



Tallgrass Prairie

CENTER

Restoring a National Treasure



The Tallgrass Prairie Center restores native vegetation for the benefit of society and environment through research, education, and technology.

Butterfly Survey at Cedar River Natural Area

Nick Tebockhorst, Biology '12/TPC student employee

This past summer I had the opportunity to take part in an undergraduate research program here at the University of Northern Iowa Biology Department. Our lab investigated butterfly populations at the Tallgrass Prairie Center's experimental prairie site used for biomass harvest and ultimately electrical generation. We completed six surveys in the months of June and July and what we found was astonishing. We recorded 799 butterfly observations representing 24 different species. The most popular plants we found



A new record for Black Hawk County, a pipevine swallowtail (*Battus philenor*).

butterflies feeding on were pale purple coneflower (*Echinacea pallida*), wild bergamot (*Mondara fistulosa*), and oxeye sunflower (*Helianthus helianthoides*). This coincides with our hypothesis that plantings for biomass production that include forbs with grass species provide

greater ecological value than plantings of just grass species. Among the butterflies we recorded were great spangled fritillaries (*Spey-*



Common Name	Scientific Name
Delaware Skipper	<i>Anatrytone logan</i>
Hackberry Emperor	<i>Asterocampa celtis</i>
Meadow Fritillary	<i>Boloria bellona</i>
Summer Azure	<i>Celastrina neglecta</i>
Clouded/Orange Sulphurs	<i>Coliás sp.</i>
Monarch	<i>Danaus plexippus</i>
Duskywing Sp.	<i>Erynnis sp.</i>
Variiegated Fritillary	<i>Euptoieta claudia</i>
Little Yellow	<i>Eurema lisa</i>
Eastern Tailed Blue	<i>Everes comyntas</i>
Fiery Skipper	<i>Hylephila phyleus</i>
Buckeye	<i>Junonia coenia</i>
Viceroy	<i>Limenitis archippus</i>
Giant Swallowtail	<i>Papilio cressphontes</i>
Black Swallowtail	<i>Papilio polyxenes</i>
Pearl Crescent	<i>Phycoides tharos</i>
Cabbage White	<i>Pieris rapae</i>
Question Mark	<i>Polygonia interrogationis</i>
Great Spangled Fritillary	<i>Speyeria cybele</i>
Red Admiral	<i>Vanessa atalanta</i>



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eria cybele), painted ladies (*Vanessa cardui*); and a new record for Black Hawk County, a pipevine swallowtail (*Battus philenor*, photo). Over the course of the summer, it became clear to me just how important prairie flowers are to butterflies. The forbs in our prairie were one of the few available nectar sources available due to the drought. **For more information on this study, contact Nick TeBockhorst at ntebockh@uni.edu.** Special thanks to Dr. Mark Myers. Photos courtesy of Jarrett Pfrimmer.

Renewed Assault on Prairie

Daryl Smith

No doubt some of you have been reading about the latest assault on the formerly vast prairie ecosystem. Once again the prairie is undergoing an extensive conversion to row crops. Approximately 162 million hectares (395 million acres) of prairie vegetation once occupied mid-continent North America prior to Euro-American settlement. The vast prairie landscape of tallgrass, mixed grass and shortgrass stretched from the Wabash River in Indiana to the foothills of the Rocky Mountains. A review of the magnitude and stages of the historic loss of tallgrass prairie in the 19th and early to mid-20th centuries is in Smith 1992 (full citation at end of article).

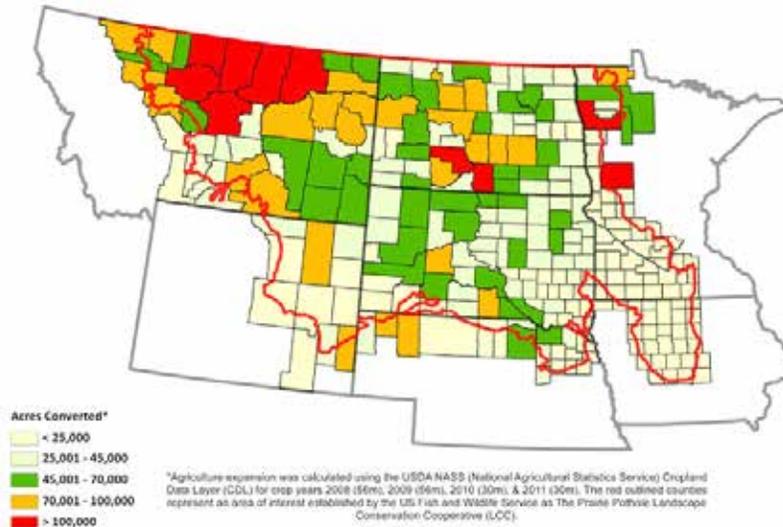
The second assault was on the southern Great Plains when farm acreage doubled between 1900 and 1920, then tripled between

1925 and 1930. The result was the Dust Bowl affecting 100 million acres of prairie.

