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THE DOCENT NEWS



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Soil Remediation

Andrew Donovan-Shead

At our docent reorientation meeting on March 6, 2004, we heard Dr. Kerry Sublette talk about his fieldwork on the Tallgrass Prairie investigating soil remediation, which is what he does to mitigate the effects caused by oil and salt-water escaping into the surface environment of the Earth. Dr Sublette's presentation was lucid and cogent.

Oil wells produce a mixture of oil and brine. Brine is water saturated or strongly impregnated with common salt. As oil wells age, the ratio of salt-water to oil increases. Most of the wells on the Tallgrass Prairie are old; there are about three hundred of which one hundred continue to operate. Naturally, the oil and brine must be separated; this is done at a tank battery located at a convenient place in the vicinity.

A tank battery consists, at a minimum, of two fat, squat tanks adjacent to a tall, thin tank. Oil and brine is pumped from the well-heads across country into the tall, thin

tank that serves as a separator. Oil and water don't mix and will separate under action of gravity with the heavier water gravitating to the bottom of the thin tank while the oil rises to the top. Sometimes the separator tank is filled with special material to increase the surface area of the interior and equipped with a horseshoe-shaped heater; heat and the higher surface area speeds separation of the fluids.

Once separated, oil and brine are pumped into their own holding tanks, the two fat jobs nearby. Oil is collected periodically by tanker truck and taken to a refinery for processing into gasoline, fuel oil, paraffin wax, plastics, polyethylene glycol (PEG), and many other products; you would be amazed, and alarmed, at how dependent our way of life is on oil. Brine is a useless nuisance that is a cost of doing business; it is pumped from its holding tank to an injection well where it is returned deep underground.

Ten times as much brine as oil is produced by each well. Brine is thought to come from ancient sea water trapped underground. It is highly

corrosive to metals and deadly to life. Life needs some salt, not much though. Oil well plumbing is made of steel pipes and tanks that are very susceptible to corrosion by salty fluids.

Most tank batteries are surrounded by earthen berms to contain any fluids leaking from the tanks. Properly designed, these containment berms will also be lined with an impermeable membrane to prevent seepage into the ground.

Often leaks occur in the pipework, spilling oil and brine onto the ground. Crude oil spills are easy to clean-up compared to spilled brine.

Crude oil is cleaned away by bioremediation. Bioremediation uses the bacteria that occur naturally in the soil to consume the oily hydrocarbons. Trick is to make it easy for these bacteria to do their job, which means adding fertilizer, moisture, creating good soil structure, and warm temperatures. It is a process called *landfarming* because the activities needed look identical to farming. You

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plow hay into the contaminated ground to improve the soil structure while adding fertilizer to help the hay decompose and the bacteria to grow, add water when needed. It's just like gardening, you don't start work until the weather is warm enough to produce good crops; in this case you want good crop of bacteria to eat up the crude oil.

Soil remediation takes time, several years for the land to recover from insult by oil and brine. Brine is a bigger problem because it has to be washed away, diluted. Brine stops roots of plants from extracting water from the soil, killing them within days. Once plant life is killed there is nothing to hold the soil together and the soil will start to erode, blowing away in the wind and washing away in the rain. Rapid revegetation is essential to hold the top soil in place. Any vegetation will form an island of fertility helping recovery of the land.

Only way to remove salt left by a brine spill is through dilution and drainage. Salt is mobile; it is diluted by rain and carried away across the natural lie of the land or with the help of a French drain. Either way, the soil must be conditioned to improve its structure by plowing in hay and fertilizer; fertilizer is needed to help bacteria breakdown the hay. If French drainage is installed then

flow is directed to a sump where the brine is collected and taken away to an injection well.

Once oil and brine is removed, the final task is to restore the original condition of the land prior to pollution by the spill. Dr. Sublette is experimenting with earthworms to help speed restoration of soils. In case of the prairie you well, know that John Deere's steel plow is bad for the deep rooted prairie grasses, but sometimes a scalpel is needed to heal a hurt. Natural vegetation is replanted and the land left to recover its former glory, convalescence in care of Nature.

Dr. Sublette's research on the Tallgrass Prairie is a collaboration between the University of Tulsa, Oklahoma State University, and the University of Oklahoma with funding from the Department Of Environment (DOE) and the Environmental Protection Agency (EPA). His results have been transferred to oil producers across the U.S. and throughout the world in the form of lectures like the one we experienced at Pawhuska, environmental checklists, self-assessment kits, bioremediation guidelines, and training videos.

