



Post Oak & Prairie Journal

A Regional Journal of Crosstimbers Connection



❖ *Inaugural Issue* ❖

January, 2015

Volume 1, No. 1

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Comanche harvester ant climbing
on a daisy (photo-A.Mayo)



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.

Please contact us regarding submissions by emailing journal@crosstimbersconnection.org



Subscribing to the Post Oak & Prairie Journal (POPJ):

First, we should note that the journal is free! You can download each issue from the Crosstimbers Connection website shown below. At this time, POPJ is not available as a print publication (although we hope that it will print nicely on your printer after it is downloaded!).

Crosstimbers Connection

P.O. Box 151882 ❖ Arlington, Texas 76015

On the web: www.crosstimbersconnection.org

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EDITORIAL

Welcome to the First Issue!

Rob Denkhaus, Editor

Welcome to the first issue of *Post Oak & Prairie Journal* (PO&PJ)! To fully appreciate what the Journal is, or at least what it is supposed to be, it's important to have an understanding of how we got here and what we are hoping to accomplish

The first concept of the PO&PJ came about in July 2007 following an extended, but failed, literature search where I strove to locate all of the published literature on the Cross Timbers ecosystem. Google Scholar did turn up a fairly lengthy list of papers but many tended to be published in relatively obscure (read: unobtainable) journals but the dream of a journal dedicated to our Cross Timbers and Blackland Prairies ecoregions began to develop.

I have long been a self-described natural history literature hound and as a wildlife biologist, I have always appreciated journals that featured articles on the full-spectrum of natural history because to fully understand or appreciate a wildlife species it is imperative to have an understanding of, and appreciation for, the soils, hydrology, plant communities, and all of the other components of the ecosystem. Wouldn't it be grand to have a local journal that would appeal to an old school naturalist such as Leopold or Muir, or (to give it a modern, local connection) Burgess, by including articles on all facets of local natural history?

One of my more recently developed, i.e. within the past few decades, naturalistic passions has been native fish and by chance, I have been an associate editor for the North American Native Fishes Association (NANFA) quarterly journal, *American Currents*. NANFA is a unique organization. The membership is composed of professional ichthyologists and fisheries managers, professional aquarists from zoos and aquaria across the nation, and a plethora of amateur native fish enthusiasts who enjoy keeping, spawning, studying, and appreciating native North American species in their homes and in the wild. *American Currents* started in the 1970s as a mimeographed handful of pages mailed out to a handful of

households across the country and today has developed into a 40+ page quarterly, full-color publication distributed to hundreds of zoos and aquaria, fish and wildlife offices, and university libraries as well as hundreds of NANFA members throughout North America and beyond.

American Currents' content is reflective of NANFA's membership. Highly technical articles describing new or modified taxonomies are common. Detailed results from scientifically conducted fish surveys written in report form are frequent. Articles written in an informal narrative style detailing the adventures of NANFA members who got together to collect fish in a watershed in virtually any state are featured regularly. Detailed descriptions of aquaria spawning efforts with specifics on water temperatures, water chemistry, plant and substrate requirements, sometimes for species that have never been spawned in captivity before, are written by amateurs working in their garage or basement. NANFA acknowledges that amateurs and novices can have something worth publishing and provides an appropriate venue for them to do so. Wouldn't a local journal that was accessible to professionals and laypeople, and the array of naturalists in between, provide the greatest value to the inhabitants of our ecoregions?

In my day job as Natural Resource Manager of the Fort Worth Nature Center & Refuge (FWNC&R), I, and the rest of the staff, make observations, conduct research, and explore different land management techniques. Few of our findings make their way into traditional journals due to lack of time (traditional publishing requires a considerable time commitment from data analysis through writing and finally the peer review process) and/or the limited scope of the work, i.e. small sample size, restricted study area, etc. This is unfortunate since many of our findings would be of interest and use to others, particularly those working or naturalizing in our region.

Working at the FWNC&R also allows me to interact with members of virtually every volunteer and professional conservation group in the region. In fact, some of the best

EDITORIAL: Welcome to the First Issue! (*continued*)

naturalists that I know are not professionals. Citizen science programs have long realized the value of volunteers and their commitment to data collection. Many volunteers are conducting basic research or performing land management activities in the region. Wouldn't it be great if they had a local venue to publish their findings?

I also work with students and faculty from most of the universities in north central Texas. Obviously, graduate students are conducting research with hopes of being able to publish their findings in traditional journals upon completion of their work. Undergraduates however, are also performing research and for much the same reasons as the FWNC&R staff, they lack the opportunity to publish their work even though they often have to expend the effort to compile their findings to receive academic credit. Wouldn't it be great if these students could add to their growing resumes by publishing their results while getting a small taste of what's in store for them as their careers progress?

So, with all of this in mind, the *Post Oak & Prairie Journal* was born and the contents of this first issue are indicative of what we hope to present for readers in the future. This issue features an article by Ann Mayo, a PhD student from UT-Arlington who has become the region's resident expert on *Pogonomyrmex*, our harvester ants, an article on a burgeoning local chapter of the Native Prairies Association of Texas (NPAT) by Michelle Villafranca, Natural Resource Specialist

at the FWNC&R, a call to action for conservation in our ecoregions by Todd Sliger, Teaming With Wildlife: True To Texas Coordinator, an article by bison rancher Tim Frasier, who describes his unique philosophy of land management which promotes both biodiversity and economics, and more.

Future content will continue to be representative of the diversity of natural history but much of the journal's success will come from you. Whether you are a professional, a student, a volunteer, a novice or an expert, if you have information in the form of data or observations or even well-thought out conjecture, you are welcome to submit an article for consideration. The only strict rule that we have for our content is that it must relate directly to the Cross Timbers and/or Blackland Prairie ecoregions. If you would like to discuss the process of submitting an article or receive input on whether an article idea is appropriate, feel free to contact me or Michael Smith using the contact information provided on page 2.

We hope that you will enjoy and learn from this issue and contribute to future issues. In the meantime, please feel free to pass along a digital copy to anyone that might appreciate a bit of the *Post Oaks & Prairies*.

Rob Denkhaus is Editor of POPJ, serves on the board of Crosstimbers Connection, and is the Natural Resource Manager of the Fort Worth Nature Center & Refuge. He can be reached at journal@crosstimbersconnection.org



No Place like Home: the Comanche Harvester Ant in the Cross Timbers

Ann Mayo, Ph.D. Candidate, University of Texas at Arlington



1. Cross Timbers at the Fort Worth Nature Center, Fort Worth, Texas. This area has a small population of Comanche harvester ants, about 20 colonies. Note the prairie, forest, and just off center on the right an oak mott with grape vines.

Kansas, Oklahoma, and Texas, Comanche nests in similar areas in parts of Texas outside the Cross Timbers as well as in parts of Arkansas and Louisiana. Further, Comanche only nests in deep sandy prairies (6+ feet) which reduces the number of suitable prairie habitats. With land use changes, these requirements greatly restrict the areas where Comanche persists. However, Comanche does well in electrical power line and other right-of-ways that are mowed keeping the prairie open.