In the mid 1990s, Samson and Knopf (1994) provided a summary of the estimated current area, historic area, and percent decline of the tallgrass, mixed grass and short grass prairies. Like Iowa, tallgrass prairie in most states had declined 99.9%. The shallow, rocky, untillable soil of the Flint Hills of Kansas reduced the amount of decline in Kansas. The decline in tallgrass prairie exceeded that reported for any other major ecosystem in North America. Mixed grass decline ranged from lows in Wyoming and Texas to greater amounts in the provinces of Canada. Information regarding Montana was apparently not included in their survey.

In the past 20 years there has been an increasing tendency in the Northern Great Plains to push cropland further west. Also, once again there is an increase in cultivating cropland in the Southern Great Plains. The trauma of the Dust Bowl Era seems to have been

forgotten as new varieties of genetically modified corn and soybeans allow the planting of row crops on land once better suited to grazing cattle. During 1989-2003, the most rapid conversion of grassland to crop uses occurred in the northern plains prairie pothole region where loss rates sampled suggested 0.4% loss of grassland/year. However, the conversion has accelerated in recent years. More recent estimates for about the same area indicate the annual rate of loss has doubled to 0.95%. That rate is greater than the rate of deforestation of the Amazon. Satellite imagery shows that the rate of land conversion nationally has exploded since 2008. In just four years, some 9.6 million hectares (23.7 million acres) of grasslands, wetlands and shrublands have been converted to row crops. The accompanying map (Figure 1) illustrates the number of acres of grassland and wetlands converted to cropland in the prairie pothole region of the northern prairie from 2008 to 2011.



Map produced by the Environmental Working Group using U. S. Dept. of Agriculture's National Agriculture Statistics Service cropland data.

Record high commodity prices and demand for ethanol, as well as rising global demand for food and energy, and advances in farm technology have tempted many farmers to convert parts of prairies, pastures and waterways into more lucrative row crops. Furthermore, some concerned citizens maintain that certain federal policies remove the risk of farming marginal lands. The results of the conversion are becoming more apparent. Heavy rains, once sequestered by wetlands and deep-rooted prairie plants now pour off the cropped fields. Eventually the water, often carrying fertilizer, herbicides and pesticides, makes its way to the Missouri River, then to the Mississippi and eventually to the Gulf of Mexico's "dead zone."

From a conservation perspective, the biologically rich grasslands and wetlands cleanse the water of huge river basins, reduce the rate of global warming and support a web of life that includes thousand of unique plants, birds and other animals. From that perspective they should be left intact.

Others don't see it that way. "America was founded on a grand idea-private land ownership," some argue, "so that you can do what you want with your property." A South Dakota farmer maintains, "productive land is an improvement over land in its natural state," espousing the 17th century philosopher, John Locke who believed that wilderness was worthless until improved by mankind. A Minnesota farmer who just converted 55 acres of unplowed land to soybeans by removing 225 semi-truck loads of large boulder feels his sweat equity has doubled the value of that land. Also, he looks at an adjacent 2,000 acre protected prairie area and sees land that is of no value to his community. "How much land do they need?," he asks, referring to the few bird watchers, prairie enthusiasts and hunters who make use of it.

"How much land needs to be prairie," is a good ques-

tion. Much depends on how the value of the land is assessed. Our society's application of the Lockean philosophy to land values does not take into account the ecological services provided by prairie. The extensively-rooted perennial vegetation of the prairie ecosystem performs vital services. Among those is its effectiveness in intercepting and infiltrating water to reduce stormwater runoff and control erosion. It is likely that several thousand acres of prairie properly placed on marginal farmland in the watershed could have

reduced the crest and scope of the 2008 Cedar River flood that inundated much of the Cedar Valley. Certainly the cost of strategically placed prairie in the Cedar Valley watershed would be small compared to the \$3.5 billion cost of 2008 flood damages in Iowa to say nothing of the reduction in human suffering. Other ecological services prairie provides are wildlife habitat, pollinators and other beneficial insects, cleaner air from sequestering carbon, detoxification of pollutants, livestock forage, increased soil fertility and genetic diversity.

