



SUMMER
2014
VOLUME 35
NUMBER 2

Missouri Prairie Journal

The Missouri Prairie Foundation

Protecting Native Grasslands



1966–2016
50th anniversary campaign

**Don't Miss our June 26
Benefit & August 23 Dinner!**

Prairie Bioenergy

Grassland Dragonflies

Edgar Denison Tribute

Gardening with Aquatic Plants

Message from the President

It seems like just a couple of years ago I was preparing a talk for the 40th anniversary of the Missouri Prairie Foundation. Now, we are gearing up to celebrate the 50th in 2016 by launching our 50th Anniversary Fundraising Campaign this summer. Time flies when you are having fun, and it is a pleasure to play a role in preserving remaining prairies, knowing these now rare natural communities have been around for several thousand years.

I feel strongly that, if we study them, these remnant prairies hold the keys for many solutions to 21st century challenges such as food and energy security, economic development, and biodiversity adaptation to climate change.

We have an example of one such creative solution in this issue, “Grassland Restoration to Renewable Energy.” The article describes MPF Technical Advisor Rudi Roeslein’s multi-disciplinary approach to an environmental problem that harnesses ecosystem services of prairie plants to provide bioenergy, clean water, wildlife habitat, and carbon sequestration. Roeslein’s plan is a shining example of what is possible.

As we move forward into the second half century of our conservation work, we welcome your involvement and ideas to expand our organization and apply knowledge gained from ancient, remnant plant communities for landscape-scale solutions to environmental challenges.

I look forward to seeing you at our Prairies & Pollinators event on June 26 in Kansas City and our MPF Annual Dinner to benefit MPF on August 23 in Springfield, featuring Dr. Peter Raven as our guest speaker. Please see the back cover for details about these exciting evenings and other upcoming events. I hope you enjoy this issue.

Jon R. Wingo, *President*

MPF members have made this nearly 50-year-old organization and its conservation accomplishments possible. I invite all members to join me in taking part in our 50th Anniversary Campaign, to invest in future prairie protection.



The mission of the Missouri Prairie Foundation (MPF) is to protect and restore prairie and other native grassland communities through acquisition, management, education, and research.

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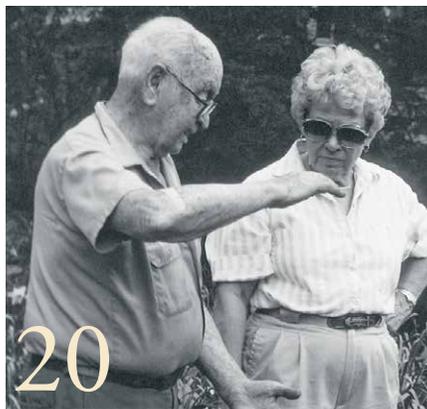
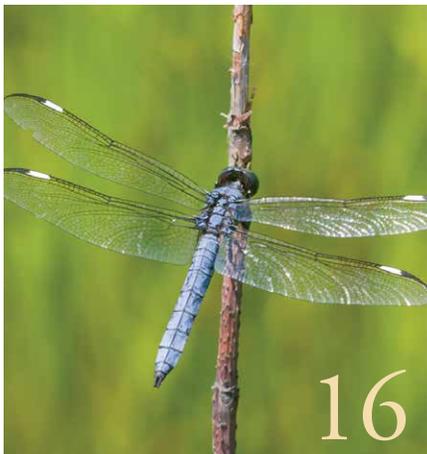
Missouri Prairie Foundation Grow Native! Committee Chair Carrie Coyne, holding LUSH Charity Pot Lotion, with, from left, Elaine Chollet, Sara Stoker, and Kelsey Eversmeyer of LUSH Cosmetics. Many thanks to LUSH for its 2014 support of the Missouri Prairie Journal and for hosting MPF in its St. Louis Galleria store on May 3.

LUSH
FRESH HANDMADE COSMETICS

CAROL DAVIT

Summer

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The *Missouri Prairie Journal* is mailed to Missouri Prairie Foundation members as a benefit of membership. Please contact the editor if you have questions about or ideas for content.

Regular membership dues to MPF are \$35 a year. To become a member, to renew, or to give a free gift membership when you renew, send a check to

MEMBERSHIP ADDRESS:
Missouri Prairie Foundation
c/o Martinsburg Bank
P.O. Box 856
Mexico, MO 65265-0856

or become a member on-line at
www.moprairie.org

General e-mail address
info@moprairie.com

Toll-free number
1-888-843-6739

www.moprairie.org

Questions about your membership or donation? Contact Jane Schaefer, who administers MPF's membership database at janeschaefer@earthlink.net.

On the cover:
A male eastern pondhawk (*Erythemis simplicicollis*) dragonfly at MPF's Golden Prairie in Barton County.
Photo by ©Richard Day/Daybreak Imagery. See the article on Prairie Odonates on page 16.



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MPF UPDATE

Prairie Conservation, Education, and Outreach



Native Bee Expert Mike Arduser and MPF Executive Director Carol Davit at the Maritz Green Vendor Fair on May 7, sharing the importance of prairie, pollinators, and native plants with Maritz employees.



MPF Board Member Scott Lenharth recently found additional species at Stilwell Prairie: the fall-blooming downy gentian (*Gentiana puberulenta*), above, Indian turnip (*Pediomelum esculentum*), blue star (*Amsonia illustris*), and biscuitroot (*Lomatium foeniculaceum*).