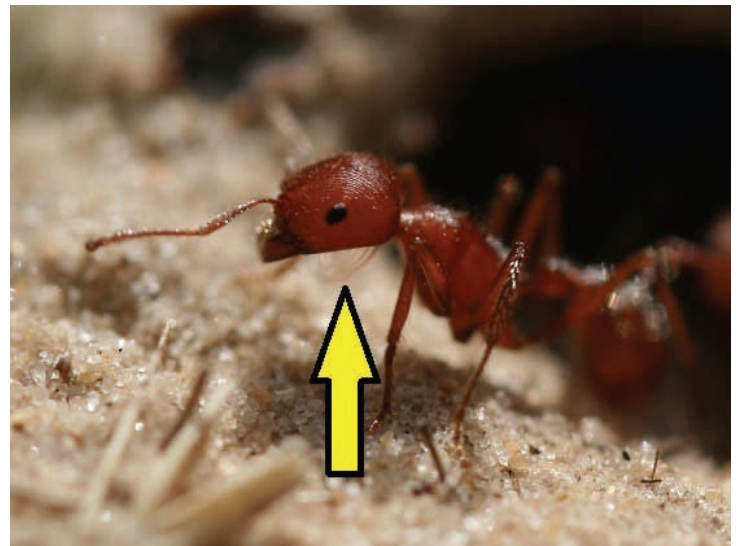
Pogonomyrmex ants are generally referred to as harvester ants because a large portion of their diet consists of seeds. (Interestingly, in 1860 Gideon Lincecum called these ants

agricultural ants because he thought they actively cultivated the grasses that produced the seeds they ate. Lincecum et al. 1997.) The genus name means bearded ant, *Pogono* – bearded – and *myrmex* – ant. (See photo # 2. The yellow arrow indicates the beard.) This beard is diagnostic for the genus. The hairs that make up the beard are used to clean legs and antennae and at

Introduction

The Cross Timbers Ecoregion is a mosaic of prairie and forest habitats punctuated with oak motts and light gaps. The movement of organisms and materials among these areas connects their ecologies in dynamic relationships that provide both stability and change. Over time, perhaps a lot of time, oak motts turn prairie into forests and tree fall and fire open forests into prairie. The mosaic of local habitats and their dynamically related ecologies are distinctive characteristics of the region. Because ants play many, diverse roles in ecosystems, they contribute to this dynamism in many ways.

The many species of ants in the Cross Timbers are found widely throughout temperate areas. In contrast to these species, I want to introduce an ant special to the Cross Timbers – the Comanche harvester ant, *Pogonomyrmex comanche*. The Comanche harvester ant¹ only nests in prairies surrounded by oak forest. Hence, the Cross Timbers offers exactly the habitat mosaic it requires. Besides prairies in the Cross Timbers of



2. The Comanche harvester ant with the beard indicated by the yellow arrow

¹ I'll be referring to this ant as "Comanche." No offense is intended towards the Native Americans with whom the ants share this name.

No Place Like Home (*continued*)

3. Progression of the external nest form of the Comanche harvester ant: (a) newly founded nest with founding queen (entrance is about 2cm [1 inch] across); (b) new colony (the skirt of soil from the entrance is about 10cm [5 inches] in length); (c) very young colony; (d) young colony; (e) established colony. Established colonies on average have a diameter of about 30 cm (15 inches) though this varies a great deal.

least in the Comanche harvester ant, aid in carrying large loads. *Pogonomyrmex* ants are only found in the Americas. These ants are also the favorite food of the Texas horned lizard, *Phrynosoma cornutum*. Since this lizard is threatened in Texas, these ants are of special interest for conservation of the lizard. Other ants in this genus are the familiar big red ants which clear large areas around the nest entrance of a meter or so in diameter. In contrast to this familiar harvester ant, the Comanche harvester ant constructs crater shaped nests with a ½ meter diameter (See photo #3). Their workers are medium sized, ranging from 5 to 8 mm in length and they have mature colonies with 5,000 – 8,000 adults. Comanche, despite the name is also less aggressive and rarely stings, though when she does it is a most painful and long lasting experience.

Ecological Roles of the Comanche Harvester Ant

While individual ant species may play specialized roles such as tending aphids, all ants play a primary role in recycling and as important members of food webs, especially as predators on other arthropods. As recyclers, ants move large amounts of materials from above ground to below ground and conversely, as well as among habitats. Most ants construct nests in the ground consisting of chambers connected by tunnels. These nests can be quite extensive with chambers housing the queen and offspring, food store, workers, and refuse. In constructing their nests, they bring up a considerable amount of soil with estimates of 320 – 600 kilograms per hectare for a community of ants – enough to contribute to the formation of prairie soils (Baxter and Hole 1967) and to the podzolic soil profile in New England (Lyford 1963). Besides this soil turnover and production, the construction of nests contributes to the exchange of gases and penetration of moisture. Besides bringing soil production and opening channels in the soil, ants bring foraged materials into the nest where they are consumed and stored. The remains may be stored in refuse chambers or be

taken out to a middens area. In this way, ants contribute to the nutrients in soil concentrating them near and in the nest.

The Comanche harvester ant constructs nests that are conspicuous crater shaped mounds that are 30 centimeters in diameter on average on the surface. Just below the surface, the nest often extends beyond the crater, perhaps as much as another 30 centimeters. Because the Comanche harvester ant nests only in very deep sand, I hypothesize that the nests may be 6 or 7 feet deep. Foraged materials are stored within the nest and remains are brought out to a middens area at the edge of the active nest mound. To date, I have only been able to get imperfect casts of the top 10 centimeters of the nest. This area is a series of chambers just below the surface where the workers congregate. A lot of communication takes place in this area. (Photo #4) Although I still lack hard numbers, I suggest that there are indications that the Comanche harvester ant contributes a great deal to the soil in its habitat.

Although the Comanche harvester ant nests only in the prairie where it mostly forages, they do forage into the woods to collect elm seeds (see photo # 5). They do not appear to venture far into the woods, 5 – 10 meters perhaps. By bringing materials from the woods into their nests in the prairie, the Comanche harvester ant directly connects the forest and prairie.

Finally, like all ants, the Comanche harvester ant eats and gets eaten. Ants may play a large role in food webs because they store food sometimes for large colonies. In turn, large colonies may provide enough workers to feed other animals, even vertebrates, like the Texas horned lizard that specialize on *Pogonomyrmex* ants (Whitford and Bryan 1979). It has been estimated that a horned lizard needs 200 ants a day. These 200 are taken from many different colonies, so many ant colonies are needed to support each lizard. The forage of Comanche is about 80-90% seeds with the remainder consisting of flower

No Place Like Home (*continued*)

4. Plaster casts of the internal nest structure of the Comanche harvester ant: these preliminary casts are incomplete and show only the top 10 cm (5 inches) of the nest. The adult ants wait in these chambers to start their work. The nests may extend 1.5 and 2 m (5-7 ft.) into the soil. (a) a view from above; (b) and (c) side views.

and vegetative parts, arthropods, and grasshopper frass. The Comanche harvester ant is a seed generalist, taking whatever is available and tending to take more of what is most abundant at the time. Comanche may impact plant populations through its ability to regulate foraging rate based on seed abundance. However, since Comanche is an individual forager (rather than trunk trail forager) and poorly recruits her sisters to resources, this question requires further investigation.

In the Cross Timbers, I have seen two predators of the Comanche harvester ant at work. The first is the black widow spider, *Latrodectus mactans* which eats other ants as well. These spiders build a web just off from the entrance of the harvester ant nest and grabs foragers as they pass by. In the photo, this juvenile spider has caught about 7 ants. (photo #6). Another common predator is the bee assassin, *Apiomerus spissipes*. But this is a slightly different game. These bee assassins work



5. Comanche harvesting ant bringing back an elm seed from the surrounding woods



6. Juvenile black widow spider preying on Comanche harvester ants

No Place Like Home (*continued*)

stealthily around the nest craters. They often begin their work before the ant nest is active (The ants close and seal their nests each night and reopen them in the morning.) The assassin pierces the ants with its sharp proboscis. But the assassins do not always win. I have also seen the Comanche harvester ant attack and kill these assassins.