As we don't yet know how much strategically placed prairie

is needed in watersheds, it would be wise to moderate further assaults on the prairie. *Questions/comments email daryl.smith@uni.edu, or call 319-273-2238.*

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Practical Data Collection: Establishing Methods and Procedures for Measuring Water Clarity and Turbidity of Stormwater Runoff from Active Highway Construction Sites.

Becky Kauten

In the spring of 2012, a new project launched at UNI in collaboration with the Iowa Department of Transportation (DOT). Through an agreement with the Iowa DOT Office of Construction, UNI is working on a water monitoring project related to stormwater runoff from active construction sites. The goal is to establish a protocol for regular sampling by DOT and its partners, as well as determine a cost-effective means of data collection that can be applied on an agency-wide scale.

Background: In 2009, The US Environmental Protection Agency (EPA) proposed including effluent limitation guidelines, or ELGs, regarding the amount of sediment allowed to discharge from an active construction site. Initially, this guideline came with a numerical standard, however no such number currently exists in the



A "stilling well" holds a pressure transducer. This device measures stream stage in 15-minute increments.

federal administrative ruling.

Since then, many departments of transportation across the US, as well as equipment manufacturers and proprietary product developers have been working to determine how best to achieve, measure and apply a numerical

standard to construction site runoff. In 2011, Iowa DOT contacted UNI to initiate such an effort based on existing partnerships and collaboration with the Iowa Department of Natural Resources – Watershed Assessment and Monitoring Section, including the Iowa Geological and Water Survey.

The project currently consists of three main goals:

1. Develop monitoring protocols initiated by >0.25 inch rainfall events. This involves collection of water samples from active construction sites, analyzing the samples and reporting based on existing and developing protocols.
2. Develop appropriate documentation. Documentation includes reports on samples, as well as information on appropriate tools and equipment to gather data over time in a cost-effective manner.
3. Produce instruction materials. Results and recommendations will be presented to Iowa DOT as resources for ongoing data collection and monitoring from active construction sites.

On-site data collection is occurring through the 2012 construction season on three major DOT construction sites in Polk and Bremer Counties. Discrete samples are collected from the adjacent stream after .25" rainfall events. Samples are also collected from "passive" stormwater collectors mounted on fence posts. Stream stage is being monitored by pressure transducers, and rainfall is recorded and reported based on the .25" threshold through an email-based alarm



Measuring water transparency at a DOT construction site.

system. UNI Earth Science students are assisting with lab analysis, comparing turbidimeter measurements with transparency tubes. On-site monitoring includes similar measurements, as well as pH, dissolved oxygen, and habitat assessments based on IOWATER protocols.

To learn more about this project, email rebecca.kauten@uni.edu, or call 319-273-3856

Seven Things to consider when hand collecting prairie seed - Dave Williams

It is fall in Iowa and time to collect seed. As you go out into prairie plantings in coming weeks, here are some tips to insure your efforts are successful:

1. Know how to identify the species you want to collect. A dried prairie plant may look quite different than when it's actively growing. The easiest way to identify a dried plant in the field is to find them when they are flowering during the growing season, mark their location and return often to see how the plant changes as it goes dormant. If you run across an unknown plant when seed collecting in the fall and want to collect seed from it, keep it separate from the other seed until you can positively identify it. There are a lot of non-native plants out there so be careful.

2. Know what the seed looks like. Dried flower parts can sometimes look like seeds, so you need to know where to look. Seeds in a compass plant flower for example, are clustered in a circular band around the outside of the center portion of the flower (Figure 1) and are typically dark colored and swollen in the center. For more information on seed

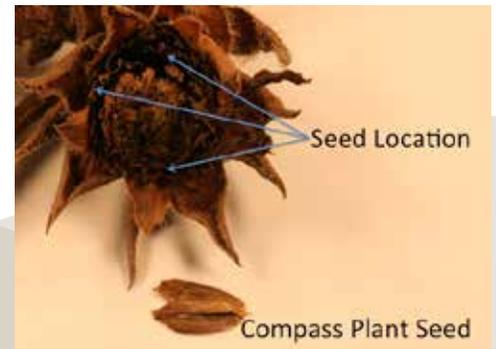


Figure 1. Location of seed on a dried compass plant (*Silphium laciniatum*) flower.

identification check out "The Tallgrass Prairie Center guide to seed and seedling identification" by Williams and Butler.

