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THE DOCENT NEWS



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New York Times Cites Work at Preserve

- Dennis Bires

Tallgrass Prairie Preserve Director Harvey Payne was interviewed by New York Times reporter Stephen Kinzer for a June 24th article in the Times entitled "American Prairie Overlooked No More" (p. A14). Kinzer begins by observing that, "When naturalists who run prairie preserves call for volunteer help, they are often overwhelmed by the number of people who show up." Asked about increased public interest, Harvey Payne commented, "This landscape has been on the brink of disappearing. The general public, academic specialists and our political leaders are sensing that if we don't do something now to protect it, we aren't going to have any left."

The article includes a photo of a dozen bison cows and calves crossing a gravel road on the preserve, pushed along by cowboys on four-wheelers during the fall roundup.

Kinzer mentions the recent opening of the Ecological Research Station at the Preserve, featuring classrooms, laboratories, and space for specimen storage. Harvey Payne adds that, "It's just amazing, the number of people who want to learn about the prairie. Even people who live here, people who in the past took this landscape pretty much for granted, are holding the prairie more dear to their hearts."

On why that is the case, James Patterson of the Nature Conservancy speculates that, "Grasslands are tattooed on our genes. Our ancient ancestors evolved on the high, grassy plains of East Africa. We humans are programmed to prefer park like vistas and wide-open, sunlit spaces."

Kinzer points out that, "One major scientific breakthrough of modern prairie studies has been the discovery that two practices – buffalo grazing and periodic burning – are essential to the health of prairies." Real estate developer Victoria Ranney, who has participated in

preserving a 190 acre patch of prairie in northern Illinois, says, "People are so excited when they see what comes up after a prairie burn, the grasses and herbs and flowers, plus all the birds and butterflies and other kinds of wildlife. It's something that makes ordinary people into, I don't want to use the word 'fanatics,' but incredibly committed advocates for this environment."

The New York Times article is posted on the bulletin board in the back office at the preserve Visitor Center.



Science in Action - Andrew Donovan- Shead

On Wednesday, June 23rd, at 9 a.m., John Fisher, George Pearson and I met in the parking lot of the convenience store at the 209th West exit from Hwy 412 to Prue, where we awaited the arrival of Dr. Glen Collier and six biology students from the University of Tulsa (TU). You may remember my report of the inauguration of the Keystone
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Ancient Forest Preserve, appearing in the May '04 issue of *The Docent News*, and the academic discussion that took place at the bottom of a small ravine on whether it is possible to determine the genetic heritage of these ancient trees through DNA analysis of their tissue. We were given to understand that only one percent of new oak trees begin life as acorns, 99 percent being propagated via new growth from the root systems of long-established specimens.

Under the gnarled limbs of these trees we witnessed the germ of an idea come into existence, not through roots spreading neither through soil nor through the medium of a nut, instead through the ethereal means of human communication. Science can only thrive in the fertile soils of open, unrestricted communication facilitated by free assembly of people and the free exchange of ideas; it is the concept of freedom embodied in the constitution of these United States. Freedoms such as these are worth preserving because without them there will be no progress, only stagnation and decay.

All of us within earshot of that riparian discussion heard this idea put forth, one of whom was Dr. Glen Collier who holds the Department Chair of Biological Science at TU; he has a PhD from Cornell in molecular genetics and systematics. He started

to ponder the possibilities of research into the question, and a project that would give his students opportunity to develop their practical skills while applying their theoretical knowledge. To quote from the school fact sheet: the department of biological science is "one of the few still fully integrated departments of biological sciences among Ph.D. granting institutions in the southwest ... providing broad training in biology for students at both the Ph.D. and M.S. levels."

Another thing that you may remember from that discussion is the opinion that the current level of analytical science for vegetable DNA is not so far advanced. Dr. Collier arrived with his students. We followed John Fisher into the preserve and parked a couple of our lighter vehicles at the tank battery about a mile from the gate. The road wasn't too bad after the rain, but not good enough for light cars low to the ground. Consolidated in two vehicles, we drove on into the northwest edge of the preserve, much farther than we had done for the inauguration, and well away from the expressway. We parked in a glade then walked into the forest. We were on high ground; Lake Keystone could be glimpsed through the trees. There was no sound of traffic, just that of birds and stridulating insects. I heard Carolina Wrens trilling.
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It was a mild morning, with clear skies, sunshine and wafts of cool air rising from the lake. As the morning warmed, a few cicadas started to rev up.

We guided Dr. Collier to some examples of elderly *Quercus stellata*. He decided to sample in three areas, two on the ridge and one part way down the escarpment towards the lake.