The year-round management of the Missouri Prairie Foundation's (MPF's) prairies requires relentless vigilance and hard physical labor. This work is carried out daily by MPF's Prairie Operations Manager **Richard Datema**, and also regularly by board members and volunteers **Scott Lenharth**, **Stan Parrish**, and **Brian Edmond**. Many other members volunteer as well, and all efforts are greatly appreciated.

The results of their diligence are evident in the high number of native prairie species sustained on MPF land, and documented in such reports as the *Golden Prairie Floristic Integrity Report* prepared by **Justin Thomas** of the Institute for Botanical Training, funded by MPF in 2013.

MPF continues aggressive restoration of its Stilwell Prairie, a 376-acre tract in Vernon County. Thanks to funding from a Missouri Bird Conservation Initiative Grant, a Missouri Conservation Heritage Foundation grant, funding from the U.S. Fish and Wildlife Service, and contributions from MPF members, more than 90 acres of this tract were cleared of trees through the work of a tree-grinding contractor. Datema also is controlling fescue and sericea lespedeza, and hand cutting woody invasives as part of MPF's Stilwell Prairie Restoration Plan. A WHIP contract from the Natural Resources Conservation Service, secured through the efforts of MPF board member **Scott Lenharth**, is making possible the restoration planting of eight hillside acres at Stilwell.

MPF is also working to continually improve its management methods. Led by Vice President of Science and Management **Bruce Schuette**, MPF is working to refine the use of herbicides to control invasives while also protecting prairie shrubs, and adjusting prescribed burning protocols to benefit the broadest number of prairie species.

MPF has exciting news regarding prairie pollinators: we are able to contract with Native Bee Expert **Mike Arduser**, recently retired from the Missouri Department of Conservation, to conduct several pollinator surveys on MPF land in 2014, as well as carry out some outreach and education endeavors.

From January to May, MPF staff, several board members, and other volunteers engaged in numerous outreach activities to present the prairie conservation message and promote the use of native plants. Numerous Missouri Master Naturalists, led by **Judy Payne**, organized and staffed an MPF and Grow Native! booth at the Kansas City Metro Lawn & Garden Show. Four MPF board members gave presentations or staffed booths at events: President **Jon Wingo**, to the Eastern Beekeepers Association; Vice President **Doris Sherrick**, to employees of MRI Global in Kansas City; Board Member **Dale Bleivins** at the Independence, MO Green Living Expo; and Emeritus Board Member **Bill Davit** at the East Central College Earth Day event.

MPF Executive Director **Carol Davit** gave a presentation to the Washington University Women's Club, and had booths at the Western Nursery and Landscape Association; at Kirkwood Earth Day, with Grow Native! Committee Member **Bill Ruppert**, volunteers and MPF members **Bill** and **Joyce Davit**, and **Jane Schaefer**, who administers MPF's membership database; at Whole Foods Market® on Brentwood in St. Louis; at the Monsanto Employees Earth Day with MPF member and volunteer **Lee Phillip**; at LUSH Fresh Cosmetics in the Galleria mall with **Jane Schaefer**, MPF member and volunteer **Caroline Sant**, and Grow Native! Committee Chair **Carrie Coyne**; and at the Maritz Corporation Green Vendor Fair, with **Mike Arduser**.

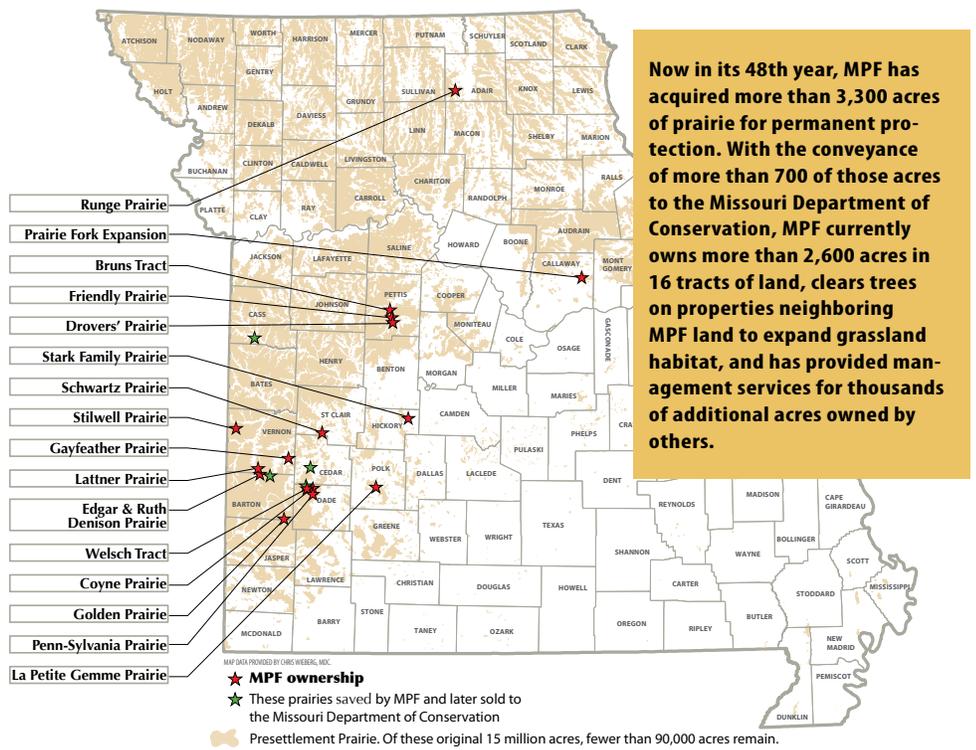
Numerous events are scheduled for later this summer and fall, including the **Prairies & Pollinators MPF Benefit** on June 26 in Kansas City and **MPF's Annual Dinner Benefit** featuring **Dr. Peter Raven**, president emeritus of the Missouri Botanical Garden, on August 23 in Springfield. Details on these and other events are listed on the back cover. We hope to see you there, and we welcome your participation in MPF's 50th Anniversary Campaign, which we are launching this summer. You are the reason MPF has accomplished so much, and your help will be critical to the next 50 years.