These are just a few of the ecological notes I have uncovered studying the Comanche harvester ant in the Fort Worth Nature Center and Wildlife Refuge in Fort Worth and the Southwest Nature Preserve in Arlington, Texas. This preliminary work leads to many more questions regarding ants in the Cross Timbers, especially concerning the contribution of ants to the dynamism of the ecoregion. Questions which I hope to pursue, not only in Texas but across the region.



7. Bee Assassin attacking a Comanche harvester ant

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Ann B. Mayo is a candidate for the PhD at the University of Texas at Arlington. She studies the ecology of the Comanche harvester ant. The information in this article is largely drawn from her own research which has yet to be published. She can be reached at amayo@uta.edu

Acknowledgements

The author gratefully acknowledges the help and cooperation with land access of the Parks and Community Services Department of the City of Fort Worth, Texas, the staff of the Fort Worth Nature Center and Wildlife Refuge, Fort Worth, Texas and the Department of Parks and Recreation, Arlington, Texas.

Navigating the Road to Conservation

Todd Sliger, Coordinator, Teaming With Wildlife: True To Texas

“Two roads diverged in a yellow wood, and I”... I should have brought a map. Robert Frost wrote one of the most famous American poems some 94 years ago. “The Road Not Taken” still boasts relevance over the years because it embodies a timeless conflict, conscious decision making. The subject of the poem is faced with the option of choosing one of two paths, both with destinations unknown. Robert Frost’s decision to choose a path with “leaves no step had trodden black” seemed impulsive and relatively uninformed. What if Frost had a map that would tell him where he could go? Would he have even looked down both paths? Would he have still wondered about the possibility of future “sighs” and regrets? Texas is at a fork in the road regarding land management and natural resource conservation. Texas has a rapidly expanding population and faces many challenges regarding energy, water conservation, urban sprawl, natural resource extraction and ultimately proper land management. What if Texans had a roadmap that would lead them out of the woods and into conservation cognizance?

We’re in luck. The Texas Conservation Action Plan (TCAP) was written by Texans, for Texans. This comprehensive document was written with the specific goal to “share our wild heritage with future generations of Texans” and with desired conservation outcomes incorporating “restoration, recovery, sustainability, and resiliency.” The cartographers of this roadmap created a plan to prevent the need to list species as endangered under the Endangered Species Act (ESA). The ultimate goal is to take care of our native plants and animals sufficiently enough that the ESA and imminent domain are rarely discussed.

The TCAP was created to be the “road map” for Texas conservation and holds relevance and merit due to the interdisciplinary approach in its construction. Ecologists, land stewards, natural resource management agencies and organizations, conservation service providers, researchers, environmental advocates, regulators, policy makers, and private land owners were targeted for their input on the state of wildlife conservation. Public opinion surveys were issued to scientists and the general public to prioritize each conservation issue. Prioritization is a key component when addressing a

myriad of conservation issues so time and monetary resources are allocated in accordance with necessity. Natural resource conservation experts have been calling for an interdisciplinary approach in management plans for decades, so that truly viable solutions can be created by the multiple-interest stakeholders that will be involved in solution implementation.

The attention to detail and breadth of issues that this document covers is truly astounding and it is evident that the creators of the TCAP have left no stone unturned. The TCAP addresses issues that cause direct or indirect harm to wildlife or habitats and acknowledges “gaps” in management plans that have historically restrained Texans from achieving conservation goals. Issues that are addressed include everything from pathogens to power development and ranching to road construction. Project implementation “gaps” listed in the eco-region handbooks can include data deficiency, insufficient coordination, or a shortage of funding. The inability to address these gaps in the past has ensured that Texas has been lost on the road to conservation realization and stuck in a perpetual roundabout without direction as to how to remove ourselves from the frustrating cycle. The TCAP provides Texans with conservation actions, or directions, to address each conservation issue and “gap” per eco-region.

Roundabouts, dirt roads, county roads, toll roads, and interstate highways are all part of our transportation system. Individually these features aren’t regarded as having significant value, rather the structure of their connectedness is valued. This structure is incorporated into the TCAP, which is designed to address key conservation issues based on natural boundaries rather than political boundaries. Political boundaries are arbitrarily drawn and are not based on geographic factors or species composition. Re-defining boundaries will provide Texans and residents of other states the framework to work together in addressing national and global conservation issues such as climate change, migratory species, and habitat fragmentation.

The statewide plan is broken down into smaller parcels of land, the 11 Texas eco-regions, providing a plan which is more palatable and efficient in implementation. An eco-region based

Navigating the Road to Conservation (*continued*)

structure provides management plans that are compatible across state, county and municipal lines, thus allowing multiple interests groups to work towards the same goals for conservation issues. Eco-region plans also allow for addressing conservation issues at a local scale, where real solutions can be created and implemented as a part of the statewide plan.

Unifying each eco-region under overarching goals will limit dead-end conservation actions, saving time and money for high priority projects. Here in Texas our economy and culture are tied to our automobile-centered transportation system. All of the parts need to be in place to have a viable route to your desired destination.

The geographic structure of the TCAP and its emphasis on eco-region scaled conservation allows for the maximum benefit for species and for people. Addressing conservation issues across political boundaries encourages the sharing of information and the collaboration of scientists. With an emphasis on monitoring, scientists can share data and effectively evaluate the state to see where we have been, where we are, and changes needed to reach our conservation destination. Local, eco-region driven projects can allow all interested parties the ability to accommodate unforeseen issues and adapt plans to ensure success. Allowing for flexibility within the plan can yield results without projects experiencing time-consuming detours. This is extremely important in creating practical projects as we are in a race against the extinction of species that exist in geologic time.

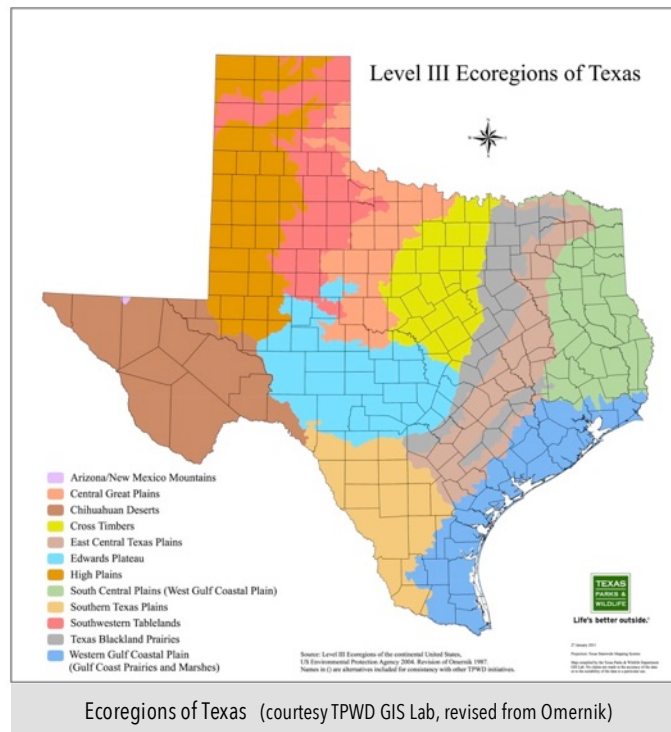
In conjunction with scientific collaboration and adaptive management plans, the TCAP encourages the participation and collaboration of the general public. The TCAP acknowledges that TPWD does not have the resources to effectively address all conservation issues on Texas' 250,000 square miles. In

addition to resource issues, the TCAP acknowledges that this state consists of more than 95 percent privately owned land and that public participation is required to address many of the conservation issues outlined in the document. Like any roadmap, the TCAP's usefulness is dependent on clarity and

accessibility. This document is written for all Texans and provides pertinent information for individuals to contribute to a variety of conservation goals. Many groups and organizations here in Texas are involved in specific conservation issues and one group is currently raising awareness of the TCAP, Teaming With Wildlife: True To Texas. This coalition exists to provide a unified voice for all Texans and in support of wildlife conservation. Encouraging usage of the TCAP and unifying efforts across ecoregions will guarantee numerous benefits to all the species and residents of the state. The TCAP recognizes that all

observations, projects, and individual actions have merit and are valued collectively. Whether you are planting native species in a riparian area or are uploading pictures of species to iNaturalist, your projects or actions may already be in-line with the Texas Conservation Action Plan.

