosystem. However, we do understand that all these species add to the biodiversity of our area, and thus to the stability, health, and richness of the cross timbers and prairies. And so, their continued presence is important, and we are better off when we know more about how they are doing here.

The canebrake or timber rattlesnake is listed by Texas Parks & Wildlife Department as "threatened," meaning that people are not allowed to collect them or needlessly kill them. Within the Texas Conservation Action Plan it is listed as "apparently secure," and considered uncommon but not rare. Its habits and preference for certain microhabitats makes it a difficult snake to find, and Clint King has pursued them with passionate interest, walking through the forest and driving the back roads at various hours of the night and day. His article shows a dedicated focus on observation, taking field notes, and then reviewing them to synthesize observations and look for trends. This is what we tend to think of as the way natural history study used to be: time- and labor-intensive exploration and note-taking, focused on *in-situ* observation of a species in its natural context. Without an army of herpetologists able to spend time in the field week after week, it is hard to do this work on any kind of broad-scale, but the insights generated by this kind of intimate contact with the subject matter can be very valuable.

White rosinweed is an endemic species within north central Texas, and so it relies on a limited geographic range and suitable conditions within that range. A portion of that range coincides with the DFW metroplex, a fast-growing region in which many open spaces are being developed. A 2013 article in the Fort Worth Star-Telegram noted that from 2011 to 2012, the Dallas-Fort Worth area recorded the largest population growth in the nation, outstripping even fast-growing Houston. Habitat loss is an issue for any species living in our area, and our multi-year drought has added insult to injury. Maria Arreola and her colleagues headed out to a number of known rosinweed localities to find and count individual plants, note if they were flowering, and count the number of seeds to measure the extent to which these plants were reproducing. They counted over 3,000 individual plants, and documented average seed production, which is another illustration of dedicated and labor-intensive field work. Under the leadership of Dr. Bruce Benz at Texas Wesleyan University, they analyzed the raw data to gain insights about this plant's status in Tarrant County. This sort of analysis is another way of understanding the significance of what is seen. On the one hand, we could look at our observations over several years, in several places, and hypothesize about what is going on based on our knowledge of natural history. However, when our observations are done in a way that allows it, statistical methods can help us decide if our hypotheses are correct. Is the rate of reproduction really changing? Is the population in one location really bigger than that in another location to a significant degree? The TxWes team was able to give us an answer, based on the combination of field observation and statistical methods.

The eastern spotted skunk is the smaller cousin of our common striped skunk. I remember when the Fort Worth Children's Museum had one in the 1960's when I extensively volunteered there. The little mustelid was the favorite of all who came into the natural history lab, and we had it out of its cage often. Sometimes it got a little stressed and began to stamp its front legs, and we always respected this signal, as the skunk still retained its full armamentarium of scent glands. It is a shame that they are thought to be losing ground here in north Texas, but Rob Denkhaus describes an encouraging sighting of this species using trail cameras. These cameras are a technological advance that greatly extends the observational reach of the wandering naturalist, at all hours of the night and day. A secretive or

EDITORIAL: In This Issue *(continued)*

nocturnal animal might go unnoticed for years in a particular locality, but they may be captured by a series of ever-vigilant cameras.

We hope that you enjoy this issue, reporting the results of careful field observations, use of statistical methods to help interpret observations, and technology that greatly extends our ability to gather information. Each of these methods and strategies has an important role to play in our understanding of vulnerable and threatened species in the cross timbers and prairies.

Reference

Fort Worth Star-Telegram. 2013. Explosive Growth Continues in Dallas-Fort Worth. (Internet: http://www.star-telegram.com/news/article3834249.html). Accessed 7/17/15.

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Silphium albiflorum metapopulation, Benbrook Lake spillway (Photo: Bruce Benz)

Secrets of the Canebrakes:

Fifteen Years of Personal Observations of *Crotalus horridus* in the Western Cross Timbers

Clint King, Board Member, Crosstimbers Connection

A mixed harmony of birdsong filled the air as the late evening sun began its descent, lengthening the shadows of towering oak and cottonwood as dusk approached. My high-topped boots parted knee high introduced Johnson grass as I wove my way through a dense forest of cane that grew up over my head. Grasshoppers fled like terrorized villagers from some hominid giant, and a fox squirrel scolded this strange interloper from the safety of a pecan trunk. It was only mid-April, but already the temperatures had been hovering in the upper eighties for nearly a week, chasing away any remaining threat of a late freeze. A light morning shower had helped raise the humidity, which had brought with it the inevitable invasion of mosquitoes that danced in the air. An aerial invasion of green darner dragonflies had swept in to thin out their ranks, but some of the lower flying ones had already picked up on the CO_2 emissions coming from my exhalations. I batted at them futilely with my snake hook.

As I broke out from the stand of cane the land opened up into a wide green swath of bottomland that transformed into a seasonal flood plain. A small grove of mixed hardwoods grew in the center, flanked on all sides by dense thickets of greenbrier interwoven with gnarled, low growing sugarberry, hackberry, and the ever-encroaching broad leaved poison ivy.

To my left, out of view but well within earshot, the West Fork Trinity River had swelled its banks from the recent rainfall, its muddy brown current whispering as it wound its way toward the metroplex some fifty miles to the east. Here a persistent group of male cricket frogs dueled it out with a symphony of grey treefrogs from bank to canopy, their seemingly endless song like the clicking of smooth stones.

Just ahead lay an immense cottonwood trunk, long felled. Most of its soft bark had given way to the elements, and for several years the slow, steady process of decomposition had begun to gradually return the dead tree back to the earth from which it had first sprouted well over a century ago. This fallen woodland giant had been my final destination. With its death, it had in turn sustained life for a myriad of other organisms that relied upon its existence for survival, from the bracket fungus that grew from its peeling bark to the bess beetles, termites, and carpenter ants that tunneled and bred in its spongy interior, to the five-lined skinks, wood rats, and wrens that sought shelter among its dried, entangled limbs and branches. There was one particular resident I knew well. Each spring, summer and fall, when time and conditions were optimal, this creature would appear like clockwork. And sure enough, there he was.

Coiled snugly against one side of the barrel-like trunk, two thirds of its massive six foot long body concealed beneath an overhanging gooseberry, lay an enormous canebrake rattlesnake. He was a stunning example of his species, magnificent patriarch of the riparian corridor. With a girth that surpassed that of my forearm and a set of fangs that could deliver a potent cocktail of both hemotoxic and neurotoxic peptides, this was a creature that rested comfortably at the very pinnacle of the food chain.

I approached slowly, hesitantly, measuring each footfall, not wanting to disturb the great serpent before I had a chance to observe him. From ten feet away he posed me no threat, nor did I to him. The snake's chunky, lance-shaped head rested in the center of its coils, a long broken rattle string draped lazily in front of its nose. It gave it a single nervous flick as I sat down on the ground beside it, the sound so slight it was almost inaudible, like the crushing of a cicada shell in the hand.