– Carol Davit, executive director and *Missouri Prairie Journal* editor

Prairie Protection Highlights

From January through early May 2014, MPF accomplished the following prairie stewardship:

- Five miles of fire lines prepared and 10 prescribed burns on 925 acres carried out on portions of MPF's Coyne, Penn-Sylvania, Golden, Schwartz, Stilwell, Denison, and Gayfeather Prairies. Burns carried out also on three prairies owned by private landowners. Many thanks to volunteers **Christine Chiu, Scott Lenharth, Stan Parrish, Mike Skinner, Brian Edmond, Day Ligon, Len Gilmore, Ray Coffey, Bob Hansen, Cathy Hansen, Joe Claypool, Kent Parrish, Ada Diggs, and Michael Datema** who worked long hours on the burn crews.



Ecologists rank temperate grasslands—which include Missouri's tallgrass prairies—as the **least conserved, most threatened** major terrestrial habitat type on earth. Prairie protection efforts in Missouri, therefore, are not only essential to preserving our state's natural heritage, but also are significant to national and even global conservation work. MPF is the only organization in the state whose land conservation efforts are dedicated exclusively to prairie and other native grasslands.



Volunteer Len Gilmore cuts trees during the Stilwell Prairie Work Day on February 22, 2014.

MPF Board Member Scott Lenharth with some of the 10 pounds of native prairie seed he collected to broadcast at Stilwell Prairie, in a five-acre area cleared of trees.

MPF's Prairie Operations Manager Richard Datema replaces a chain on a chainsaw at Stilwell Prairie. The impressive tree clearing conducted by a contractor and Datema is improving this 376-acre prairie for prairie-dependent plants and wildlife.

- Three hundred feet of trees girdled in the draw next to the north fence line at Stilwell Prairie.
- Woody growth cut at Denison Prairie and at the Gilbreath property bordering Golden Prairie.
- Ninety acres of small trees/heavy brush cleared at Stilwell Prairie. In addition, eight acres at Stilwell were prepared for seeding, and approximately 10 pounds of seed of 40 prairie plant species were scattered at Stilwell over five acres of

land cleared years ago. MPF Board Member **Scott Lenharth** collected the seed from MPF Board Member **Bonnie Teel's** Prairie View Prairie, which is only six miles from Stilwell. Species included tall blue sage (*Salvia azurea*), white prairie clover (*Dalea candida*), white wild indigo (*Baptisia alba*), hawkweed (*Hieracium longipilum*), and prairie sunflower (*Helianthus pauciflorus*).

- At the March volunteer workday at MPF's newly acquired Stark Family Prairie, approximately 60 percent of the small eastern red cedar (*Juniperus virginiana*) trees were cut from the six-acre, north-facing hillside woodland. Many thanks to MPF members **Tom Hutton** and **Jim Choate** for their much appreciated help.



Prairie Research

Golden Prairie Botanical Report

At the end of 2013, the Institute for Botanical Training (IBT) completed its 43-page Golden Prairie Floristic Integrity Report, the result of 2013 field work and analysis conducted by Justin Thomas of IBT. Funded by MPF, the report quantifies the floristic richness, diversity, evenness, dominance, Native C-value, and Floristic Quality Index mean at Golden Prairie, as well as provides baseline data for monitoring the vegetation at Golden Prairie. A PDF of the report is available at www.moprairie.org/Prairie-Research/.



This rush, *Juncus brachyphyllus*, had been listed as a state historic species until Justin Thomas of the Institute for Botanical Training discovered it at Golden Prairie in 2013.

To date in 2014, a contractor and MPF's Prairie Operations Manager Richard Datema have cleared 90 acres of small trees/heavy brush from MPF's 376-acre Stilwell Prairie. Above are three views of the work (left, before; right, after): Top, looking west toward Kansas. This area of prairie includes Mead's milkweed. Middle, looking east/northeast, large brush areas have been removed and many trees girdled. The bottomland shown here contains some extensive areas of prairie cordgrass. Bottom, looking north of the previous view.

MPF Acquires Land in Joplin

With funding from the U.S. Fish and Wildlife Service, in early May, MPF acquired a new property: 8.1 acres within the City of Joplin, which MPF will reconstruct to native prairie species. After five years, MPF will convey the land to the City of Joplin, which will make the land part of its park system.

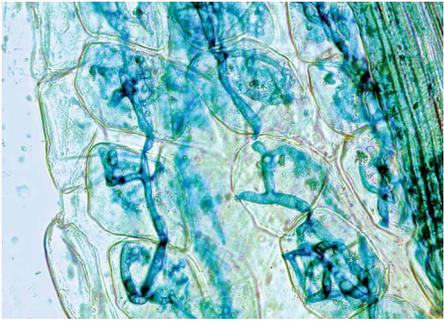
"The Service is delighted to work with partners like the Missouri Prairie Foundation and the City of Joplin to provide the public with a prairie experience within the city limits of Joplin," said Scott Hamilton, biologist with the Fish and Wildlife Service. "It is our mission to work with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people."