While the Texas Parks and Wildlife Department (TPWD) is tasked with wildlife and habitat conservation in Texas, TPWD is not the gatekeeper of wildlife conservation in the state. The TCAP authors have spent money, time, and energy to create a document per eco-region that provides every Texan with a guide to be part of the solution regarding wildlife conservation and sound land management. The responsibility of conservation here in the state should not fall on the shoulders of TPWD solely, as they are not the only citizens that benefit from healthy wildlife populations and habitat. It is every Texan's responsibility to take care of our natural heritage. This document and the voluntary actions it promotes are the roadmap to navigate the numerous conservation issues that



Navigating the Road to Conservation (*continued*)

confront Texans daily. This document can assuage the possibility of future “sighs” and regrets by eliminating the unknown when standing where “two roads diverged in a yellow wood.”

The statewide Texas Conservation Action Plan and the 11 ecoregion handbooks can be viewed and downloaded at <https://tpwd.texas.gov/landwater/land/tcap/handbooks.phtml>

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Todd Sliger is the Coordinator of the Teaming With Wildlife: True To Texas Coalition. He can be reached at T.Sliger@teamingtxwildlife.com



SIGHTINGS:

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

Week in 2014	Sighting
Week 48: November 23-29	Strecker's chorus frog – late year sighting: Wise Co., LBJ Grasslands, 11/28/14, 2:05pm. Air temperature 68°F at the surface, and 55.4°F about five inches into an adjacent gopher mound. – Michael Smith (michael@crosstimbersconnection.org)

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>.

Rambling Through Woods and Prairies

Michelle Villafranca, Natural Resource Specialist, Fort Worth Nature Center & Refuge

Are you a native North Central Texan? Did you grow up in the Metroplex or an outlying rural area? You may remember somewhat simpler times of rambling about the countryside on a childhood adventure through the woods and prairies here. As a child, I pushed the limits of my parent's allowable wandering range by sneaking past my neighborhood's boundary and exploring into the adjacent woodlands. I didn't wander too far from home. My explorations were along a creek that was sheltered by the deep shade of post oaks. The creek cut through typical red Cross Timbers soil. This soil is what supports the post oaks and what defines the distinct Eastern and Western Cross Timbers ecosystems. I grew up in the Western Cross Timbers. At that time, I had no idea what that was. I just knew that there were some interesting post oak trees interspersed with openings of tall grasses; and that I would occasionally see horned lizards and rattlesnakes.

Often, my parents took me on car trips through the rolling limestone hills of the Fort Worth Prairie and the woods and

savannas of the Western Cross Timbers. Our destination was in Wise County where we would hike, camp and ride horses. As I grow older, many of these areas of my childhood memory have

been changing. Mostly, the changes are due to the expansion of our cities out into the countryside. My ramblings as an adult now lead me to reach out to others to express how special these woods, and even more so, these prairies are.

In May 2014, I served on a committee that organized the *State of the Prairie* conference in Fort Worth for Native Prairies Association of Texas (NPAT). NPAT is

a non-profit land trust dedicated to the conservation, restoration, and appreciation of native prairies, savannas, and other grasslands in Texas. Our intent was to bring attention to native prairies, with a special highlight upon those in the North Central Texas area. We also hoped to create and solidify a unified connection between local prairie restorationists, natural resource professionals, prairie enthusiasts, educators, and landowners. At the conference, speakers presented on topics such as prairies in a changing climate, bison 'on the range,'



Photo: Michelle Villafranca

Little bluestem, butterfly milkweed, and bull nettle in the Western Cross Timbers



Photo: Michelle Villafranca

Rambling Through Woods & Prairies (*continued*)

prairie restoration techniques, native plant restoration on lands impacted by energy development, prescribed burning, brush management, prairies as a teaching tool for urban youth, and local prairies across the Metroplex.

From the excitement and synergy of the conference, several local chapters of NPAT have formed in the Metroplex: Blacklands Prairie chapter and Fort Worth chapter. I am a founding member of the Fort Worth chapter. The chapter's intent is to weave together these same people in an effort to conserve, restore, protect and educate our community about the importance of the historic prairies of North Central Texas.

These prairies are the ones upon which Dallas (Blackland Prairie) and Fort Worth (Fort Worth Prairie) were built. Farming, commerce, the Chisholm Trail...these sprang from the prairie. These prairies are the same ecosystems upon which the wealth of a huge urban powerhouse has been built. And these prairies are the same which should be preserved, acknowledged and appreciated for what they have contributed to us individually and to our community's heritage and economics.

As a child roaming through the woods and prairies of North Central Texas, I didn't realize or acknowledge what a truly special place this is. I didn't understand the significance of the natural history here. But as an adult, I now know that it conveys a story of millennia. These prairies tell a story of all

that has come before our time, and hopefully enough will remain for future generations to explore and enjoy. North Central Texas prairies are our heritage. Have you rambled through YOUR prairies or woods lately?

Find out where you can ramble in the Metroplex at the Fort Worth chapter of Native Prairies Association of Texas website: <http://www.fortworthnpat.wordpress.com>.

Michelle Villafranca works at the Fort Worth Nature Center & Refuge as the Natural Resource Specialist. She actively contributes to collaborative projects at other City parks and Stormwater sites, as well as working with other organizations on regional projects and conferences. She can be reached at: michelle.villafranca@fortworthtexas.gov

If you are interested in learning more about Native Prairies Association of Texas (NPAT) or the Fort Worth chapter of NPAT, visit their respective websites at:
www.texasprairie.org or
www.fortworthnpat.wordpress.com
 Questions about the Fort Worth chapter?
 E-mail fwnpat@gmail.com.



Photo: Michelle Villafranca

Seeking a More Complete Understanding of Reptile and Amphibian Overwintering

Michael Smith, President, Crosstimbers Connection

It is winter in north Texas, with the first few days of 2015 leaving little doubt about this climatological fact. January 1 through 10 had low temperatures in the Dallas-Fort Worth area below freezing on all but two days, with 16°F on the coldest day. The high temperatures stayed within the 30s and 40s on all but two days. In an average winter from December through February, the DFW area low temperatures range from 35.5-39.4°F, while highs are 56.4-60.4°F (NWS, 2015). What does this mean for ectotherms such as reptiles and amphibians (herps)? Ectothermy provides some real advantages including not having to constantly expend energy to maintain a constant temperature. On the other hand, when temperatures fall, metabolic activity necessary for active functioning slows and at some point, foraging, escaping predators, and digesting food are compromised. Herps have various strategies for coping with this, and while we have a fair amount of descriptive information about overwintering in the cross timbers and prairies, a lot remains to be learned.