The canebrake was well suited for its place here beside the rotting log fortified by a protective hedge of wild grape vine and greenbrier. Its body was a dove grey, with a slightly pinkish wash that rendered it all but invisible atop the pile of dried leaves that blanketed the ground. Thick black chevrons formed a consistent pattern down the back, breaking up the background coloration and enhancing the reptile's camouflage. A single chestnut brown stripe ran through the center of each "V." A few inches before it reached the rattle the markings morphed into thin black bands that dissolved into a solid black, bringing light to the creature's local name, "velvet tail."

Secrets of the Canebrakes *(continued)*

I inadvertently moved, and the snake's tongue emerged to flicker briefly, its bifurcated tips picking up scent particles from the surrounding air and sending them to the Jacobson's organ located in the roof of its mouth. It was sizing me up.

I had managed to find this remarkable species of state-protected rattlesnake many times over the years along these riverbanks and floodplains, but each time brought a renewed sense of awe and wonder to my mind. I have been engrossed in personal observation of the canebrake rattlesnake for almost twenty years. Canebrakes are mysterious reptiles that lead retiring, secluded lives. On a typical stroll through the woods they are a rare sight indeed, but each encounter has provided me with an additional piece to their puzzling natural history. I have, over time, learned that their habitual, routine lifestyle (quite different from their famous free ranging cousin the western diamondback), when learned and followed closely, can bring them into view in the field with increasing regularity.

My legs grew numb, deprived of proper circulation, and I rose briefly to stretch them out. The canebrake's body tensed and it flicked its rattle back and forth, a casual shake that soon became a whirring blur of movement as it rose in pitch and frequency. As it did, I bent my ear and listened closely as it began to whisper its secrets.

Canebrake rattlesnake from Wise Co., TX

The canebrake rattlesnake (*Crotalus horridus*) is currently listed as threatened by the Texas Parks and Wildlife Department. A note should be made that it is illegal to possess, harass, collect or kill the species in Texas, although one is free to observe and photograph to one's heart's content. Canebrakes are widely distributed across the eastern half of the southern United States. They are known as timber rattlesnakes in the north, where they occur as close to the continental divide as Ohio and on to the eastern seaboard. There is ongoing scientific debate as to genetic variation between northern and southern populations, although DNA testing has confirmed that there is no subspecies. In terms of coloration and habits, however, southern *Crotalus horridus* are quite different than their northern counterparts.

The canebrake rattlesnake in the south is found from eastern Kansas and Oklahoma south to the east Texas piney woods, east to the Carolinas and northern Florida. It is found in isolated areas down to the gulf coast in Texas. While it can be a common snake in many parts of its range, Texas populations thrive mostly in isolated pockets of pristine habitat. A few such populations occur within the coniferous woodland of eastern Texas, from the coastal areas northeast through the Sabine and Big Thicket and up to the Red River. The second is a rather restricted area composed of mixed hardwood and juniper between Rockwall and western Wise counties. Here, along the banks of the Elm, Clear, and West forks of the Trinity River, in a mostly rural environment, isolated from substantial human populations, the species reaches one of its greatest population densities. And it is here that my love for the canebrake rattlesnake first blossomed.

In1994 along a tributary to the Trinity River, where a thin stream of backwater meanders across a dense grove of post oaks along a gently rolling hillside strewn with moss and lichen laden boulders I laid eyes on my first canebrake rattlesnake. Some months later in the same place I found a second.

It was mid July, right after a summer rainstorm had graciously watered the parched earth. The humidity was almost as unbearable as the

Secrets of the Canebrakes *(continued)*

mosquitoes. Although I had been aware of the canebrake rattlesnake's presence in my home state, I was taken aback at the now obvious fact that they could literally be found at my doorstep. I was two miles from my house. An immediate fascination with the species was born that day, and I was gripped with the sudden obsession to learn all I could about their natural history.

As the years rolled on I began to find the snakes with greater frequency. This was largely due to the fact that I kept extensive field notes. Looking back on past sightings, I began to notice a pattern. While the occasional specimen was found in an unlikely area (such as the three specimens discovered in open grazed pasture bordered by bluestem prairie) the species reached its greatest population density in areas that adhered to specialized microhabitat.

Atypical habitat: prairie in Wise County where three canebrakes have been seen

The most common factor linked to the abundance of rattlesnakes was habitat and microhabitat. Aside from the above mentioned specimens, the vast majority of individuals were discovered either along the banks of the Trinity River or in flood plains in close proximity.

In order to better understand this close tie with its specific niche one must first understand the methods the species uses to acquire food. Canebrakes are ambush predators. They can be said to be nocturnal but are usually only found on the move in the early morning and late evening hours, and are thus more specifically categorized as being crepuscular in nature. They emerge from their subterranean shelter within the impenetrable labyrinth of brush pile or an abandoned mammal burrow two to three hours before dark, where they make a beeline for a familiar ambush spot, usually beside a large rock, log, stump, or tree base that falls along rodent trails. There they coil and remain in position throughout the night, seldom moving until late morning when the sun's rays become too intense, whereupon they return to their daytime shelter. Many times individuals will use the same logs or stumps for weeks to months, as long as a steady supply of rodents continues to use the trails. This, of course, is itself dependent on an adequate supply of food for the snake's prey items as well. So in order to distinguish areas more suitable for prey items I had to begin to study what prey was most frequently consumed by canebrake rattlesnakes. This posed a problem, for without a scientific permit I was forbidden by the state to possess specimens (either dead or alive) to analyze stomach contents. My quest for answers seemed to have hit a brick wall, as all the textbook literature simply stated their chief prey as rodents. Fortunately I found a breach low enough to leap over. The answer came in the form of roadkilled specimens. Still illegal to actually pick up or possess, I could, however, slit the stomach open at roadside and remove the contents, and so I did. Within the span of several seasons I had accumulated enough data to get a fair picture of what north Texas canebrakes fed upon. This only left the comparatively simple task of perusing through mammal field guides and studying the diets of specific rodents, then identifying what they fed upon in the field and locating areas within the snake's habitat range most rich in those types of flora. A hypothesis was soon formed: rodent species most common to the area were most likely those found in the stomachs of the snakes, and they would most likely feed upon the most common and therefore most readily available food source, which would come in the form of various seeds of local plant species. The plot was beginning to thicken.