MPF is honored to take on this work, which will increase the biodiversity of the area and create additional natural space for the people of Joplin to enjoy. Tony Robyn, City of Joplin recovery planner, stated, "In our post-2011 disaster recovery planning, the citizens expressed an interest in developing more recreational opportunities and we view this as a dynamic, value-added enhancement to nurture a healthy and diverse community."



Many thanks to Jeff and Hallie Sale of Vinton Supply Company of Springfield, MO for donating four backpack sprayers to MPF, valued at \$376. The sprayers will be used to spot spray invasive species on MPF prairies. Thank you, Jeff and Hallie Sale, for your generosity!

From left, Vinton Supply Company employee Jean Rudd, and owners Jeff and Hallie Sale with the four backpack sprayers the Sales donated to MPF early in 2014.



JUSTIN THOMAS

Shown here, at 40X magnification, are blue mycorrhizae (AMF) on square plant root cells, from plants collected on dolomite glades. The structures inside the cells are the arbuscules, formed by the AMF, where AMF exchanges resources with the plant.

Mycorrhizal Research on MPF Prairies

Alice Tipton, a graduate student at the University of Missouri-Columbia, will conduct research at multiple MPF sites in 2014 as part of a large Missouri grassland mycorrhizal study. Mycorrhizal interactions are relationships between fungi and plants in which the fungi provide the plant with nutrients and water in exchange for some of the plant's carbon resources.

These relationships are ancient, dating back to the first land plants on earth. More than 80 percent of land

plants make mycorrhizal relationships with arbuscular mycorrhizal fungi (AMF), which are also the most common mycorrhizal fungi associating with prairie plants. Some prairie plants cannot grow without AMF. Surveys in other grasslands have shown that AMF diversity is strongly associated with plant diversity, and that agricultural disturbances and invasive plant species can alter AMF communities below ground.

Tipton will be working at MPF's La Petite Gemme Prairie, Stilwell Prairie, Schwartz Prairie, and many other prairie and glade sites across southern Missouri. The survey will examine the diversity and richness of AMF taxa living on plant roots in restored and remnant glades and prairies of different land use histories and soil types. Tipton will genetically sequence AMF DNA and use these sequences to identify different taxa of AMF living in and on grassland plant roots.

This research will help identify whether current grassland restoration practices are restoring the community of AMF needed by native plants, and whether it may be helpful to begin implementing soil microbial restoration in Missouri grasslands. Tipton's research is funded through the Missouri Department of Conservation's Wildlife Diversity Fund.

Burns & McDonnell Hosts MPF Board Meeting

The engineering firm Burns & McDonnell hosted the April 12, 2014 MPF board of directors meeting and a tour for members of the stormwater management features on the grounds of its world headquarters in Kansas City. Many thanks to Burns & McDonnell Restoration Biologists **Randy Root** and **Dennis Haag** for making arrangements for the meeting and for leading the tour.



CAROL DAVIT



CAROL DAVIT

From left are Dennis Haag, Gordon Shaw, and Randy Root of Burns & McDonnell, who led the tour of the engineering firm's numerous native rain gardens and other features designed to slow and filter stormwater runoff.



JILL ERICKSON

A large number of shrubs and trees supplied by Forrest Keeling Nursery was a new feature this year.

MPF Kansas City Plant Sale a Phenomenal Success

Many thanks to the dedication and hard work of the 35 volunteers and native plant vendors who contributed to the breaking of yet another sales record for the annual MPF April native plant sale at the City Market in Kansas City on April 19 and 26.

With sales of native wildflowers, grasses, vines, shrubs, and trees supplied by Missouri Wildflowers Nursery, Forrest Keeling Nursery, and Applied Ecological Services, MPF netted more than \$11,000 during the two very busy Saturday mornings. The funds will be allocated for MPF's prairie conservation work.

Special thanks to **Doris** and **Bob Sherrick**, who have spearheaded the sale for many years, and **Bill Fessler**, who is the Sherricks' apprentice for heading up future plant sales. Other volunteers who put in many hours at the sales were **Susan Appel, Darlene Arnett, Barbara Baker, Ronny Berry, Dale Blevins, Paula Diaz, Jill Erickson, Spencer Ernst, Margo Farnsworth, Dennis Gredell, Bob Hansen, James Hart, Vicky Hart, Dan Haus, Deb Haus, Gary House, Jamie Jepson, Lance Jessee, Linda Lehrbaum, Sid Lehrbaum, Glenn Longworth, Steve Mann, Holly Mehl, Jim Pascoe, Diane Rush, Marty Schuettelpelz, Sandy Slusher, Bonnie Teel, Jim Wells, Van Wiskur, Lori Wohlschlager, and Joan Zeller.**



50th
anniversary
campaign

GOLDEN OPPORTUNITY FOR PRAIRIE PROTECTION

Prairies Now and Forever

Missouri was once blanketed with 15 million acres of tallgrass prairie, covering one-third of the state. Much of the state also harbored prairie species in open woodlands, savannas, and glades. These native grasslands are a vital part of Missouri's biological heritage. **Today less than one percent of original native prairie remains, in fewer than 90,000 scattered acres.** Many of these remnants are under constant threat of land conversion.

Whether for the birds that nest under cover of the tall grass, the many species both above and below ground that can be found nowhere else on earth, or the memories of early pioneers seeking new opportunities, our remaining prairies define the richness of our past and the promise for our future, and must be protected for future generations.