Sampling the herpetological literature, such as herpetology texts (e.g. Pough, et al., 1998), journal articles, natural history books (e.g. Stebbins & Cohen, 1995), and other sources (e.g. Werler & Dixon, 2000) provide descriptions of biological processes and illustrative examples. These illustrative examples may or may not generalize across many species, habitats, and climates. Here is an example: some frog species can withstand freezing by producing large amounts of glucose or glycerol as temperatures reach freezing, acting as a

sort of anti-freeze (Pough, et al., 1998) and if thawed after a few days, may still be alive. This is true for gray treefrogs and some chorus frogs. Presumably this affords some protection from unexpected freezes after spring emergence. How many other frog species in the cross timbers and prairies share this ability, and is it associated with frogs living in particular microhabitats?

Some snakes often choose communal dens for overwintering, and this may in part be related to the severity of winters and the availability of suitable refuges. For example, in Manitoba, Canada, there is a location where the crevices run deep, and each year thousands of red-sided garter snakes take refuge in that den. Winters are long and severe in Canada, and the snakes need shelters deep enough to protect them. Not all snakes den communally, and the severity of winter is apparently not the only factor to be considered in communal versus isolated refuges. A study of massasauga rattlesnakes in Ontario, Canada found that each snake hibernated separately, in tunnels left by tree roots or in deep burrows created by other animals (Harvey & Weatherhead, 2006). In our latitudes in Texas, the western diamond-backed rattlesnake may overwinter in communal dens, but many of our snake species do not do this.



A potential winter refuge: a burrow under a fallen tree in a bottomland forest

Understanding Reptile & Amphibian Overwintering (*continued*)

Is a western coachwhip that spends the winter alone in a deep crevice in rocks or an abandoned mammal burrow choosing this isolated refuge for a reason? How often, if at all, do they communally hibernate with other snakes?

Box turtles may dig in and hibernate through the winter. The soil temperature helps determine when they may emerge in the spring. A group of ornate box turtles and three-toed box turtles were monitored near St. Louis (Grobman, 1990), and they dug toward the surface when the soil temperature around them was about 45°F for a week or more. When they reached about four to eight inches of soil depth and the temperatures stayed at or above 45°F for about five days, the box turtles would begin to emerge. How often do we see reports in Texas of spring emergence of box turtles with accompanying temperatures? Do we know how directly we could apply Grobman's findings to Texas turtles? Populations of the same species may be acclimatized to local temperatures so that we could speculate that Missouri box turtles may tolerate cool temperatures a little differently than Texas box turtles. Measuring air and soil temperatures and correlating these with observations of box turtle emergence in the spring could help answer that question locally.

A report published in 1948 provided something like the kind of local natural history information that would be fascinating to see for our area. Wilfred Neill (Neill, 1948) described winter behavior in about 100 species of herps in Richmond County, Georgia. The observations were informal and anecdotal, apparently accumulated over a period of time by the author and possibly by associates. He described local copperheads and canebrake rattlesnakes as preferring to use dens, while other species were reported to overwinter under fallen logs, old stumps, in standing timber, in burrows, or other refuges. He

noted many species that appeared active when found under cover in winter, and reported many salamanders as being active all winter or being only observed during the winter. Much of this is not new in a general sense. Here in north Texas, we know that salamanders tend to be active in winter and early spring after rains, but do we know at what water and air temperatures local populations of these amphibians are most likely to be active and breeding? We also know that cottonmouths are relatively cool tolerant, but do we know the temperature thresholds beneath which they will seek refuge rather than bask in winter sunshine and remain active?

One role for a regional natural history journal such as the *Post*

Oak & Prairie Journal could be to invite and publish accounts of wintertime observations of herps, so that more specific information is available for a broad number of species. To be useful, the reports should include date, time of day, temperature where the animal was found as well as air temperature. For example, while checking temperatures in an area of the LBJ Grasslands in Wise County on 11/28/14, I unearthed a cold and apparently torpid Strecker's chorus frog from the sandy



Strecker's chorus frog, seen 11/28/14

soil of a gopher mound at 2:05pm. It was 68°F at the surface, and 55.4°F about five inches into an adjacent gopher mound. Within probably 30 seconds, the little frog was active and trying to hop away.

When you consider the numbers of field herpetology enthusiasts, students, Master Naturalists, and similarly-inclined folks in our area, it should be possible to compile the kinds of verified sightings that could, in the aggregate, shed a great deal of light on the wintertime natural history of most of the herpetofauna found in the cross timbers and prairies. Taking good field notes is important, but sometimes is pushed aside. Planning ahead, having the right equipment with you, and

Understanding Reptile & Amphibian Overwintering (*continued*)

taking the time to take good field notes has to compete with the tendency to just travel light and savor the moment. I have in the past been the one still sitting there with a thermometer and a GPS while everyone else moved on to search more microhabitat, and it can be tempting to skip the note-taking in order to cover more ground. On the other hand, I've concluded that having information that could shed more light on a natural history question is, in the long run, more rewarding than flipping rocks at a slightly higher rate.

The Grobman box turtle study illustrates how it could be useful to know something about temperatures within soil and under cover. Such information might allow us to make predictions about end of the year disappearance and spring emergence of herp species. The information might allow us to explore how these things change in association with climate change. Accordingly, I visited two areas on three occasions in the past few months, to record temperatures on the surface and within burrows, in soil, or under substrate. Visits occurred approximately in mid-day. I sampled several locations at the LBJ National Grasslands on November 28, 2014. This was during a time when the air temperatures had warmed considerably from freezes that occurred in the middle of the month. In all observations, the surface (which ranged from 62-70°F) was approximately 15 degrees warmer than it was under an insulating layer of soil or rock. Then I measured temperatures in several locations at the Fort Worth Nature Center & Refuge in December and January. On 12/21/14, temperatures were 2 to 4°F warmer under logs, in soil, and in burrows than on the surface (which ranged from 41.4-44.6°F). On 1/10/15, after several very cold nights, temperatures were approximately 4°F warmer under cover than on the surface (where temperatures ranged from 30.7-40.8°F). On the other hand, soil temperatures were 3 to 4°F cooler than surface temperatures.

These observations are offered to suggest what might be done if there was a systematic effort to report the temperatures at the surface and within refuges during late fall, winter, and early spring. More information about temperatures within microhabitats and winter refuges, and more reports of herp sightings during those same periods of time, would contribute to better understanding of how reptiles and amphibians cope with winter in the cross timbers and prairies.

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If you have not already discovered iNaturalist, please check it out. The app for smartphones can be a great way to easily submit sightings together with a photo and GPS data. For herps, the "Herps of Texas" project is a great place to share sightings. Additionally, there is a "Crosstimbers Connection" project offered by the publisher of this journal. Also consider the "DFW Urban Wildlife" project.

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What's In Your ... Ecology? (and Why!)

Bison Ranching & Ag- 2.0

Tim Frasier, Frasier Bison LLC

You've all seen the TV commercial and I admit to attempting to connect my query with commerce. At the end of any day, if an idea has merit or any hope of becoming a moving part of the world as we know it, it becomes about the commerce of it all. Where I depart from tradition is in the paradigms within which ecological-integrity or environmental-enhancement and commerce are mutually exclusive.