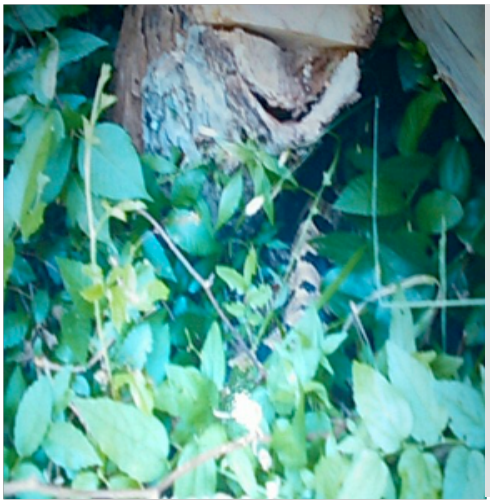
Identifying the rodents and seeds they feed on was easy with the help of a few field guides. I soon learned that the three most common rodents found in the stomachs of the roadkilled specimens were the wood rat (*Neotoma sp.*) the cotton rat (*Sigmodon hispidus*) and the white-footed mouse (*Peromyscus leucopus*). In fact, in all of the specimens sampled, these were the only prey items present. A closer study of the dietary preferences of these rodents confirmed my speculations:

Secrets of the Canebrakes *(continued)*

White-footed mice relished pecans, which grew in abundance along the river banks and in the flood plains, and both cotton and wood rats' diets read like a list of local plant species: oak leaves, greenbrier, and hackberry. Furthermore, their microhabitat preferences equaled those of the rattlesnakes: bottomland replete with hollow trees, under logs and in brush piles (wood rat) fallen logs, tree bases (white-footed mouse) and burrows in brush piles (cotton rat). So that at least explained why the canebrakes favored this microhabitat, but another realization dawned on me as I looked at the predominant trees

White-footed mouse

that grew there. Pecans and cottonwoods were the most common, followed by willows and oaks. All these except for the latter were softwood trees. Their branches contained a high moisture content which they soaked up from the sandy riparian soil. This caused them to break easily during periods of high wind. Pecans were particularly notorious for this. Thus softwood trees were another factor necessary for optimum habitat, for as the branches broke they inevitably fell to the forest floor, providing ample basking and ambush sites the snakes could utilize. Likewise, greenbrier and hackberry grew in tangled masses, the first as a vine and the second as a brushy shrub-like tree, often together. These grew beneath larger trees in the partial sunlight filtered down through their leaves, forming a sort of understory or subcanopy. This created a dappled effect of light on the substrate below, no doubt composed of dead leaves and short grasses. This combination created the perfect basking situation for *Crotalus horridus*. It could thermoregulate in the midst of a thick fortress of thorns in partial shade and partial sunlight, making it able to be active in fairly cool as well as fairly warm weather. Its camouflage



A glimpse at one of my first canebrakes, found in 1997 on the Blind Man Ranch in Wise County, TX one half mile from the Trinity River. This snake was observed repeatedly over a 7 year period

concealed it well among the mixture of living and dead leaves, and prey was steadily abundant here as well. This became my new set of qualifications for prime canebrake real estate: areas in close proximity to the river (a permanent water source) coupled with pecan groves, beneath which grew plenty of greenbrier. The only thing left to do was give it a test run in the field.

In no time I gathered a handful of choice sites that met my new specifications, fully expecting to find ten times the amount of snakes than before. I was in for a surprise. I found no more snakes in these supposedly choice haunts than I had in comparatively less favorable ones. So it was back to the drawing board, aka my field notebook.

Looking for similar patterns, I found just such in the time periods over which I observed the snakes. While field sightings varied, I noticed specific windows of time in which the snakes were found alive on the roads. Perhaps the reason I was failing to increase my field productivity was the simple fact that the snakes were impossible to see in perfect habitat. A three foot long well-camouflaged rattlesnake coiled silently in dappled sunlight behind a wall of thorns and shadows was the epitome of looking for a needle in a haystack. So if I wanted to find more canebrakes, it looked like I was going to have to hit the road.

A quick tally of times each snake was found soon provided me with an average time. I then took the earliest and latest points and created my window of surface activity, when the snakes were most likely to be seen abroad. Of course, those snakes

Secrets of the Canebrakes *(continued)*

found either alive or dead in the roadways were either traveling to (evening) or from (morning) their habitual ambush sites. A consistency of late evening and morning sightings confirmed this, with very few sightings of live snakes on the roads after noon or 9:30 pm. I then took note of the earliest and latest mean times specimens were found on the move in the daytime, since I had limited nighttime access to property anyway. After studying maps in The Roads of Texas I narrowed my driving down to an eight square mile box and quickly found several tracts of land that qualified microhabitat wise. One road in particular was phenomenally perfect, being only a mile long,

Subadult canebrake found alive on the road 6/4/14, 8:40pm, Wise Co., TX

bisecting the river between both open pecan groves, floodplain, and oak woodland. In true form, I found plenty of canebrakes here, much more than I ever had in the field in fact. In the course of a single season I racked up more rattlesnakes than I had seen in all of the previous years put together. But something was missing. Finding a canebrake on the road paled in comparison to seeing one in its element in the middle of its natural habitat. I had to find a way to locate them in the daytime in the field. Back to my field notes...

As fate and fortune would have it my predicament solved itself on an unlikely morning in early fall. The temperature was in the low sixties, with a brisk wind that made it feel even colder. But the sun was out, without a cloud in the sky, so the day found me at one of my usual hangouts: an open swatch of flood plain uphill from the banks of the West Fork Trinity. Underneath a bridge at roadside I had spotted a huge pile of cottonwood logs recently stacked there by an electrical company clearing trees that posed a danger to overhanging power lines. Dense stands of Johnson grass choked by Virginia creeper had grown up between the logs, and the place screamed "canebrakes." I pulled over and began my descent down the hillside to the log pile, my hopes high in spite of the unfavorable chill in the air. I came around the edge of a stray log and my eyes just so happened to fall directly onto the only exposed coil of an adult canebrake.

The snake was almost invisible. It was tucked away almost entirely beneath a log on a bed of dead oak leaves that blended perfectly with its pinkish gray ground color. The log had been almost completely overgrown by greenbrier, the shiny leaves and tangled, thorny vines so thick that it reduced my view of the substrate below to fragmented pieces where the sunlight filtered through. Here a ray of light just so happened to fall upon a couple of square inches of scales. If it hadn't, I would have easily stepped over the snake. All this dawned on me as I stood there, hands on my knees, peering down at that patch of scales, which suddenly shifted back into the dark recess of the log and was replaced by another patch of scales. That was it! It was the greenbrier! Canebrakes required an understory to thermoregulate and remain hidden at the same time! The secret to their proliferation! As the discovery hit me I jumped into the air, and the vibrations transferred from my boots alarmed the snake, which set up a furious buzzing from beneath the log. More whispered secrets, like music to my ears.

The greenbrier thicket is perhaps the most essential clue to population survival of *Crotalus horridus* in north Texas. Once I discovered this I applied it to my earlier findings and began to find rattlesnakes in the field with ever-increasing frequency. In certain areas that met all habitat requirements they were actually quite common, and at one site determined then to be the predominant snake species. Of course greenbrier provides a sufficient fortress of protection, and scanning through it takes hours of patience and an acquired keen eye for detail. It had taken me ten years to stumble upon this revelation, and I couldn't help but wonder how many snakes I had simply passed by without even realizing it. Unlike the nervous and at times irascible western diamondback, the canebrake is not easily provoked to rattling. It seems to know when it is hidden and when it has been spotted and unless one goes out of one's way to agitate it, it usually chooses to remain silent and still, relying on its camouflage, which is superb in and of itself.