The students got busy marking trees, taking samples from new growth in the understory around the older trees, and sent the more agile student into the crown of the older trees to collect leaf material there. We noticed an improvised deer stand that some hunter had constructed in one of the trees.

While John, George and I waited for the sampling to finish, we heard some humming birds chattering as they flew into the woods from the direction of the lake. John spotted a Summer Tanager perched on one of the trees; it was about the size of a Cardinal but with scarlet plumage overall and a much more lightweight and pointed beak. A yellow and black flash caught our eyes and John identified an Eastern Swallowtail butterfly that flitted in and out of the canopy of the tree. Soon the sampling was complete and Dr. Collier was in a hurry to return the van to TU for use by another group. On the way out of the preserve, an Indigo

Bunting crossed our path to disappear into the woods.

Dr. Collier's sampling was the easy part of the project. Next come the analysis and interpretation of the results. When I got home, I sent an email to Glen asking for more detail on how his project got started and how he sees it moving into the future. He sent me an excellent reply that appears below under his name.



Research Experience for Undergraduates - Dr. Glen Collier

I almost didn't go to the dedication of the Keystone Ancient Forest Preserve. It was cold and rainy and it seemed as if the ceremony itself was dangerously close to being canceled. However, I did and the rain quit right as the formal ceremony ended, so I stayed and went on the hike that followed. The ravine down which we hiked was absolutely beautiful.



Although Dr. Dave Stahle's demonstration of taking a core sample to check tree growth rings was interesting, what intrigued me most was an apparently off-the-cuff comment about the possible clonal relationships between the old trees and the young *seedlings* growing under them.



It was about this time in the discussion that Dave mentioned that one of his former graduate students, Dr. Stacy Clark, had discovered that some *seedling* post oaks were actually connected to the rootstock of older trees. In other words, they were NOT offspring growing from acorns, which are the product of sexual reproduction. They were clones; genetically identical copies of the larger specimens growing above them. Dave wondered if there are easier ways to verify clonality than by digging out the root connections, which is not easy in rocky terrain. I rashly commented that I thought molecular genetic techniques could address that question.

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After that day, the possibility of pursuing this question kept bouncing around in my head. A brief search of the literature yielded three pertinent papers in which the tools to isolate the appropriate genetic markers had been developed for red oak (1), shown to be applicable to other species of oaks (2) and had been recently used to suggest limited clonality in the scrub oak, *Quercus geminata* (3). Clearly the tools were available to pursue this question, and we have the equipment and molecular expertise to do it at the University of Tulsa (TU).

Timing of the dedication ceremony was serendipitous for another reason. A colleague in the Department of Biological Science at TU, Mark Buchheim, and I are Directors of a National Science Foundation Research Experience for Undergraduates (REU) program. This is a ten week program over the summer in which ten undergraduates from colleges and universities around the country come to our campus to gain hands-on

experience in the research enterprise. Title of our particular program is "Phylogenetic Approaches to Biological Questions". Two other faculty participants had recently withdrawn from this summer's activity and Mark and I were searching for new projects to add to the program; this new project seemed like a perfect fit.

Another touch of serendipity was that Dr. Cindy Sagers of the University of Arkansas mentioned to me that one of her students from her Plant Ecology course was looking for summer research experience; so, that is how Clayton Coffman came to our program. Mara Sharpe is the other student working on this specific project this summer; she is from the University of North Carolina at Pembroke. Other students present at the sampling were Jon Nylund (TU), Henry Tran (TU), Casey Wright (TU) and Becca McClintock (Vanderbilt); they are all working on other specific projects in the REU program, but came out to help collect leaves.

The kind of genetic marker we are analyzing is the same as that originally discovered by Alec Jeffreys and used to determine genetic *fingerprints* that are now routinely used in forensic genetics. These genetic markers are collectively called microsatellite loci; they are segments of DNA in which a simple sequence of bases is repeated several to many times. Number of repeats can

vary from individual to individual, so different versions (alleles) of the marker can be detected by the fact that they differ in size. Specific alleles present in any single individual for several different markers is the genetic *fingerprint* of that individual; likelihood of two individuals being identical for such *fingerprints* is very low UNLESS they are clones.

The repeated portion of a given micro satellite locus is flanked by DNA of unique sequence. These unique sequences can be used as *primers* to amplify a specific micro satellite locus. Amplified DNA from several individuals can be compared by running them in parallel lanes of a gel that separates DNA fragments based on size.

In our initial feasibility test, we extracted DNA from leaves of post oaks growing in Chandler Park. We used primers designed to amplify micro satellite loci in red oak and found that they worked with the DNA from post oak. We were ready to sample some of the ancient post oaks of the Keystone Preserve.