3. Know when to collect. Collecting seeds when ripe will maximize germination and collected seed can be stored longer before planting. You can predict optimum seed collecting times based upon your region's longitude and established blooming patterns. In central Iowa for example, spring flowering species, such as prairie smoke (*Geum triflorum*), will have ripe seed in mid-June. In northern Minnesota however, prairie smoke seed will ripen later in June since the growing season starts later. A good rule of thumb to follow is to look at the stem below the seed head. If it is discolored (brown or black) and dry, it is likely ripe. A sure way to determine if a seed is ripe is to place the seed on a hard surface and gently apply pressure with your thumbnail



Figure 2. Checking for seed ripeness on a pale purple coneflower seed (*Echinacea pallida*).

(Figure 2). If the seed is hard or dents slightly then it is ripe. Easily dented or milky seeds are not ripe and need more time to ripen on the plant before collecting.

4. Get permission. This is not a concern if you are collecting seed



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NEWSLETTER

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on your own property, however if you are collecting seed on land owned by the state, county or on private property you should always get permission from the appropriate entity. (Otherwise, you may get a visit from the sheriff!) State preserves are always off limits for seed collecting.

5. Be efficient when collecting seed. The old saying, "To do the job right, you need the right tools" also applies to seed collecting. Stringing gallon milk jugs around your waist will increase your seed storage capacity and keep seed separate just in case you

want to do some extra cleaning later (Figure 3). Consider bringing extra brown sandwich bags for additional storage. Generally, grass seed can be easily pulled off the stalks with your fingers. I have found it very satisfying to hand collect indian-



Figure 3. Equipment for seed collecting.

grass (*Sorghastrum nutans*) because it seems like you get a lot of seed with every pull. Seed heads for many forbs however, need to be clipped with scissors because they are tightly connected to the stalk. Don't go cheap on the scissors here! Inexpensive brand scissors will break. We use Fisker brand scissors. They are sharp and durable but be careful – it's easy to cut your finger(s) which will be the end of seed collecting for the day. Other tools, like combs,



Figure 4. Combing little bluestem (*Schizachyrium scoparium*) for seed.

work well when collecting small seeds, like little bluestem-*Schizachyrium scoparium* (Figure 4). For more information on hand collecting seed check out "The Tallgrass Prairie Center Guide to prairie restoration in the upper Midwest" by Smith, Williams, Houseal, and Henderson.

6. Leave some seed. It's true that seed is a renewable resource but leave some for nature. Birds, ants, rodents rely on seeds for sustenance. Seeds may be a critical link for plant replacement in periods of drought or flood. A good rule of thumb is to take half and leave half.

7. Enjoy the experience. Seed collecting is relaxing and a great way to connect with nature. *Email dave.williams@uni.edu for more info.*



Reachin' Out (!) to a Different Kind of Audience

Ryan Welch

About a year ago it was with heavy heart that I left my position as Outreach Coordinator at the Tallgrass Prairie Center. I had the opportunity to take a job closer to family teaching at a local community college. Initially I was unsure of how I would be able to work my past skill set of informing the public, organizing educational seminars, and spreading the mission of the Tallgrass Prairie Center into this new role. I soon found, however, that my students were enthusiastic to learn about local ecosystems. From day one, I took my Envi-

ronmental Science labs into the field to show students the natural areas around them. Many students had never been to any natural areas, even those that literally were within minutes of their homes. I took them to prairie roadside ditches,



Thursday Environmental Science Lab group from Clinton Community College on the roadside.

upland forests, remnant limestone prairies, and floodplain forests. While all of the locales were not glamorous, the students came away from each area with a better sense of the world around them and more aware of local opportunities to experience nature.

All too often as educators and advocates, we sometimes lose sight of the bigger picture while focusing on the finer details of our craft. It was of greater benefit for my students to go out and explore a natural area, no matter what its condition, than to hear me lecture about the finer points in a classroom with powerpoint slides. So while I may no longer be employed with the Tallgrass Prairie Center, I am still doing outreach, education, and advocacy of the prairie, just to a more localized audience, teaching them to think globally, while looking and acting locally. **Reach out! No worries.**

Ryan's Reachin' Out! Cowboy Cookies (made famous because he baked them fresh for each TPC Seminar he organized):

2 cups flour	½ t baking powder
1 t baking soda	1 cup butter or margarine
½ t salt	1 cup sugar
2 eggs	1 cup brown sugar
1 t vanilla	12 oz choc. chips/ coconut
1 cup Rice Krispies	1 cup oatmeal

Cream together the sugars and butter/margarine. Then add all of the dry ingredients and mix. Then add all of the liquid ingredients and mix. Then stir in the cereals, chocolate chips and coconut. Place spoon sized cookies on a greased cookie sheet and bake at 375 ° for 10-12 minutes. They keep longer if you freeze them, and/or hide them from Greg.