Rather than satiating my thirst for knowledge, this major breakthrough in my studies only opened another can of

Secrets of the Canebrakes *(continued)*

Floodplain along the West Fork of the Trinity River, the location of several dozen sightings

mystery worms, as is often the case of the plagued brain under the influence of biology. I now found myself turning to my field notes yet again, this time focused on those specimens I had come across that were deviations from the norm. I had found scores of wild canebrakes, and while the vast majority I could easily fit into a box of what could be deemed as "normal behavior," it was those exceptions to the rule that now captivated my thoughts. Basically I had two main questions: what were the differences in those specimens found in atypical habitat, and what were those few individuals doing that were found moving around late at night? Both seemed linked somehow by their most basic hunting method. The canebrake's microhabitat is not only important to the regulation of its body temperature, but also its ambush style of acquiring food, and the frequent re-use of familiar sites means the snake can sustain itself in a smaller home range. In fact, in areas where the species reaches its greatest abundance both greenbrier thickets and fallen timber abound. In other words there appears to be little competition over either suitable sites or prey items. So what was with the wandering? Or the snakes found late at night? What were they doing and why? Had they failed to read the handbook? Again I found myself seeking more answers.

Fortunately the answers to both questions could be pursued simultaneously. I began to frequent a new location, one that contained a sizable square mileage of bottomland in close proximity to a higher mesa covered in bluestem grass, several miles from the river. I hunted it extensively, often for nights on end, driving through miles of mixed habitat on a two lane county road between 7:00pm and midnight, taking extensive notes on weather pattern, season, temperature, humidity, and barometric pressure, looking for departures from the norm and missing links. I also began to study aerial maps. Oh, and I found canebrakes. Lots of canebrakes.

DOR (dead on road) specimens, while not collected, were measured, sexed, and given GPS coordinates. I would often return to exact location sites during the daytime and photograph the habitat. I also began to watch other species of snakes for abnormal behavior and take more detailed notes in them as well. All the while my faithful wife rode alongside, fetching flashlights, serving as a scribe, as well as an extra pair of eyes. I owe a lot to my confidante, my field partner, and my constant source if encouragement for always supporting and aiding me in my insatiable quest for knowledge of the secret lives of canebrake rattlesnakes, especially given the fact that I was not being compensated for my research. In such a case it helps if one's significant other enjoys the company of venomous snakes too.

Compiling my notes, I began to see several patterns. First of all late night excursions where I found canebrakes active as late as 10:30 pm also showed a significant increase in the abundance of other species of ophidians. These cases I quickly tied back to sudden barometric pressure drops such as approaching thunderstorms. This made sense, since the Trinity River is often subject to seasonal flooding, and while rattlesnakes are fully capable of swimming, being caught at the bottom of an armadillo burrow during a flash flood could prove fatal. Therefore snakes that thrive in the floodplain often have to make a speedy getaway for high ground in front of an oncoming storm. All snakes are sensitive to changes in the weather. On the rolling plains one spring weekend I experienced one of the greatest mass snake movements I had ever seen as a massive storm cell moved into the Abilene area from the southwest, bringing tornados, hail, and torrential rainfall.

My research also showed canebrakes to be diurnally active when drought-breaking late summer showers quenched the

Secrets of the Canebrakes *(continued)*

thirsty land. In these cases humidity played a huge factor, and we often found rattlesnakes out and about midday, and once even during the middle of a downpour. Rock rattlesnakes (*Crotalus lepidus*) in the arid southwestern deserts often employ this same strategy. Typically a nocturnal species, they become diurnally active during the monsoon season, emerging from their subterranean crevices onto wet boulders along rocky bluffs to thermoregulate and drink. In fact, almost every single specimen of *C. horridus* I discovered during abnormal hours was found moving either nocturnally due to a sharp drop in barometric pressure or diurnally in accordance with late summer showers. The first mystery had been solved.

A recent example of flooding within the Trinity River floodplain

By now it was 2012 and another plaguing question had yet to be answered. What was I to make of the canebrakes that occupied the variety of habitats incongruent with those specific riparian ecosystems that caused the species to proliferate there? Over the years I had accumulated dozens of records of specimen data from such unlikely habitats as bluestem prairie, mesquite savannah, agricultural upland on the edge of post oak outcrops, and even a few from rural back yards. Often these places were devoid of logs, and no greenbrier choked out the ground. They were miles from the river as well. Certainly there had to be a link I was not seeing. Why did they occur there at all when several miles away lay pristine habitat from which they had certainly originally come? Were rodent populations too low to sustain sizable numbers of resident *C. horridus*? Hardly. Wood rats and white-footed mice were everywhere, and while canebrakes were common at most study sites they could hardly be called abundant. So what was the point in straying? Why occupy unlikely habitat that met few of their requirements for survival? My wife stumbled upon the first key to the answer in the late spring of 2012. In what would later prove to be the single greatest season we had ever had for sightings, on a seldom traveled backroad in Wise County, some six miles from the Trinity River, she came across an adult DOR. I was out of town on an unrelated bio-survey trip to the Big Thicket in the piney woods of east Texas (where we found no canebrakes, may I add) and she was out carrying the torch for my private research project while I was away. She phoned me with the news. "I just found a timber," she exclaimed, "four foot long DOR ... grazed pasture all around ... miles from the river." It was on.

The very night I got back into town we made for the new locale. We found three snakes in a single evening. Finally I had a breakthrough. Not only did they occur in this unlikely location, they predominated. I dedicated the entire 2012 season to the area, a 4 mile loop of mixed grazed agriculture, mesquite savannah, and deciduous woodland. While I had no access to private property I could cruise the roads, and it paid off. We found thirteen canebrakes there between late April and mid September.

Again, while I collected no specimens, I did take all the data I could accumulate. And again it paid off, this time in the form of a GPS satellite application called Google maps.

Adult canebrake DOR (dead on road) on Wilson Prairie (atypical habitat)

Having a friend who specializes in the field of land management and works with landowners to conserve and restore damaged ecosystems by means of government compensation, who has access to topographical and geo maps

Secrets of the Canebrakes *(continued)*

also helps. Between the two resources I quickly figured out what was happening. It was a matter of self-preservation on the snakes' part. And the results were astounding.

As more and more of the deciduous riparian corridor that banked the Trinity River gave way to farmland, the rattlesnakes found themselves losing more and more ground. Dense patches of greenbrier, some acres wide, that formed a sub-canopy beneath their towering trees were cleared as ranchers bought up good bottomland for its fertile, nutrient-rich soil. They planted coastal and alfalfa grasses, and introduced cattle. To make matters worse, bands of feral hogs (an ever-growing detriment and general nuisance to all wild things and places in the state) began to make their destructive introduction as they followed the river system in search of food, water, and shelter. Man and hogs were the first predators the canebrakes had had to seriously deal with. With their keen sense of smell and thick, thorn- and fang-resistant hides, the omnivorous feral hog had begun to prey upon slow moving serpents like canebrakes. Even worse, they were losing their habitat almost daily. So all this time I had been witnessing survival of the fittest. It was nature adapting where it could not compete. As I compared what had now become nearly two decades of field notes on the canebrake rattlesnake, my eyes began to pick out a hidden image that had been there all along.