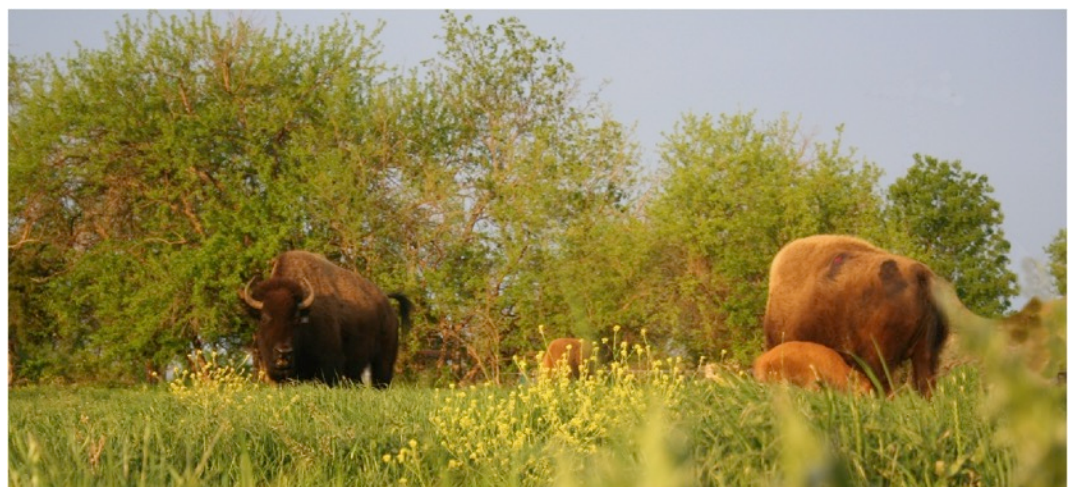
Commerce is ever-present in nature and should be ever-present, in and on the minds of all 'Nature-Nerds'- all the time. This is how human connectivity is achieved. On one level it sucks, while on another it makes us better messengers of something that just might be important because it's vital, as opposed to something that is valued by name only, 'because you should' or 'it's the right thing to do.'

I think it is a good exercise to ask ourselves what's in our ecology? and why! It is at that point that a plan is born and beneficial organism(s) can be hatched. That's right all you humans, you ARE organisms with a choice of being beneficial or tending otherwise...

I raise bison and have a unique perspective. I accept that without the benefit of a large land holding, I am left in the service of those, or as a message for others that do. So I have an experiment station where I run 6.5 animal units on 7 acres under continuous graze in a food-plot / bison production / native restoration / permaculture design / 3-dimensionally bio-diversity positive / beneficiary co-efficient conscious/ non-toxic / forward / profitable model!!! There is everything wrong with everything I have strung together in reference to my model. The only thing right with it – is that it

works and the production is not embellished or exaggerated. Come by and see if you don't believe it at: 3069 E. Harris St. Gainesville TX. Or not, and take my brassy invitation as proof evidentiary that you just might be surprised! The point is, I don't care what you think! I am having the time of my life discovering the natural world, as a working partner, and an undiscovered asset to (and available for) service to humanity.

It just so happens that I got into all of this to prove it didn't work. Well.... It does, and it works better and cheaper. There's something else; I feel good about what's in my ecology and why. As a bison rancher, I tend to have an appreciation for wild things and wild systems. My grazer is native and the keystone-consideration of my ecology, but not at the expense of its wellness. Habitat wellness can become quite the brain-full once you head down the whole enhancement-for-production trail. By now you may be asking yourself, 'this all sounds great, but exactly what's in this guys ecology/and why?' Glad you asked, but my answer will also include my selection criteria. Table 1 lists all the system parts that I add, promote, or protect within my ecology to the benefit of its wellness and productivity.



Flowering turnips and productive bison

There are many other organisms in the ecological system that I call my ranch. It's really more of a complex habitat for multiple organisms, which also happens to produce bison. Personally I

What's In Your ... Ecology (and Why!) (*continued*)

Table 1. System parts added, promoted, or protected to the benefit of ecological wellness and productivity

Organism	Benefit	Beneficiary	Financial Benefit	Self-Populating
Bison	Mechanical Disturbance	Entire System	Entire Revenue	100%
	Dung	Dung Beetles/ soil structure	No cost bio fertility	100%
		Soil microbes	No-cost bio-fertility	100%
Grazing Turnips	forage/energy	Bison	Low-cost feed	10%
		Soil microbes		100%
	flower	American Bumble Bee [Cooke Co.]		
	flower	all native pollinators		
	Seed pods	avian wildlife		
Winter oats	forage	bison	Low cost feed	20%
	Substrata organic matter	Soil structure	Low cost bio-fertility	
	Seed grain	Avian wildlife/ bison	Low cost feed	
Harry vetch	forage	bison	Low cost bison feed	50%
	Nitrogen fixation	Soil structure	Low cost bio-fertility	
	Flower	Native pollinators		
Arrow leaf clover	forage	bison	Low-cost feed	100%
	Nitrogen fixation	Soil structure	Low cost bio-fertility	
	flower	pollinators		
Rye Grass	forage	bison	Low-cost feed	100%
	Seed grain	Avian wildlife		
Hack berry	browse	bison	Low cost feed	na
	Berry production	Avian wildlife		
	Water conservation	Surface water	Resource conservation	
Mull berry	browse	bison	Low cost bison feed	na
	Berry production	Avian wildlife		
	Water conservation	Surface water	Resource conservation	
Mesquite	beans	bison	No cost bison feed	na
	Nitrogen fixation	Soil structure		
	Cover	Avian Wildlife		
Bois D' Arc	Water conservation	Surface water	Resource conservation	na
	Nesting	Doves		
Deadfall & stags	Nesting	Native pollinators		na
	Cover	Wildlife		
Duck weed/ both varieties	Bio-remediation	bison		100%
	Forage	Bison	[no] cost feed	
	Water conservation	Surface water	Resource conservation	
	flower	Native pollinators		
	Predation of mosquitoes	Dragon fly	Vector management	
	Reduced water temp/ evaporation	Surface water	Resource conservation	
Coon Tail Milfoil	Bio remediation	bison		100%
	Cover	Gambusia	Vector management	
Gambusia	Mosquito control	Bison	Stress management	100%
	Bio-fertility	Aquatic ecology		
Nematodes [heter haptitis indiga]	Fly/ fire ant control	bison	Stress and disease management	100%
Baveria bosiana 23	Fly [specific] control	bison	Stress management	20%

What's In Your ... Ecology (and Why!) (*continued*)

Table 1 (continued). System parts added, promoted, or protected to the benefit of ecological wellness and productivity

Organism	Benefit	Beneficiary	Financial Benefit	Self-Populating
Indian Paint Brush	Pollinator energy	Native pollinators		na
Bee Balm/ horse mint	Pollinator energy	Native pollinators		na
Indian Basket	Pollinator energy	Native pollinators		na
Illinois Bundle Flower	Forage	Bison	Low cost feed	100%
	Seed pods	Avian wildlife/bison	Low cost feed	
	Nitrogen fixation	Soil structure	No-cost bio fertility	
Side oats gramma	forage	bison		na
	Seed grain	Avian wildlife		
Eastern Gamma Grass	forage	bison		na
	Seed grain	Avian wildlife		
Indian Grass	Forage	bison	Low cost feed	na
	Seed grain	Avian wildlife		
Bartlett Pear	Bison feed/ water conservation	Bison/ surface water	Low cost feed	no
Silk Tree	browse	bison	Low cost feed	na
	Nitrogen fixation	Soil structure	Low cost bio-fertility	
Hybrid Pearl Millet	forage	bison	Low cost feed	na
	Seed grain	Avian wildlife/ bison	Low cost energy	
	Organic matter [substrata]	Soil structure	Low cost bio-fertility	
Cow-peas	Forage	Bison	Low cost feed	0%
	Nitrogen fixation	Soil structure	Low cost bio-fertility	
	Organic matter [substrata]	Soil structure	Low cost bio-fertility	

choose to have a criteria, or axiom, upon which my decisions are based. Each organism I choose to insert, promote and/or preserve must have a positive beneficiary-coefficient that may or may not be directly or indirectly connected to commerce. For example; the *Gambusia*, or mosquito fish, is a beneficial organism whose name is synonymous with useless. They prey on water born mosquito larva, thus they represent a mosquito, or vector, control. They also live, feed, reproduce and die within,

and as a part of, my surface water aquatic-ecology. Their beneficiary-coefficient in my ecology or ranch is 16, and they have been intentionally added to my system (see Table 2).