Our sampling design for the trees in the preserve is simple: Identify a number of presumed old post oaks and collect leaves from them, as well as from the smaller saplings and *seedlings* growing under them. Outcomes for the comparisons of these samples will differ greatly, depending
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 upon the hypothesized genetic structure of the population of post oaks. If the population of individuals all arose by sexual reproduction and the micro satellite markers we assay are sufficiently numerous and polymorphic, we expect each individual to have a unique genotype. However, if the population consists entirely of clones, then we expect to see a single genotype shared by all individuals sampled. Reality may lie between these extreme expectations; we won't know until the end of the summer, at the earliest.



What's Blooming? - Van Vives

It is mid July and the prairie is going through that summer transition that we experience each year. The wild flowers are not as plentiful and soon there will be an upsurge as we approach the end of summer and beginning of fall blooms. The most prominent blooms belong to the Iron Weed. On the walking trail the color belongs to the Wild Petunia and Gentian. These are short plants and they are quickly becoming lost in the fast growing grasses. The Big Bluestem is springing up with the abundant rains we have had. Some of it is already four to six feet tall.

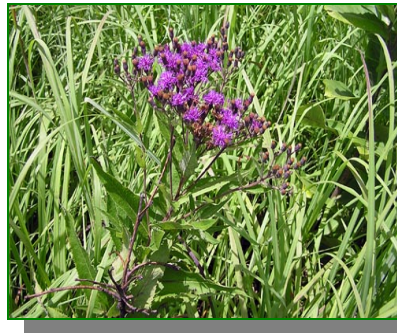
There is still some Black Eyed Susan and some of the Coreopsis in bloom. Other flowers are as follows:

Blue Vervain, *Verbena hastata*:

These plants have been used in a variety of folk medicines.



Blue Vervain



Baldwin Ironweed, Veronia baldwinii

Mullein, *Verbascum thapsus*:

This is a biennial of the snapdragon family. The first year the leaves form a basal rosette. The second year the flower stalk emerges with alternate leaves and a cluster of yellow flowers form at the top of a stout stalk that can grow to six feet. The leaves are large and very hairy. Settlers used the leaves as diapers and toilet paper. It was also used in early times to treat lung diseases, diarrhea, insomnia, and pain.

Native Americans made a tea from the leaves and used it to treat coughs.



Mullein

Partridge Pea, *Chamaecrista fasciculata*:

Native Americans used the plant root to treat fevers, cramps, heart ailments, and constipation.



Partridge Pea



Prairie Rose Gentian, Sabatia campestris

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Tall Rosin Weed, *Silphium integrifolium*:

The Rosin Weed is very prominent at the trailhead. Some of the plants are six feet tall.



Tall Rosin Weed



White Prairie Clover, Petalostemum candida

Wild Potato Vine, *Ipomoea pandurata*:

This plant has a large root and was used as food by Native Americans. Since the raw root is a strong laxative, it was usually boiled to neutralize its effect.

Prairie Dodder, *Cuscuta pentagona*:

This is a parasitic flowering plant that gets its nutrients from other flowering plants.

There are no apparent leaves and the flowers are very small and white.



Wild Potato Vine



Prairie Dodder

Long-bearded Hawkweed, *Hieracium longipilum*:

This plant is probably one that you would pass by without a second glance. It is not spectacular. It is a slender hairy stem growing three feet or more tall. The leaves are basal (near ground level) and are up to ten inches long and one inch wide. The flower head is at the upper tip of the stem and has small yellow flowers, which resemble a miniature dandelion. Typically the top of the stem arches over and the flower hangs downward. I do not have a picture of it. It was observed growing in

several places on the walking trail.

Showy Tick Trefoil, *Desmodium canadense*:

This plant grows up to four feet tall.



Showy Tick Trefoil

Snow-on-the-mountain, *Euphorbia marginata*:

This plant is just beginning to bloom. What one notices are the cluster of white leaves with green stripes at the top. The real flowers are small white flowers in the center of the cluster of leaves.



Snow-on-the-mountain



Fond Farewell to Tim Grogan
 - Dennis Bires

Tim Grogan, Director of the Oklahoma Chapter of the Nature Conservancy, will be leaving that position at the end of July to become owner and General Manager of Tidal School Winery in Drumright, Oklahoma. Those of us who have had the opportunity to work with Tim will genuinely miss him. He has been an energetic leader and an indefatigable fund-raiser for the Conservancy's work in

Oklahoma. Tim was instrumental in establishing the new Four Canyons Preserve in northwest Oklahoma.