Adult canebrake crossing the road, 10:30pm, July 2014, during a barometric pressure plunge

Like looking at a "magic eye" photograph, it suddenly all fell into place as I compared my notes with aerial maps of the lay of the land. The snakes were following tributaries from the river, occupying tiny niches of habitat and adapting their lifestyles to survive in these niches. Letting my mind wander slightly to the borders of my imagination, I could see the habitat specific

A tributary to the West Fork, Trinity River where four canebrakes have been found

canebrake rattlesnake evolving into a habitat generalist like its relative the western diamondback, which is arguably the most common serpent species in the western two-thirds of the state. Of course, this was all speculation, and a species' attempt to adapt to its surroundings is a far cry from a successful adaptation. Add the fact that habitat (especially microhabitat) is a resource that is difficult to recreate, and while successful species adaptations take generations, a bulldozer can remove entire habitats and populations in a single day. For this reason I am ever thankful that the state has chosen to protect this sensitive reptile, for whatever it's worth. Nevertheless, public opinion of rattlesnakes is still negative at best, and in the face of progress and development the canebrake finds few friends and little sympathy.

It is now 2015, and my research of *Crotalus horridus* population densities and the factors that cause them to fluctuate continues unabated. It seems with every question I answer a host of others spring to life. Do north Texas populations hibernate communally as the timber rattlesnakes do in the north, or singly? Do they follow scent trails to

Secrets of the Canebrakes *(continued)*

separate den sites or utilize the same burrows they use during warm months? Are the adult snakes found in atypical habitats recent wanderers or did they grow up there? How have the snakes in these habitats modified their diets if at all? And how important is the greenbrier understory and fallen log microhabitat to these distinguished populations? The answers can only be brought to light through more research, more land access, and more data accumulated through field experience. But I am persistent. I am dogged and determined and patient. It has been nearly two decades since I saw my first wild canebrake rattlesnake. I learned from that first one and every single specimen since. It is currently mid-March, and the pecans are just beginning to show their first buds. Soon enough my life will again be entwined with that of the snakes I am so fond of. And with the coming of spring, I can't wait for that first sighting of pinkish grey coils adorned with ebony chevrons, to hear those rattles whir and begin to sing, perhaps revealing yet another secret of the mysterious lives of the canebrakes.

Clint King has over two decades of herpetological experience in the field, assists in surveys of herpetofauna with Texas Parks & Wildlife Department and contributes specimens to university collections. Clint has been an officer in the DFW Herpetological Society, written many articles and given numerous talks on reptiles, amphibians, as well as invertebrates. He can be reached at: contact@crosstimbersconnection.org

Viability of *Silphium albiflorum* in Tarrant County

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Fauz Saheb, Stefan Self, Yasmine Sharif, Philip Trammell, Bruce Benz,
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Abstract

White Rosinweed (*Silphium albiflorum* A.Gray: Asteraceae) is a Texas endemic vulnerable to extinction in Tarrant County, TX. Habitat fragmentation due to urban growth has reduced its geographic extent in Tarrant County and surrounding areas. Population viability analysis in 2014 includes estimates of net reproductive value for the 3,301 individuals in 179 metapopulations from four of the known Tarrant County protected natural area localities. Two localities with fewer than five metapopulations each were not surveyed. Less than one third of the metapopulations surveyed had net reproductive values greater than one (1.0) suggesting they are not reproducing effectively. The Benbrook Lake Longhorn Buffer Zone locality shows the lowest rate of increase; only two of 38 metapopulations show recruitment. White Rosinweed appears to be critically endangered in Tarrant County because there is 1) an observable reduction in numbers of individuals, 2) the total geographic area occupied by the species is declining, 3) the number of mature individuals currently alive is small, and 4) two localities have fewer than 250 mature breeding individuals.

Introduction

White Rosinweed (*Silphium albiflorum)* is a perennial plant species endemic to North Central Texas (Diggs et al. 1999:404, Turner et al. 2003:148). Turner et al. delineate range limits as Denton county in the north, Dallas and Ellis on the northeast, south to Travis, southwest to Kendall, west to Gillespie, Mason, Menard and Concho counties and north east through Mills, Comanche, Erath and Parker for the contiguous counties. Two apparent outliers extend the species' range to the west in Callahan and Knox counties. In terms of vegetation provinces, its range extends across the Blackland prairies on the east, south to the Edwards Plateau, west to the Rolling Plains and across the Cross Timbers and Prairies in north central Texas (Hatch et al. 1990).

Commonly known as White Rosinweed for its distinctive white flowered – ray and ligulate – capitula (Figure 1). Plants are perennial; standing 0.4-1.0 meters tall, have a basal rosette of laciniate leaves and alternate cauline leaves (Figure 2). Occasionally the white ray and white ligulate flowers may be slightly cream- or light yellowish colored. It flowers from May to July. *Silphium albiflorum* has narrow habitat requirements occurring on and around limestone outcrops (pers. observation; Diggs et al., 1999). Due to its geographic range restrictions and

Figure 1. White rosinweed capitulum from Benbrook Lake Spillway (Pecan Valley Park) locality. Photo taken June 2015 by B. Benz

Viability of *Silphium albiflorum* in Tarrant County *(continued)*

Figure 2. White rosinweed individual in Tandy Hills Prairie showing plant growth habit during flowering. Photo taken June 2015 by B. Benz

narrow habitat requirements, habitat destruction and recent drought (2009 – 2015) conditions may limit the species' ability to successfully reproduce. Previous research by Texas Wesleyan University conservation classes suggest that *S. albiflorum* populations are threatened with extinction due to population elimination due to habitat destruction and limited population viability. For example, eighty percent of the locations documented by existing herbarium collections at the Botanical Research Institute of Texas (BRIT) have been either extirpated or are completely surrounded by suburban development (unpublished). We hypothesized that *S. albiflorum* is potentially threatened with extinction due to suburban development in Tarrant County. Due to the aforementioned potentially increasing threats, we have documented net reproductive rate using a life table approach (Donovan and Welden 2002) for metapopulations in the following Tarrant County areas: Tandy Hills Prairie, Benbrook Lake Spillway, Benbrook Lake Holiday Park, and Benbrook Lake Longhorn Buffer Zone (Figure 3). Pedestrian survey of these areas located and geo-referenced most, but probably not all, of the metapopulations. Two additional localities in Tarrant County – the Fort Worth Nature Center and Refuge and a residential site southwest of Benbrook Lake - were not included in this particular census. We expect that other localities and additional metapopulations can be included in future censuses.

Population viability analysis (PVA) was developed by conservation biologists to assess extinction risk. The assessment is accomplished through annual census and demographic study (Groom et al. 2005; Primack 2014). Characterization of population structure accounts for survival while seed production documents fecundity. The numerous PVA programs available provide broad and varied means of analysis. We opted for a very simple approach, one that documents net reproductive rate for Tarrant county metapopulations. Calculation of net reproductive value (R_0) for each metapopulation used the life table approach described by Donovan and Weldon (2002). Net reproductive value of an individual of age x is the expected number of offspring this individual will produce over its lifetime. Calculation of net reproductive rate for white rosinweed metapopulations provides a straightforward approach to population viability by characterizing each metapopulation's ability to replace itself. Net reproductive rate values greater than or equal to one suggest the metapopulation is either growing exponentially or replacing itself, respectively. Using this estimate alone, we can also ascertain whether the *S. albiflorum* populations are reproducing at rates that are significantly different from one another, and whether they are indeed under threat of extinction.