On the other hand, I have criteria upon which I reject additions, or insertions, to my system. An example of this is ammonium nitrate. I have a never-ever protocol on this product because I have spent years enhancing my system and choose to

Table 2. Direct and indirect benefits of the mosquito fish

Organism	Function	Benefit	Direct Beneficiary	Action	Indirect Beneficiary
Gambusia	feeding	Vector control	Bison +1	Disease control	All host mammals +1
	Waste /death	Bio-fertility	Milfoil +1	Bio-remediation	Bison +1
	Waste/death	Bio-fertility	Duck weed [1] +1	Bio-remediation	Bison +1
	Waste/death	Bio-fertility	Duck weed [2] +1	Bio-remediation	Bison +1
	Reproduction	Population	Gambusia +1	Vector control	Bison +1
	Prey	Food	Avian Wildlife +1	Food source	Bison +1
	Prey	Food	Hatchling Turtles +1	Food source	Aquatic plants +1
	Presence	Visual	Frasier Bison LLC +1	Stewardship	Whole system +1

What's In Your ... Ecology (and Why!) (*continued*)

not regress (or devolve) its functionality. The traditional source of energy, which is also readily available and considered 'the way to go,' has a negative beneficiary-coefficient of -6 (see Table 3).

Table 3. Ammonium Nitrate

Substance	Function	Benefit	Direct Beneficiary	Action	Indirect Beneficiary
Ammonium Nitrate	Plant energy	Forage	Bison +1	Nitrogen	None -1
	energy	Soil fertility	Plants +1	Nitrogen	None -1
	Toxin	none	Soil microbes -1	death	None -1
	Toxin	none	Soil macro-organisms -1	Death/ exclusion	None -1
	Bio-fertility accumulation	none	None -1	No action	None -1

As opposed to straight Urea with a *positive* beneficiary-coefficient of 7 (see Table 4).

Table 4. Urea

Substance	Function	Benefit	Direct Beneficiary	Action	Indirect Beneficiary
Urea	Plant energy	forage	Crop +1	energy	Bison +1
	Plant energy	Root development	Bio fertility & plant health +2	energy	Soil structure +1
	Does not conflict with nitrogen fixating nodule development	Re-generative bio-fertility	Bio-fertility +1	Low cost nitrogen	Soil structure / fertility +1

Let's examine and calculate the beneficiary-coefficient of the keystone-consideration and admitted passion of the author, the American Bison. I must beg the pardon and patience of the reader for this author's admitted unwavering and resolute dedication to a species that civilization would have us long forget. Hidden behind the perception-curtain of dogma and cinematic-truth lies the American bison, an ecologically dynamic doable.

Bison are assumed agents of ecological integrity because they evolved with North America. We know the latter is true, but struggle with how to evolve past the sociologies of our time and restore them to the North America we have. I propose them as doable because they are. I also propose that because we can, we have a responsibility to examine and facilitate a world within which more native-solutions are possible. Some may reject my thesis based on their perceptions or doctrines. I defend my thesis with positive outcomes and enhanced biodiversity. I examine and credit the contribution of bison to my little ecology/ ranch/ experiment station in a quantifiable way with a beneficiary-coefficient of 26. Any and all keystone organisms or considerations of any ecology should have a higher beneficiary-

coefficient than any other organism in the system. This logic puts symbiosis ahead of preference and changes the pragmatics of land productivity and agricultural due diligence as we know it (see Table 5).

If Leopold were alive today, I believe he would postulate about the hydro-axe, the no-till and the bison. Fire and gun surrogates and/or uses, would remain part of the axiom. I will also guess that he, as should we, would allow for production-models to be as conservation and biodiversity minded as possible by incorporating available science with positive beneficiary-coefficients. So what does that mean?

My experiment station is a conservation disaster/ but an ecological and biodiversity-positive success. So... who cares/ why experiment and what's it good for except bragging about 6.5 AU's on 7 acres under continuous graze? Glad you asked! Unlike some models that rely on funding from the government, a patron-saint, or donations and volunteers, other folks live under the loom of notes and margin-call realities. This sets in motion an anti-conservation paradigm for folks that are born to work the land, but may not be born into an excess of it. Some of

What's In Your ... Ecology (and Why!) (continued)

Table 5. Bison functions and benefits

Organism	Function	Benefit	Direct Beneficiary	Action	Indirect Beneficiary
Bison	Native grazer	Mechanical disturbance	Native grass health +1	Preventing bunch necrosis	Native grasses +1
	Seed distribution	Mechanical	Native Grass +1	Hair and dung	Bison +1
	Waste/dung	Bio-fertility	Soil microbes +1	Microbe food	Soil structure +1
	Waste/dung	food	Dung beetles +1	Dung processing to bio available plant food and sub-strata distribution	Soil microbes +1
	Mechanical Compression	Bio-fertility	Soil structure +1	Carbon sequestration	Soil structure +1
	Grazer	Re-growth	Exotic forage plants +1	Forage growth-stimulation	Bison feed +1
	Hair [down] shedding	Nesting material	Avian wildlife +1	Available after shedding	System function +1
	Wallowing behavior	Panning soil	Forbes, amphibians, soil structure +1	Creating concave features throughout the system surface	System function +1
	Scratching behavior on south-east side of standing dead fall and trees....	Native pollinator nesting site	Native pollinators +1	Rubbing off bark	Plants in system +1
	Reproduction	Species restoration	Bison +1	Behaving naturally and proof evidentiary of health	Species restoration/conservation +1
	Reproduction	Revenue	Frasier Bison LLC +1	Bison to sell	Whole system +1
	Presence	Visual	Frasier family +1	Awesome view out the kitchen window	Frasier Bison LLC +1
	Meat	People food	Frasier Family +1	OMG good & healthy too! ☺	Whole system +1

these folks want to dedicate their investment to a mission of import like bison that transcends US food security contribution, to wildlife restoration and species preservation. My work can make this more possible from an economically viable perspective that includes environmental enhancement. One to 1.5 acres per AU of beneficiary-coefficient positive food plot technology will sustain the herd for as much as 8-12 months. When the native regime becomes productively stressed, and before it becomes irreparably affected; retreating to the food plots will allow for extended rest periods, re-germination and seed-banking, successful native-enhancement projects and still yield a healthy herd which throws off the revenue making it all possible. This program also cancels the need for complete depopulation, which becomes very important if the mission

includes bison preservation. The concept integrates agriculture with conservation, production with preservation, environmental enhancement with wildlife habitat, and my favorite – 21st century humans as beneficial organisms – sustainably!

Future articles, should the readership decide to tolerate my timber, will be with more focus and specificity on projects, experiments and outcomes that I engage. Whereas I'm just getting started; enlightenment is a moving target and my path is made up of U-turns, hard lefts and rights and sometimes straight-down-the-middle to more questions than answers. But, I have a strategic advantage in my ecology and I'll tell you why. It's called a consultant. Ben Tyler with Texas EcoLogix (www.texasecologix.com) has tolerated my dysfunction for years and is solely responsible for the successes that I help others with. Like me, he gauges successes by



American bumblebee food

What’s In Your ... Ecology (and Why!) (continued)

productive outcomes and sustainability, with a preference for positive beneficiary-coefficient systems. He patiently waits for me to accept additions within my ecology to my benefit such as sub-soiling for strategic water conveyance, and more tree-hugging for intentional browse-based experimentation. I glean from my land in its language, with the benefit of an interpreter who speaks holism and all its dialects. So... nothing is a weed, nothing is present without benefit (which may be a message) and everything within a system is functioning. While I will

admit that Mr. Tyler and I share a preference for the company of the natural world, we agree with an axiom of: every habitat needs at least one good human who asks -

‘What’s in my ecology? – and why!’