Through increased prairie conservation, restoration, and outreach, the Missouri Prairie Foundation will protect more pollinators and other wildlife, clean more water, sequester more carbon, and bring more beauty home in the landscaping of our communities. For nearly 50 years, the Missouri Prairie Foundation has been honoring our prairie heritage, protecting prairies for our grandchildren, and encouraging the use of native plants.

Nearly 50 years ago, the founders of the Missouri Prairie Foundation took a stand to ensure that Missouri will *always have rich, beautiful prairies*. As its 50th Anniversary approaches, the Missouri Prairie Foundation presents all prairie enthusiasts and lovers of native landscapes with a *golden opportunity* to invest in future prairie protection by *contributing to the Missouri Prairie Foundation's 50th Anniversary Campaign*.

Campaign Goal—\$4 million in gifts and pledges

This campaign fundraising goal will enable the Missouri Prairie Foundation (MPF) to purchase more land, steward it carefully, and increase and sustain the staffing necessary to continue building support for prairie and native plants.

How MPF Will Allocate Campaign Funds

\$1 million for annual operating expenses from 2014 to 2016

\$1 million for new land acquisitions, so MPF is financially prepared to act promptly to save a prairie parcel from being plowed under. While MPF has recently received funds that are being used to acquire prairie parcels, it is vital that MPF's Acquisition Fund, with a current balance of just \$32,000, continue to receive funds so MPF is prepared to acquire prairies when they become available.

\$1 million for MPF's Stewardship Fund, to provide a secure source of funding for future prairie stewardship expenses.

\$1 million for MPF's Permanent Endowment Fund, to provide a permanent source of funds for non-stewardship operating expenses.

50th Anniversary Campaign Funds Received, Awarded, or Pledged To Date

Several recent generous gifts, pledges, grants, and awards, including those listed below, are moving MPF toward its campaign goal:

\$750,000 Award for Prairie Acquisition in Jasper and Newton Counties from the U.S. Fish and Wildlife Service and the Missouri Department of Natural Resources

\$555,266 from the Estate of Ms. Linden Trial, for prairie acquisition, stewardship, outreach, education, and research

\$162,495 Award for Land Acquisition and Restoration in the City of Joplin from the U.S. Fish and Wildlife Service and the Missouri Department of Natural Resources

\$100,000 Grant from the Robert J. Trulaske, Jr. Family Foundation, for prairie acquisition

\$79,143 from the Joseph C. Koster Revocable Trust, for area of greatest need

\$50,000 pledged from Mr. Rudi Roeslein, for area of greatest need

\$30,000 from Dr. Clifford Welsch, and an additional \$90,000 pledged, for prairie acquisition

\$16,840 from LUSH Fresh Handmade Cosmetics, to help underwrite 2014 *Missouri Prairie Journal* expenses



How You Can Help MPF Reach Its 50th Anniversary Campaign Goal

MPF has established **Prairie Champion** and **Prairie Patron** giving opportunities for individuals, businesses, philanthropic foundations, and others with the means to give **cash** or **securities** at the following levels:

Prairies Now and Forever Champion *\$1 Million or More*

Big Bluestem Champion *\$500,000 or More*

Prairie-Chicken Champion *\$250,000 or More*

Sunflower Champion *\$100,000 or More*

Monarch Champion *\$50,000 or More*

Blazingstar Champion *\$25,000 or More*

Gold Patron *\$10,000 or More*

Silver Patron *\$5,000 or More*



ALLEN WOODLIFFE

BRUCE SCHIETTE

CHRISTINE TORLINA

Putting Your Donation to Work

Below are examples of the ways your gift can make a difference.

With a **\$1 million** gift,

- MPF could purchase several hundred acres of native prairie
- or protect and steward its 2,600 acres of native and restored prairie for about five years
- or protect and steward about 700 acres of prairie in perpetuity
- or meet its \$1 million permanent endowment goal during this campaign

With a **\$500,000** gift,

- MPF could purchase 150 to 300 acres of native prairie
- or protect and steward its 2,600 acres of native and restored prairie for more than two and a half years
- or protect and steward about 300 acres of prairie in perpetuity
- or meet half of its \$1 million permanent endowment goal

With a **\$250,000** gift,

- MPF could purchase roughly 100 acres of native prairie
- or protect and steward its 2,600 acres of native and restored prairie for about 15 months
- or protect and steward about 150 acres of prairie in perpetuity
- or meet one quarter of its \$1 million permanent endowment goal

With a **\$100,000** gift,

- MPF could fund the production of the *Missouri Prairie Journal* for more than three years
- or fund production of the *Missouri Prairie Journal*, other outreach and education activities, and its Grow Native! program for one year

- or protect and steward its 2,600 acres of native and restored prairie for about nine months
- or protect and steward about 60 acres of prairie in perpetuity

With a **\$50,000** gift,

- MPF could protect and steward its 2,600 acres of native and restored prairie for about four and a half months
- or protect and steward about 30 acres of prairie in perpetuity

With a **\$25,000** gift,

- approximately 7.5% of MPF's annual operating budget would be met

Gifts at the \$1 million, \$500,000, \$250,000, \$100,000, \$50,000, or \$25,000 levels can be designated to any of several MPF funds to address particular conservation interests to the donor.