Methods

Metapopulations (comprised of all *S. albiflorum* individuals located within 1.5 meters of each other) in four Tarrant county locations (Tandy Hills Prairie, Benbrook Lake Holiday Park, Benbrook Lake Longhorn Buffer Zone, Benbrook Lake Spillway of Benbrook; Figure 3) were located by handheld GPS. Individuals were tallied according to leaf number, presence or absence of a flowering stalk, and the total number of seeds per flowering stalk. Static life tables based on age structure (stage classes were determined based on the number of leaves in the rosette and on the flowering stalk when present) and stage-class fecundities for all members of each metapopulation were

Viability of *Silphium albiflorum* in Tarrant County *(continued)*

Figure 3. Maps depicting location of metapopulations in four localities in Tarrant County, Texas censused in October, 2014. Darker color indicates higher R_0 value for meta-population.

constructed to determine net reproductive rate (R_o) (Donovan and Welden 2002). ArcGIS (ESRI) was used to analyze metapopulations per locality based on georeferenced locations. Maps of metapopulation R_0 values depict the average number of individuals that each metapopulation is expected to produce over their lifetime which is a proxy for the contribution each metapopulation will make to the viability of white rosinweed populations in Tarrant County, Texas.

Results

A total of 3,302 individuals in 179 *S. albiflorum* metapopulations were recorded (Figure 3). Tandy Hills Prairie contained 1,691 individuals within 97 metapopulations. Benbrook Lake Spillway, contained 682 individuals within 24 metapopulations. Benbrook Lake Holiday Park, contained 111 individuals within 20 metapopulations. Benbrook Lake Longhorn Buffer Zone contained 817 individuals within 38 metapopulations (Table 1). The average number of seeds per metapopulation was recorded within localities. Metapopulations in Tandy Hills Prairie produced an average of 1.7+/-0.3 seeds per individual (12.2 seeds per metapopulation). In Benbrook Lake Spillway, metapopulations produced an average of 7.6+/-1.9 seeds per individual (51.2 seeds per metapopulation). In Benbrook Lake Holiday Park, metapopulations produced an average of 2.1+/-

Viability of *Silphium albiflorum* in Tarrant County *(continued)*

Table 1. Descriptive statistics of White Rosinweed (*Silphium albiflorum*) in four localities in Tarrant County census in October 2014.

Locality	Total Number of individuals	Number of metapopulations	Average Number of Individuals /meta-population	Number of flowering individuals	Total number of seeds Fall 2014	Average (stdev) number of seeds produced/meta-population
Tandy Hills Prairie	1691	97	17.4 (1.9)	317	1181	1.7 (0.3)
Benbrook Lake Spillway	682	24	23.6 (4.7)	162	1229	7.6 (1.9)
Benbrook Lake Holiday Park	111	20	11.3 (1.7)	21	113	2.1 (0.5)
Benbrook Lake Longhorn Buffer Zone	817	38	21.5 (4.1)	288	18	0.1 (0.04)

0.5 seeds (5.7 seeds per metapopulations). In Benbrook Lake Longhorn Buffer Zone, metapopulations produced an average of 0.1+/-0.04 seeds per individual (seeds 0.5 seeds per metapopulation) (Table 1). Tandy Hills Prairie contains 54.2%, of the individuals, Benbrook Lake Spillway contains 20.6%, Benbrook Lake Holiday Park contains 11.3%, and Benbrook Lake Longhorn Buffer Zone contains 24.8% of the Tarrant County *S. albiflorum* population. Analysis of number of individuals per metapopulation, indicates the average *S. albiflorum* metapopulation contains 18.4 (+/- 20.2) individuals.

The net reproductive value (R_o) of each metapopulation was also mapped for each locality (Figure 3). The darker color represents higher reproductive value and the lighter color represents lower reproductive value. No apparent spatial autocorrelation of reproductive values within localities was detected.

The frequency distribution of net reproductive value (R_o) across all four localities (Figure 4) showed average R_o values to be close to zero (overall average R_0 is 2.1+/-5.3). The Benbrook Lake Longhorn Buffer zone locality R_0 values were significantly lower than other localities (Kruskal Wallis ANOVA F = 22.3; $p < 0.05$; pairwise comparisons calculated on ranked R_0 values with Dunnett's C adjustment) while the Benbrook Lake Spillway (Pecan Valley Park) locality had much higher values. Many fewer metapopulations are reproducing successfully ($R_o \geq 1$; Figure 4) in the Benbrook Lake Longhorn locality.

Conclusion

Our results suggest that the *S. albiflorum* population in Tarrant County is declining and threatened with extinction. Only 25% of all of the metapopulations in Tarrant County had stable or increasing net reproductive rates ($R_o \geq 1$). Seventy-one percent of metapopulations in Benbrook Lake Spillway had stable or increasing net reproductive rates. However, net reproductive rates were stable or increasing for only 55% of Benbrook Lake Holiday Park metapopulations, 30% of Tandy Hills

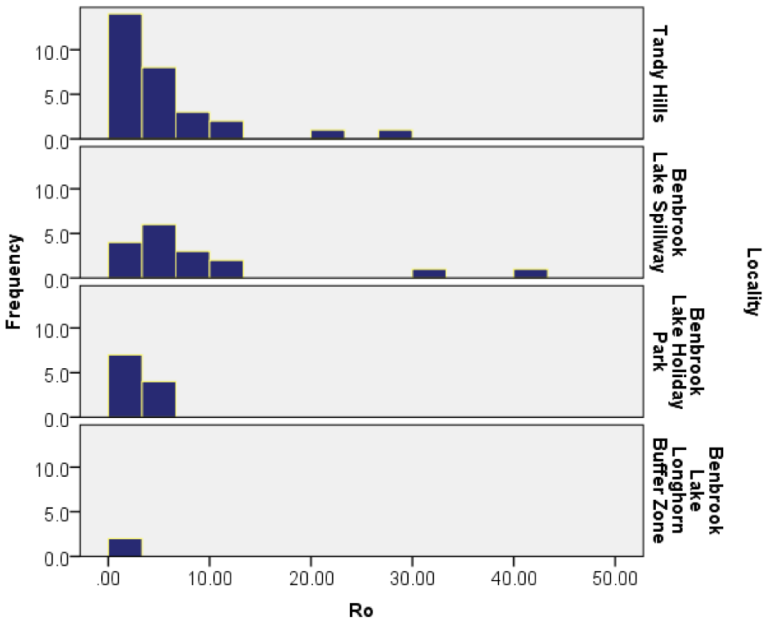

Figure 4. *Silphium albiflorum* R_0 values of 1.0 or greater for four localities in Tarrant County, TX. An R_0 value of one (1.0) indicates an individual in that meta-population produces on average one individual over its lifetime.