Table 6. Purple Top Grazing Turnips – Beneficiary Coefficient of 14					
Organism	Function	Benefit	Direct Beneficiary	Action	Indirect Beneficiary
Purple Top Grazing Turnip	Forage	Low cost bison feed	Bison +1	Cool season forage	Frasier Bison, feed cost +1
	Mechanical disturbance	Aeration	Soil structure +1	Tap root & tuber	Other forage plants +1
	Mechanical disturbance	Panning of soil surface	Soil structure +1	Water capture	Soil structure +1
	Forage	Winter feed	Wildlife +1	Cool season feed	Deer and other mammals +1
	Brasicas family	Adverse impact on negative soil microbes	Soil structure +1	Bio-fumigation	Other forage plants +1
	Bison energy	Winter feed	Bison +1	Tuber production	Food for wildlife and humans +1
	Seed pod production	Avian wildlife food	Avian wildlife +1	Seed pod production	Low level re-germination Frasier Bison +1



November turnips – bison feed

Tim Frasier is a bison rancher in Gainesville, Texas, and a consulting bison specialist who has written on the subject of bison for numerous publications. He can be reached at tbefrasier@aol.com

Using Native Prairie Grass in a Stormwater Channel Restoration Project

Juan Cadena, CESSWI, Stormwater Superintendent, City of Fort Worth

Drainage channels are constructed to carry and convey large amounts of stormwater during and after rain events. Engineered drainage channels are maintained to their design conditions to function at their peak capacity and reduce the likelihood of high levels of rain threatening life and property from flooding, severe erosion, and/or water pollution.

The City of Fort Worth's Stormwater Management Division provides channel rehabilitation and restoration as part of its routine maintenance operations. In the Channel Restoration Program, City engineers investigate various channels throughout the year and select channels that are in need of major maintenance due to erosion, scour, sedimentation/overgrowth, or severe degradation.

Native Prairie Grass Program

The City of Fort Worth Stormwater Division, in an effort to reduce cost and increase benefits to the community, developed the Native Prairie Grass Program. The objective of the program is to introduce native prairie grasses and flowers in select drainage easements following reconstructive maintenance efforts with the goal of reducing future maintenance needs while providing environmental and aesthetic benefits to the community. Benefits of this program include:

Benefits to City:

- Less maintenance requirement (Mow 1-2 times per year instead of 3-4)
- Fuel savings
- Able to do more with same resources
- Positive public relations

Benefits to Citizens or Community:

- Saving tax money
- Quality urban wildlife habitat
- Wildflower show every spring (weather permitting)
- Birding areas
- Increased property value

Benefits to Environment (Going Green):

- Lower fuel emissions
- Less fuel consumption
- Provides natural habitat in the inner city
- Native grass uses less water



Prior to restoration

Community involvement/ Outreach opportunities:

- Seeding Parties
- On-site education by way of neighborhood meeting
- Prairie-Fest (an annual neighborhood festival that promotes sustainable practices)
- Pre-construction neighborhood site meeting
- Stormwater Public Education staff sending mailers to properties adjacent to drainage easement

Possible External Resources and how they can contribute:

- Fort Worth Nature Center: Strong desire to see this program succeed. Works in cooperation with Stormwater. Organizes external resources and recommends plant selections
- Texas Parks and Wildlife: Can provide urban biologist and statewide involvement
- Botanical Research Institute of Texas: Provides plant

Using Native Prairie Grass in a Stormwater Channel Restoration Project (*continued*)

knowledge, guidance, research/ monitoring, outreach and education, and political influence

- TCU: Student research/ monitoring and student involvement
- Cross Timbers Master Naturalists (Community Group): Public awareness and acceptance, plant salvage, volunteer labor, community involvement, education/publicity via their newsletter and websites
- Natural Resource Conservation Service: Potential Funding (Wildlife Habitat Incentive Program and Environmental Quality Incentive Program Grants), soil specialists
- Texas AgriLife: Soils Expertise and community involvement
- Native Plant Society of Texas: Public awareness and acceptance, plant salvage, volunteer labor, community involvement, education via their newsletter and websites



Selection of a Pilot Project

As part of this program, City engineers selected the channel at Valley Ranch for restoration. The channel, as determined from the original engineering design plans, had been designed in 2004 to convey a 100-year flood event. Over the years due to minimal maintenance, this portion of Valley Ranch suffered severe degradation, standing water, vegetation growth and undesired sediment deposition, diminishing the capacity of the channel to convey runoff, creating an eyesore, and making nearby homes and schools more susceptible to excessive mosquito populations. The overgrowth also discouraged the neighborhood citizens from any recreational use of the area.

As part of the Channel Restoration Program, Stormwater Field Operations crews meticulously re-established and restored the channel to its original design condition. Crews utilized a range of heavy equipment such as an excavator, sheep's foot roller, Gradalls, mini-excavator, skid steer loader, front end loader, hydro-mulch equipment and a watering truck to work in native and off-site material to restore the 740 linear feet (LF) of channel. Another vital part of the success of this project was the use of multiple erosion control products and techniques.

Project Scope

Work was accomplished in 4 phases between August 12, 2013 and October 30, 2013. The cost of the project was \$25,324.22. Stormwater Management crews expended 600+ labor hours rehabilitating 740 linear feet of channel. Crews performed vegetation and sedimentation removal, excavation, re-grading and re-shaping of the channel, replanting and the installation of erosion control blankets to protect the channel bottom and banks from severe erosion. All work was completed by City employees. The levels of flexibility and pride in workmanship are clearly reflected in the success of the project. Signage was placed near the project site to provide residents with key information about the project.

- Phase 1
 - Evaluation:
 - Stormwater Field Engineering and Stormwater Field Operations
 - Native grass potential
 - Fort Worth Nature Center Personnel
 - Botanical Research Institute of Texas Personnel
- Phase 2
 - Vegetation removal
 - Removed over 420 cubic yards of sediment
- Phase 3
 - Re-grading (excavation/fill), compaction and re-shaping
- Phase 4
 - Planting grasses
 - Native prairie grasses
 - Annual grasses
 - Hydro-mulch slopes
 - Installation of erosion control blankets

Using Native Prairie Grass in a Stormwater Channel Restoration Project (*continued*)

Outcome

This project has already demonstrated the great potential for the use of native grasses for channel rehabilitation. Over the next 2-3 years, as the grasses get fully established, the project will provide a great living laboratory to inform and improve future projects both by the City of Fort Worth and others.

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As seen above, local volunteers are assisting in the removal of invasive nonnative grasses, which combined with City efforts will ensure success

This report is a condensed version of a project nomination for a Texas Public Works Association award. The City of Fort Worth won the TPWA's 2015 In-House Project of the Year Award in the Environment / Water / Wastewater category.



**Crosstimbers
Connection**

- Connecting People with Nature in North Texas -

www.crosstimbersconnection.org

Crosstimbers Connection is a 501(c)(3) nonprofit organization established in order to offer education regarding the cross timbers and prairies ecoregions, information about the wildlife and natural history of those areas, and to provide opportunities for people to visit those places.

Our all-volunteer staff have taken many small groups of children and adults on walks in parts of the cross timbers and prairies, provided free educational programs, and offered free publications such as *Frog Calls*, *Texas Field Notes*, and the *Post Oak & Prairie Journal*. We hope you will consider supporting our efforts, by visiting our website and contributing. Thanks!