A **\$10,000** or a **\$5,000** gift

- will help fund MPF's annual operating budget, including stewardship, outreach, and education costs

Each contribution moves MPF closer to fulfilling its campaign goals, and each donor is an honored supporter. Gifts or pledges may be lump sums or annual amounts. Prairie Champions and Prairie Patrons receive significant recognition and a generous package of amenities. For more information, please call 573-356-7828, email info@moprairie.com, or see the **Donate page at www.moprairie.org.**

Campaign Membership Goals

Your annual membership dues are critical to the operation of MPF. MPF is grateful to all members, at each level, for joining and sustaining their memberships.

To broaden its membership support, which will **increase MPF's prairie protection capacity** and also **strengthen the collective voice for prairie conservation**, MPF has established the following membership goals to reach by 2016:

- Grow membership to 2,000 or more by 2016. As of May 2014, MPF membership is at 1,650 individuals/families/groups. The MPF goal is to attract and sustain at least 350 new members at the regular to sustaining member levels (\$35 to \$500) by 2016.
- Welcome 50 or more new lifetime members by 2016. A gift of \$1,000 or more (lump sum; cash or securities) entitles an

individual, family, or organization to lifetime membership in MPF and complimentary admittance for two to the MPF Annual Dinner. With 50 or more new lifetime members, MPF will have more than 150 total lifetime members.

- Recognize 30 or more lifetime members as Crawford & Christisen Compass Society Members in 2014, in 2015, and in 2016. Lifetime members who make an annual gift of \$1,000 or more (cumulative or lump sum in a calendar year) are members (year gift is made) of the Crawford & Christisen Compass Society and invited to the annual Society dinner. The Society is named for MPF's co-founders Bill Crawford and Don Christisen, who set the direction for MPF's permanent prairie protection.



How to Make A Campaign Gift of Cash or Securities

To make a tax-deductible, 50th Anniversary Fundraising Campaign gift of cash, please send a check to

**Missouri Prairie Foundation
50th Anniversary Campaign
Community Foundation of the Ozarks
P.O. Box 8960
Springfield, MO 65801**

If you are making a tax-deductible campaign gift of securities, please contact MPF at **888-843-6739** or view the **Donate page** at **www.moprairie.org**.



As the Treasurer of the Missouri Prairie Foundation, I am in a unique position to evaluate the organization's fiscal strengths and weaknesses. The past five years have been tremendous for MPF in terms of opportunities for growth: prairies have been added, Grow Native! was acquired, funding sources have been strengthened and diversified. The establishment of a control environment to ensure MPF's continued expansion and success has been embraced by MPF's Board of Directors and implemented throughout the organization by our staff. MPF's Executive Director, Carol Davit, has been a driving force in these efforts. I believe that under Carol's direction the organization has the opportunity to continue to expand dynamically, and with complete fiscal responsibility. For these reasons, I felt comfortable investing in MPF by becoming a life member.

—Laura Church, Missouri Prairie Foundation Treasurer



I have pledged the contribution of \$50,000 to MPF because I believe it is a lean, effective, and passionate voice for the restoration and preservation of an extremely important ecosystem that may vanish in our lifetime. Without MPF's constant vigilance, promotion, and making people aware of the ecological, environmental, and social impacts of the loss of this valuable part of our heritage we will certainly lose the remaining few tracts of prairie. Not until I joined MPF and participated in the grassland vs. cropland debate did I realize the significant role that our prairies play in clean water, soil erosion and health, flooding, CO₂ sequestration, wildlife habitat, pollinators, and so many other ecological services that are yet to be fully appreciated. This is a cause to which I have dedicated not only money, but also a significant part of my time and business efforts in order to help restore our native prairie to its rightful and prominent role in a healthy and vibrant environment. I hope you will join me in this noble and important cause.

—Rudi Roeslein, CEO, Roeslein and Associates



I've always loved the Missouri countryside. But it was not until my sister Linden's death in 2012, and her bequest to the Missouri Prairie Foundation, that I began to truly appreciate the Missouri prairie. I've also come to appreciate the people in the Missouri Prairie Foundation, their enthusiasm for saving and restoring Missouri prairie, their knowledge, and their willingness to volunteer their time and expertise to this great cause. I'm thrilled that my sister's bequest has become part of the MPF's 50th anniversary campaign. She was a modest, unassuming person, and in many respects the Missouri prairie mirrors her spirit.

—Mike Trial, Missouri Prairie Foundation Member

Prairies Now and Forever



FROM
Grassland Restoration
TO
Renewable Energy

*How MPF Planted Seeds for a
Large Sustainable Energy Initiative*

By Sheldon Ripson



Some ideas come out of the blue. But an idea taking shape in the hog barns and rolling hills of northern Missouri came out of the green—the grasslands revered by an entrepreneur, industrialist, and dedicated conservationist. Missouri Prairie Foundation (MPF) technical advisor Rudi Roeslein loves native prairie for its beauty and unique set of ecological services. Now Roeslein is staking his reputation on an ambitious goal of returning 30 million acres of highly erodible land to native grasslands in 30 years.

Roeslein's business intuition tells him the only way that can happen is by creating an economic model for landowners to plant native grasses. And that is exactly what he intends to do.

"We hope to come up with another crop for farmers: the natural prairie grasses that have grown here for thousands of years," Roeslein said. "I'm not saying this is a silver bullet. But this is a potential solution for challenges like protecting water quality, preventing soil erosion, safeguarding pollinator services, and increasing wildlife habitat. If there is an economic value for these ecological services, it will be a better source of income than planting crops in areas where they are not sustainable."