Viability of *Silphium albiflorum* in Tarrant County *(continued)*

populations, and a meager 5% of the Benbrook Lake Longhorn Buffer Zone metapopulations. Calculations of net reproductive rate from static life tables for each meta-population indicate the status of the populations' ability to persist and reproduce effectively in Tarrant County. Benbrook Lake Longhorn Buffer Zone, containing 21.2% of the entire Tarrant County population, contains only 2 metapopulations that are effectively reproducing. In comparison, Benbrook Lake Holiday Park, Benbrook Lake Spillway, and Tandy Hills Prairie contain 11, 17, and 28 metapopulations actively reproducing themselves, respectively. Considering there were 179 metapopulations studied, these numbers are alarmingly low (roughly 33 percent), and of great concern for the species' vulnerability to extinction.

In conclusion, Red List Criteria indicate that, 1) because the geographic area of *S. albiflorum* occupancy is compromised by habitat fragmentation due to urban development activities, 2) local populations show declining effective reproduction and the unpredictable nature of recent weather, this Texas endemic species faces significant extinction threat. Continued monitoring and census as well as population genetic analysis of these and other metapopulations within Tarrant County and throughout the state of Texas could lead to mitigate these threats in order to promote future population viability of this native Texan.

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Authors of this work were enrolled in Conservation Biology (BIO 3470) at Texas Wesleyan University in the fall of 2014 when this work was performed. All class members are 2015 graduates and have since dispersed to the far corners of Texas. Authorship is given in alphabetical order because all individuals contributed equally. The senior author is a Professor of Biology at Texas Wesleyan University and can be contacted at bbenz@txwes.edu.

Figure 5. *Silphium albiflorum* – Benbrook Lake spillway, Pecan Valley Park. Photo taken by B. Benz

SIGHTINGS:

Things seen and heard, especially the first and last sightings of the season, or sightings in unusual places or significant situations

Week in 2015	Sighting
Week 17: April 19-25	4/23/15 - Diamond-backed watersnakes (*Nerodia rhombifer rhombifer*), communally basking at a creek in northern Tarrant County, TX. Observations of such communal basking might help explain unfounded reports of "nests" of snakes (especially cottonmouths) or a "ball" of snakes. Observation: Judith Sikora.

Photographs of diamond-backed water snakes communally basking. (Photos: Judith Sikora)

To submit a sighting, please send the relevant information to: journal@crosstimbersconnection.org. Please include the date, location, identification, and the significance of the sighting (unusual location or habitat, early or late season sighting, etc.). If possible, include a photo in jpg or similar format to confirm identification. We publish selected sightings but regretfully cannot always publish all of them. Thank you for contributing!

We love getting significant sightings here, but remember to also report sightings to www.inaturalist.org! Sightings of herpetofauna in Texas should be contributed to the Herps of Texas project, http://www.inaturalist.org/projects/herps-of-texas. Additionally, Crosstimbers Connection has a project at iNaturalist: http://www.inaturalist.org/projects/crosstimbers-connection.

A Trail Camera Surprise

Rob Denkhaus, Natural Resource Manager, Fort Worth Nature Center & Refuge

In the spring of 2014 the Fort Worth Nature Center & Refuge (FWNC&R) initiated a long term trail camera project to document the wildlife species of the Refuge and to monitor trends in populations. The project, funded through a grant from the Fort Worth Audubon Society with ongoing support from the Friends of the FWNC&R, involves 30 trail cameras placed in random locations around the Refuge for 30 day intervals.

Thirty cameras operating for 30 days results in 900 trap nights (TN) per month. TN is the standard measure of effort in projects such as this. Each TN generates, on average 16-17 photos, meaning that the 30 camera array produces approximately 15,000 photographs monthly, all of which need to be reviewed and cataloged for future data analysis.

Photo review has a lot in common with people-watching at the mall. The vast majority of the photos, like the vast majority of mall visitors, are pretty typical and unexciting but every once in a while something interesting happens by. Avoiding boredom while striving to maintain an appropriate level of attention to detail can be challenging.

While reviewing photos from March 2015, a single nondescript black and white, night-time photo caught my attention. The photo was taken at 5:16 a.m. on March 20, 2015, the first of what we refer to as a "3-shot burst" wherein each time that the camera is triggered it takes a series of three photos roughly five seconds apart. The 3-shot burst gives the best chance of getting at least one identifiable photo of the animal that triggered the camera. In this case, the first photo was the only one of the burst that captured the animal in question as the critter was moving directly towards the camera.

The interesting photo (Fig. 1) shows a portion of what is obviously a skunk but instead of the two parallel solid white stripes that we are all used to, this animal has a broken pattern of white splotches. The photo shows not our typical striped

Figure 1. Trail camera photo showing an eastern spotted skunk (*Spilogale putorius*) in riparian forest habitat at the FWNC&R.

A Trail Camera Surprise *(continued)*

skunk (*Mephitis mephitis*), but the increasingly uncommon and heretofore undocumented on the FWNC&R eastern spotted skunk (*Spilogale putorius*).

Texas is home to five of the nine species of skunks found in the New World. Three of these species, the eastern spotted skunk, striped skunk, and the hog-nosed skunk (*Conepatus leuconotus*) are found in the post oaks and prairies region but only the striped skunk would be considered common. Both the eastern spotted and hog-nosed species are listed as Species of Greatest Conservation Need (SGCN) by the Texas Parks and Wildlife Department. SGCN listing does not mean that the species are officially threatened or endangered only that there is some cause for the long-term health of the species because of population declines or other factors such as habitat loss.

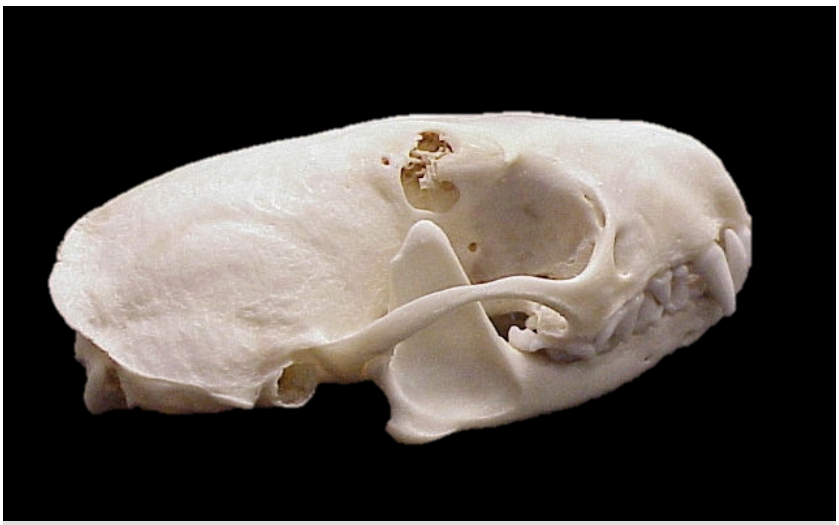

Figure 2. Cleaned and articulated eastern spotted skunk skull found DOR in Wise County, TX.