Tim has been an enthusiastic supporter of the Tallgrass Prairie Volunteer Program. I have mentioned before that Tim recognized he was the envy of other TNC State Directors, none of whom have a volunteer program on anything like the scale of ours.

Few here are aware that Tim's former career, prior to the

Nature Conservancy was as a *turn-around artist*, i.e. someone who helps financially ailing companies recover and prosper. Having been quite successful turning around several firms, Tim decided to devote a portion of his career to his lifelong commitment to conservation, and we're grateful that he did.

Best of luck, Tim, and you may see some of us at the tasting room over in Drumright.



Mark Your Calendars....

<p>Saturday August 14th, 2004</p> <p>For further information call TNC Tulsa Office 918.585.1117</p>	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  </div> <div style="text-align: right;"> <p>Wild Brew 2004 Tulsa</p> <p>A casual event offering the opportunity to sample domestic and international beers, ales and wine from outstanding microbreweries, as well as signature dishes from Oklahoma's finest restaurants.</p> </div> </div>
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TNC Oklahoma Chapter Preserve Updates

Salamanders as Indicators of Ecosystem Health - Chris Wilson

The Nickel Preserve harbors a suite of salamander species that are uncommon or endemic to the Ozarks. These species have been selected as nested targets within the primary ecosystem targets. Most are ranked G3 or G4, meaning they may be quite rare in all or parts of their ranges.

The Ozarks Ecoregional Conservation Assessment identified the Nickel Preserve as a key site for the protection of these important conservation targets. The size and ecological quality of the preserve provides for healthy populations of these salamanders. Preserve staff have initiated monitoring programs to track the relative abundance of these species across the preserve. Salamanders can be very useful *indicator species*, meaning the health of these organisms may closely parallel the health of the larger ecosystem.

Salamanders have several unique attributes that make them especially good indicators of ecosystem health or environmental change.

Salamanders comprise the largest biomass of all vertebrates in many forest ecosystems. They are functionally positioned at mid-levels in the food web. They are apparently quite sensitive to disturbances, both ecological and human induced. Their small territory size and strong site fidelity make them good indicators of very local changes in their environments.

Nickel Preserve staff have established 15 transects in a wide variety of habitats across the preserve. 36" x 10" boards have been placed in pairs at 20 meter intervals along the transects. Transects will be checked monthly from March through October. Results will provide staff with insights into species use among areas with different management practices. Additionally, changes in relative abundance of salamanders over time may indicate ecosystem level changes. The success of management actions such as prescribed burning will be measured by the desirability of these changes over the long term.

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Oak-Pine Forest

Ringed salamander, *Ambystoma annulatum* (G4) Ozark endemic
Western slimy salamander, *Plethodon albagula* (G4) Ozark endemic
Southern redback salamander, *Plethodon serratus* (G5?) disjunct

Riparian Forest

Oklahoma salamander, *Eurycea tynnerensis* (G3) endemic, restricted

Stream Ecosystem

Oklahoma salamander, *Eurycea tynnerensis* (G3) endemic, restricted
Graybelly salamander *Eurycea multiplicata griseogaster* (G4T4) endemic
Ozark zigzag salamander *Plethodon angusticlavius* (G5T4) endemic

Cave Ecosystem

Grotto salamander *Typhlotriton spelaeus* (G4) endemic
Dark-sided salamander *Eurycea longicauda melanopleura* (G5T4) endemic
Graybelly salamander *Eurycea multiplicata griseogaster* (G4T4)



Tallgrass Prairie Preserve

- Bob Hamilton

The big new story from the Tallgrass Prairie Preserve is the expansion of the fire-bison unit. On June 15th the tallgrass cowboys opened the gates to add an additional 6,656 acres to the year-round bison unit, expanding it to 21,045 acres. This expansion was made possible by the completion of 10.5 miles of new bison fence on the preserve's southeast boundary. Initiated in early 2003, this fencing job was a

tremendous challenge due to the heavy timber, extreme topography, and persistent muddy conditions. The final addition to the bison unit of about 2,000 acres is scheduled to occur in late 2006. On to the next fencing job!

Summer means it is time to continue the struggle with the evil weed, sericea lespedeza, the number one problem exotic plant species in the southern tallgrass region. Again this summer we are employing a four man spot-spray crew from June through October to search out and spot spray this

exotic plant. Each crew member operates an ATV pulling a 65 gallon sprayer. We target patches on the landscape that are in their first growing season after a burn since the sericea is much more visible due to livestock (bison and cattle) concentrating their grazing on the lush grass re-growth. For the month of June the crew put in 340 man-hours, which was a significant effort considering the number of days lost to rain and high winds.