Major Northern Missouri Project

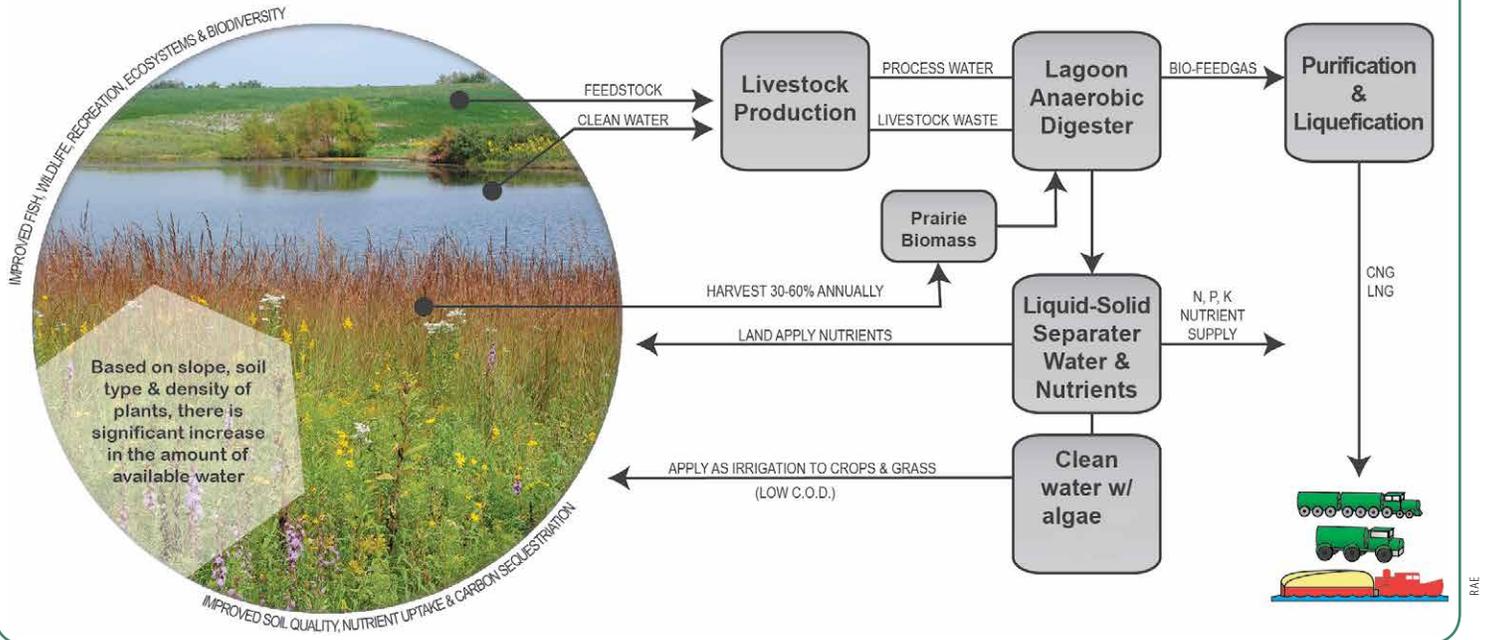
Early in 2014 Roeslein's company, Roeslein Alternative Energy, announced a \$100 million renewable energy initiative with Murphy-Brown of Missouri (MBM). MBM and its parent company Smithfield Foods, the world's largest hog producer, own nearly 50,000 acres in northern Missouri.

"I'm really encouraged by this project," said Brian Paulsen, MBM Director of Environmental Health and Safety. "I'm excited by Rudi, the team he's put together, and the model he's put together. He's got the front side figured out and the back side. No one else has done that. This will be good for north Missouri, good for the environment, good for everyone."

Top, a prairie planting at Murphy-Brown of Missouri, initiated in 2008 thanks to a partnership of the Missouri Prairie Foundation, the Missouri Department of Conservation, the U.S. Fish and Wildlife Service, and the Natural Resources Conservation Service.

The Vision:

We strive to provide a sustainable solution for Industrial waste and livestock production by using the residue for bioenergy production and nutrient replenishment. By providing a sustainable process that supports both food production from livestock and incorporates natural prairie grass restoration, we can substantially decrease the carbon footprint and provide many ecological services for people, wildlife and the environment.



The Key: Anaerobic Digestion

At the heart of the process is anaerobic digestion (AD). In the absence of oxygen, naturally occurring microorganisms extract methane from animal manure and organic matter. Rather than sit in an open lagoon, the waste is moved into a covered lagoon or tank. The microorganisms create biogas, which rises to the top of the digester. The biogas is collected and cleaned of impurities like sulfur. What remains is the same molecule as natural gas (98 percent methane, also known as biomethane), which can be compressed (CNG) or liquefied (LNG) for use as transportation fuel and/or injected in the U.S. natural gas grid system. The residue can be used as natural fertilizer, and the water can be safely used for irrigation. Odor emissions are reduced by 98 percent.

The 2013 edition of *Biogas: An All-Rounder* noted that “using liquid or solid manure from livestock in a biogas plant is particularly good for the climate. It constitutes a pre-processing step as it makes the livestock manure more tolerable for plants and reduces methane emissions during storage and spreading on fields and pastures. The neighborhood also gains an added bonus, since the odor emissions when spreading fermented products are considerably lower than with conventional slurry.”

Roeslein seeks to harness AD in a large-scale way. Barn scrapers will move waste from approximately 1.5 million hogs into nearly 100 existing lagoons fitted with impermeable covers. Methane production could begin late in 2014. When completed, CNG

production could approach 20 million gallons annually.