The eastern spotted skunk was once relatively common but the specific reason(s) for its apparent population decline are unknown or at least unproven. Theories center on the ever-present habitat loss due to a myriad of human development projects and the effects of widespread use of insecticides and the associated bioaccumulation in insectivorous animals such as the spotted skunk.

Description

The eastern spotted skunk is the state's second smallest skunk; the closely related western spotted skunk (*S. gracilis*) being noticeably smaller. Adults of the eastern species weigh 450-680 g (~1-1.8 lbs.) with males typically being heavier.

What appear to be chaotic white splotches on a black background upon closer inspection show six distinct but broken white stripes (think of a seven lane freeway) running from head to rump with the outer, or ventrolateral, pair starting on the back of the forelegs and running the length of the body, the lateral pair start behind the ears, and the dorsolateral pair start on the back of the head. The inner four stripes tend to terminate before reaching the posterior portion of the body where two interrupted white bands are found. Adding to the complex pattern are small white spots in front of each ear and one more on the forehead.

Identifying *S. putorius* from a skull alone is difficult if not impossible. All of the Texas skunks, with the exception of the hog-nosed, have 34 teeth and a dental formula of I3/3, C1/1, P3/3, M1/2 so dentition is not adequate for identification. Figure 2 shows the skull of an eastern spotted skunk found dead along Hwy 287 in Wise County.

Diet

A farmer would be hard pressed to find a better animal to live around the barnyard than the eastern spotted skunk. Primarily insectivorous, they consume mostly members of the Orthoptera (Grasshoppers and Crickets), Coleoptera (Beetles), and Hymenoptera (Ants, Wasps and Bees). During the winter and other times when insects are unavailable, other agricultural competitors such as cottontails (*Sylvilagus floridanus*), voles (*Microtus spp.*), and Norway rats (*Rattus norvegicus*) become the primary prey. Carrion and bird eggs are also consumed opportunistically.

Habitat

Eastern spotted skunks are habitat generalists occurring in wooded areas and tallgrass prairies but preferring rocky canyons and outcrops when they can find them. Some authorities say that the species avoids wetlands and semiaquatic habitats but the FWNC&R photo shows an eastern spotted skunk in riparian forest along the West Fork of the Trinity River in an area that

A Trail Camera Surprise *(continued)*

two months later was under several feet of flood waters.

Behavior

Like all skunk species, the eastern spotted skunk has the ability to protect itself through the use of chemical warfare, a foul-smelling musk typical of the skunk family that can be accurately sprayed 4-5 m. Other skunks however, cannot deliver their musk while doing a handstand. When confronted, spotted skunks (both eastern and western) will stomp their forefeet or run towards their foe quickly stopping which causes their hindquarters to elevate vertically creating a handstand. (NOTE: The skunk in Fig. 1 may be in the handstand position) Typically, skunks do not spray in this position instead dropping to all fours and curving the body in a "U" shape with the tail raised and the business ends (the one with anal glands and the one with teeth) both facing their opponent.

Eastern spotted skunks are almost entirely nocturnal but are generally more active and alert than the other skunk species. These small skunks also readily climb trees to avoid predators or to access potential den sites in hollow trees.

Spotted skunks are reported to use an unusual technique for opening eggs. The skunk attempts to bite through the shell while straddling the egg and if unsuccessful, uses its forefeet to "throw" the egg back between the hind feet where one hind foot may be used to give the egg an extra kick. The skunk then chases the egg and inspects it for damage. If the egg still can't be cracked open, the entire procedure may be repeated several times.

Mortality

Eastern spotted skunks are susceptible to predation by domestic dogs (*Canis familiaris*) and cats (*Felis catus*), coyotes (*C. latrans*), bobcats (*Lynx rufus*), foxes (*Urocyon cinereoargenteus, Vulpes vulpes*) and great horned owls (*Bubo virginianus*). Like all skunks, eastern spotteds may carry rabies although the incidence of rabies within spotted skunk populations is reported to be low.

Additional Sightings

Additional sightings, both past and future, that can be documented should be reported so that records can be updated regularly. Uploading observations on iNaturalist.org will alert the proper authorities of your findings so that they can be included in regional management plans.

Deodorizing skunk spray

While researching eastern spotted skunks I stumbled across an interesting paper that documented the history of research into what skunk spray is made of. Apparently people have been trying to figure out what makes skunk spray so odiferous since the 1800s. While interesting reading, the value of knowing the "History of Skunk Defensive Secretion Research" may be debatable. However, the author, William Wood, is a chemist and offers a chemist's opinion on how to de-scent a dog or other accidentally sprayed victim.

Tomato juice and all of the other old wives' tales do not work because they simply try to mask the smell. As a chemist, Wood approached the problem by changing the "thiols (the noxious smelling stuff) into compounds that have little or no odor." To do that:

- Bathe animal in a mixture of 1 quart 3% hydrogen peroxide, ¼ cup baking soda, and 1 tsp liquid detergent
- Rinse animal with water after 5 minutes
- Repeat if necessary

Wood, W. F. 1999. The History of Skunk Defensive Secretion Research. The Chemical Educator 4:44-50.

Rob Denkhaus is the Natural Resource Manager of the Fort Worth Nature Center & Refuge, an Adjunct Professor of Environmental Science at Texas Christian University, and Director of the Teaming With Wildlife: True To Texas coalition. He can be reached at r.denkhaus@teamingtxwildlife.com.

NOTEWORTHY EVENTS

For a Biodiverse Calendar!

July 31, 2015 – (all day)

Teaming With Wildlife: True to Texas – Eco-Summit

This is one of five, full-day forums to "introduce the Coalition, provide members with relevant information, and encourage Texans to provide their input regarding conservation issues." It will provide biologists a stage to talk about pressing issues within our eco-region and allowing attendees to share their input in small breakout sessions.

Hosted at: *Botanical Research Institute of Texas, 1700 University Drive, Fort Worth, Texas 76107*
More information at: http://www.teamingtxwildlife.com/the-2015-eco-summit-series

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August 1, 2015 – 8:00am-12:00pm

Botanical Research Institute of Texas - First Saturday

BRIT offers a wealth of information and events for the community. Their "First Saturday" event is open to the public for tours, plant ID, exhibits, and activities for kids. There is also a farmer's market so you can take home fresh, local produce! Highlights include their pocket prairie, geology wall, braided gardens, and wetland area.

Botanical Research Institute of Texas, 1700 University Drive, Fort Worth, Texas 76107
More information at: http://www.brit.org/events/more-children-families

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September 8, 2015 – 12:30pm

Webinar: Fire, Harvester Ants, & Horned Lizards

A recent study from the Verble Fire Ecology Lab looked at how prescribed burns affected home range size of Texas horned lizards in central Texas. The study also looked at how fires and drought affect the lizard's primary prey, the harvester ant. Robin Verble-Pearson, Ph.D., director of the fire ecology lab at Texas Tech, will discuss this study during the webinar.

Join the webinar using the following link: http://acp2.missouristate.edu/lizards/. Registration is not required.

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