Dr. Sublette's research is a shining example of value extracted from the Tallgrass Prairie and The Nature Conservancy's commitment to science-based environmental
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(Continued from page 2) conservation. We had a fascinating look at science applied to nurture our environment. In this The Nature Conservancy excels, making it easy to see cause and effect, easy to see the value of taking good care of our natural heritage; it removes the emotion and grounds in facts our efforts to conserve.

In our next issue, I will report Roy Churchwell's presentation on the role of heterogeneity in grassland bird productivity at the Tallgrass Prairie. We had a really good meeting. And I'm glad I had chance for a brief chat with Jenk Jones who, as fortune would have it, put me onto Robert Service as a likely poet to interest my little Brother, Aaron. What a blast!



What Spring Will Bring

- Van Vives

Life is rustling beneath the soil surface even now. If you walk the trail you will already see feathery blades of Yarrow, *Achillea millefolium*. Dig into the dead grasses and you will spot new shoots of the Purple Coneflower, *Echinacea purpurea*.

Some of the first flowers to look for in March and April are:

Small Bluets, *Houstonia pusilla*

Pasque Flower, *Pulsatilla patens*

Rose Vervain, *Glandularia canadensis*

Hoary Puccoon, *Lithospermum canescens*

False Garlic, *Nothoscordum bivalve*

Prairie Trout Lily, *Erythronium mesochoreum*

Spring Beauty, *Claytonia virginica*

Wood Sorrel, *Oxalis violacea*

Let's have a contest! Let's see who will be the first person to spot Small Bluets in bloom. When you see some, note the approximate place on the trail and the date and time. Send me the data at www.vcarlv@aol.com.



Ecoregion Plan Available On-Line

- John Fisher

The TNC Osage Plains/Flint Hills Prairie Ecoregion Plan is available for download from this link: <http://sites-conserveonline.org/gpg/resources> The link to the plan document is near the bottom of the page under the section labeled Ecoregion/Ecological Planning Unit. It's a large file, almost 13MB, but worth your time and effort. Check out the Geography of Hope section while you're there.

Geography of Hope describes the methodology the Conservancy uses to plan and develop their protection strategies.



Visitation Summary - Gorge Meyers

December 2003

We had only 143 sign-in visitors during December, an increase of three visitors, or 2.1%, from December 2002. Visitation was down 12% for the year compared to 2002. There were 69 visitors from other states, up 23.2% from last December. Virginia (12) lead the list, followed by Texas (8), Delaware and Illinois (6 each), and Connecticut, Ohio and Tennessee (5 each). Nine visitors came from four other countries, down 59% from last November. Making the list are England (3), and Australia, Canada and Germany (2 each). 65 Oklahomans visited the preserve in December 2003.

Mondays, Tuesday, Saturdays and Sundays had more visitors as 88% of the month's visitors came on those days. The rest of the week accounted for 11.5% of visitors. 90% of the visitors came between 11:30 a.m. and 5:30 p.m. 78% (7) of the foreign visitors were first timers, along with 54% of other state visitors, and 52% of Oklahomans. Overall, 55% of
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 visitors were first timers.

There were fewer comments than usual but people enjoyed the prairie. Comments

included, “With snow was lovely – saw deer, bison and lots of hawks”, “Hire me? Nice place!”, “Stunning open space! Thank you for

maintaining it”, “Always beautiful”, and, “An absolute wonder”.



<p>April 24, 2004 10:00am - 3:00pm at the preserve</p> <p>contact Dennis Bires 918-631-2443 for more information</p>		<p>Oilfield Cleanup Day</p> <p>Help us remove trash and harmful discarded hardware around the oil pumping units on the Preserve. Bison love to scratch themselves on the fences and other exposed parts of these installations, so we want the areas to be free of waste metal and other litter.</p> <p>Meet at Headquarters at 10:00 a.m. Bring a lunch. No need for advance notice -- just come and join us for all or part of the day.</p>
<p>May 8, 2004 9:00am - 12:00 Noon Tallgrass Prairie Visitor Center</p> <p>contact Jim Thayer (918)494-3784 for more information</p>		<p>Tallgrass Prairie Bird Identification Day</p> <p>There will be a short orientation with handouts for future reference. We will then go into the field to visit several habitats and practice the process of bird identification. The formal part of the day will be over at 12:00 noon, but Jim will be available afterwards to do some additional birding with those who are interested.</p> <p>Bring - binoculars (if you have them), food and drink for yourself.</p> <p>Contact Jim Thayer at 918-494-3784 if you plan on attending.</p>

Bison Chart

	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03
Over-wintered	300	380	390	476	626	760	953	1,204	1,475	1,644

ROUNDUPS

		01/95*	10/95	10/96	10/97	10/98	10/99	10/00	11/01	11/02
New Calves	62		120	163	199	225	228	299	371	437
Calving Rate	37%		72%	82%	82%	79%	70%	67%	68%	65%
Animals @ Roundup		380	450	541	650	847	1,020	1,224	1,539#	1,893
Number Sold		47	49	75	59	100	78	62	51	266
Number Purchased			47**	10	33	13	62	56	7	24
Year-Round Bison Unit	5,000	5,000	5,700	7,100	8,700	8,700	10,400	10,486	10,486##	14,389
No. Cattle Pastured	10,000		9,600	9,400	8,150	7,740	7,700	7,000	7,000	5,700
Cattle Pasture							22,629	23,756	23,756	19,853

* The first roundup was held Jan. '95 (The herd was dedicated Oct. 18, 1993)

** In 1995 the Sedgewick County Zoo in Wichita donated three bison and the Wichita Mountains Wildlife Refuge gave the TGP 44 bison. #To balance the math, subtract three old cows purged from the herd; two were butchered and one had to be put down due to old non-recoverable injuries. ##The year-round bison unit was increased to 14,389 acres in Dec. '01. The cattle pasture was correspondingly decreased to 19,853 acres.

3 oz serving	Calories	Fat	Cholesterol	Protein
Bison	93	1.8gm	43mg	23gm
Beef	183	8.7gm	55mg	25gm
Chicken	140	3.0gm	73mg	25gm
Turkey	125	3.0gm	59mg	
Elk	124	1.6gm		26gm
Antelope	128	2.3gm		29gm

Managed Area:

36,831 acres owned by TNC 1,864 acres leased by TNC 38,695 total
 5,950 acres of Western Wall Game Management Area on which TNC
 has deed restrictions 44,645 total project area

This report was compiled by Bill Rinehart.

WGR 2/10/03



TNC Oklahoma Chapter Preserve Updates

Nickel Preserve Spring Workdays and Hikes

Chris Wilson

Spring is springing, and it may be the best time to visit the Nickel Preserve. We invite you to come and experience the area by participating in a workday or a hike. Two self-guided trails begin at the headquarters building. They are open during daylight hours 7 days a week. For more information about the preserve or events, call 918-456-7601 or email Chris Wilson at cwilson@tnc.org.

Scheduled events for the Spring are:

PINE PLANTING

Saturday, April 17 and Friday, April 23 9 am

More than 3,000 shortleaf pine seedlings need to be planted in restoration areas. Bring lunch, gloves, snacks, and any tool that can make a small hole in gravel soils, or use one of ours.

FULL MOON HIKE

Tuesday, May 4 7 pm

Take in the sights, sounds, and smells of spring as twilight fades to moonlit darkness. We'll hike the savanna trail from the headquarters building for a

magnificent view of the rising moon.

PRESERVE WORKDAY

Saturday, May 15 9 am

There will be something for everyone as we paint gates, collect trash, and dig weeds from wildflower beds. Bring lunch, gloves, snacks, and plenty of energy.

BREEDING BIRD COUNT

Saturday, May 23 Time TBA

This is a great time of year for birding at the preserve. Last year's count yielded more than 100 species. A cookout is planned for the day's end.



Pontotoc Ridge Jim Erwin

At Pontotoc Ridge Preserve we are waiting on it to dry up enough to get in our 1000 acre burn. We have just completed a 600 acre coop burn. Our annual butterfly count is on June 12, at 10:00 am. And we also have a work day scheduled for March 30th. The Oklahoma Native Plant Society will have a field trip here on April 17th. If you ever had any questions about plants this would be the time to

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Jim Erwin

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get them answered.

At Cucumber Creek Preserve we got another burn in with the help of the National Forrest Service, and are looking forward to seeing the results.



TNC Fire Initiative

The Nature Conservancy has identified at least 107 million acres of important conservation areas, in the U.S. alone, that are threatened by altered fire regimes. More than half of the areas on the map are at stake. Around the world, hundreds of millions of acres more are at risk.

Altered fire regimes directly affect our mission to protect the diversity of life on Earth. Building on three decades of experience in ecological fire management and a respected in-house cadre of fire professionals, the Conservancy has launched the Fire Initiative to address the threat of altered fire regimes on both public and private lands.

The Fire Initiative uses five major tactics:

- ★ **Lead, Integrate and Collaborate:** Addressing fire-related ecological threats at the places where the Conservancy works and collaborating with other non-profit

organizations and multilateral institutions, such as Conservation International, United Nations and World Bank, to set priorities and provide a voice for biodiversity concerns.


- ★ **Improve Government Policy:** Engaging policy makers to address policies, programs and funding sources that either hinder or advance action in fire-altered ecosystems.
- ★ **Catalyze Fire Learning Networks:** Bringing together land management partners, community leaders, landowners, experts, scientists, non-profit partners and policy makers to exchange information and expertise, find solutions to common problems, share best practices and provide a voice for fire management. To date, we have established [networks](#) in the United States, Mexico, Central America and the Caribbean representing more than 100 million acres of priority conservation areas.
- ★ **Build Partner Capacity:** Working with national government agencies and community-based organizations that have the greatest potential to address altered fire regimes at priority

conservation areas, and building their capacity through resource sharing, networking, training and mentoring.

- ★ **Improve Science:** Applying the best available science to the threat of altered fire regimes and supporting best practices for adaptive management and restoration at sites. Because the lack of scientific information on the role of fire in ecosystems is a critical barrier to taking appropriate action in many places, we work with partners around the world to identify, prioritize and address gaps in knowledge.

In Oklahoma, altered fire regime is a common threat to most of our terrestrial portfolio sites. The seasonality, frequency, intensity and scale of fire is no longer operating as it did in presettlement times. This lack of ecosystem function often leads to lowered ecosystem health, such as woody species invasion. Restoring functional fire regimes is a primary focus on many of our sites, and TNC has developed considerable expertise and recognition for its capable use of prescribed fire.



Oklahoma	News	Tallgrass Prairie	Nickel / Ozarks	Pontotoc Ridge	More Preserves	Adopt-a-Bison
 The Nature Conservancy Saving the Last Great Places	Calendar	<h2>Oklahoma Calendar</h2> <p>TNC > Oklahoma</p>				
	Help Out Contacts					

<p>Sunday May 23rd, 2004</p> <p>For further information call Chris Wilson Nickel Preserve Director 918.456-7601</p>		<p>Nickel Preserve Bird Count</p> <p>Watch this space for details. Come and join in the fun.</p>
<p>Saturday August 14th, 2004</p> <p>For further information call TNC Tulsa Office 918.585.1117</p>		<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>

918/585-1117 Saving the Last Great Places of Oklahoma 918/585-1117

Docent Schedule

March 2004

<u>21</u> Beverly Atteberry Barbara Bates	<u>22</u> Loretta Vives Van Vives	<u>23</u> Bill Rinehart Carl Wilhite	<u>24</u> Marilyn Keefer	<u>25</u> Duane Price	<u>26</u> Jenk Jones, Jr. TG	<u>27</u> John Boxall Jim Deming
<u>28</u> Nicholas Delgrosso Charlotte Evans	<u>29</u> Iris McPherson	<u>30</u>	<u>31</u>			

April 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				<u>1</u>	<u>2</u>	<u>3</u>
<u>4</u> Jo Brooks Nicholas Delgrosso	<u>5</u>	<u>6</u>	<u>7</u> Dave Dolcater Pat Jaynes	<u>8</u> Deana Brewster Dennis Brewster	<u>9</u> Barbara Strahm Bob White	<u>10</u> Dorothy Buck
<u>11</u> Barbara Bates Nancy Irby	<u>12</u> Jenk Jones, Jr. TG	<u>13</u> Dean Johnston Mary Ellen Johnston	<u>14</u> Don Baird Larry Myers	<u>15</u> Rose Whitekiller	<u>16</u> Maureen Forsythe Steve Forsythe	<u>17</u> Beverly Atteberry Richard Burton John Fisher TG
<u>18</u> John Boxall Jo Brooks	<u>19</u> Loretta Vives Van Vives	<u>20</u> Neil Garrison	<u>21</u> Stuart Marshall	<u>22</u> Marilyn Keefer Bill Rinehart	<u>23</u> Suzy Harris	<u>24</u> Van Vives TG
<u>25</u> Monica Murray	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u> John Boxall		<u>30</u>