“If you really look at animal manure, it’s a waste byproduct of plant material. There is carbon value there. We will harvest the carbon using anaerobic digestion. Then we’ll take the remaining sludge and put it into the soil as a valuable nutrient. The N, P, and K are still there. The digester captured the value,” Paulsen said.

Injecting digested manure into soil provides about one metric ton in benefits per acre per year thanks to carbon dioxide stored in the soil from the manure (0.8 metric ton) and lower nitrous oxide emissions (0.2 metric ton). Nitrogen in synthetic fertilizer or undigested manure volatilizes to release nitrous oxide, a greenhouse gas about 298 times more potent than carbon



DERRICK ROESELEIN

Prescribed burning of one of the prairie plantings at Murphy-Brown of Missouri, and on facing page, the initial winter seeding of prairie plants on the property in 2008.

dioxide. Methane that reaches the atmosphere is 20 times more destructive than carbon dioxide.

MBM officials say the project will lower production costs, increase efficiency, and help surrounding communities.

“There will be significant benefits to the environment from these lagoon covers. We’ll reduce our carbon footprint. We’ll reduce our land application efforts,” said Bill Homann, MBM Director of Administration and Compliance. “We are clearly aligning ourselves with a project our parent company will strongly support.”

Native Grasses as a New Energy Crop

Next Roeslein envisions using biogas harvested from restored native grasslands to produce more Renewable Natural Gas (RNG). Germany in 2012 had 7,600 AD systems using energy crops to generate biogas. The industry accounts for 41,000 jobs and 6.5 billion Euros in sales. MBM officials have identified land near waterways where grass could be planted as buffers, harvested, and added to digesters to produce biogas.

“We said we’d work with him on that, but it’s in the infant stage,” Paulsen said. “We’ve got several thousand acres up here and some could be called unproductive. What could be done to make

it productive? Would it be better to use another kind of grass here?”

“If we can improve the output with the same asset base by adding prairie grasses to the manure maybe we’ll get another 20, 50, or even 100 percent output,” Roeslein said. “In addition to being bullet-proof environmentally we are increasing asset value by utilizing land differently. Hopefully this will be a model for other farmers.”

Roeslein’s Introduction to Prairie

Roeslein bought the first of his three farms in 1992 shortly after starting Roeslein & Associates, the St. Louis-based engineering, modular fabrication, and construction services firm. An avid outdoorsman, Roeslein started planting native grasses after noticing large deer while hunting on the Kansas prairie. He reasoned the deer got large by eating deep-rooted native forbs and legumes, which can extract water and nutrients non-native plants can’t reach. Wildlife photographer and MPF partner Frank Oberle provided native grass seed for Roeslein’s farms. Oberle introduced Roeslein to MPF past president Steve Mowry, who later suggested that Roeslein serve on the MPF board.

Roeslein began thinking about using plant life for biofuel while conducting a controlled burn on his farm.

“There was a tremendous amount of energy being released. So I wondered if there was a way to harness this. That was kind of the spark,” Roeslein said.

MPF, Mowry, and Oberle encouraged Premium Standard Farms (the predecessor company of MBM) to begin a project in 2008 that included 400 acres of grassland restoration. The Missouri Department of Conservation and the U.S. Fish and Wildlife Service consulted and offered technical support. Thanks to funding from the Natural Resources Conservation Service’s WHIP program, today the prairie restoration is robust with high numbers of wildflower species, a large volume of native grass, and increased wildlife in the prairie habitat.

“There’s no better example in the state of how to emulate an ecosystem on 400 acres in a short period of time. That was the beginning of a philosophical change on how to get diverse plant use. MPF was able to prove we can plant high quality grasslands very easily,” Oberle said.

Roeslein was on the MPF board during discussions about environmental challenges for the project after heavy rains filled nearby livestock lagoons. Roeslein wondered whether anaerobic digestion could help those kinds of problems while also providing a source of renewable energy, so he arranged to meet with Premium Standard Farms.

“When he learned about the situation, Rudi had the cogs working the whole time thinking about taking an ecological difficulty and making everyone come out better,” Mowry said.

“Steve and I went with Rudi for the presentation. He said we’ll take all the manure you can give us and we’ll make a positive outcome,” Oberle said.

Roeslein credits the meeting for allowing the project to begin. It started a two-year collaborative effort leading to the joint venture. Roeslein Alternative

Energy will own the natural gas from the project and MBM will retain the rights to the compost material that is the other by-product of anaerobic digestion.

“We had experimented with impermeable lagoon covers, which wouldn’t allow rainfall to accumulate. We were just flaring off the gas. Then Rudi and his team started talking about using the covered lagoons like digesters that could capture the gas. Rudi brought in some folks to really look at ways to utilize that gas profitably,” Homann said.

“At the time everyone in the renewable energy industry was focusing on ethanol and using biomass from energy crops like corn, corn stover, or non-native giant miscanthus to produce more ethanol from second-generation processes that were still not proven technology,” Roeslein said. “My concern was they were focusing on biomass yield and not ecological services. No one was talking about what would happen from converting additional marginal land into biomass production, like Conservation Reserve Program lands, without considering ecological services and wildlife habitat.”

Obstacles and Opportunity

Roeslein’s business model seeks to tap into the natural gas boom. There is a growing market for diesel-powered vehicles converting to natural gas, which is less expensive and burns 90 percent cleaner than diesel. Roeslein Alternative Energy is actively engaged with large customers interested in converting fleets to CNG or LNG. Many find the sustainability of RNG attractive and the price advantage compelling.

“It will take time for truckers and fleets to get comfortable that they can have access to the gas at convenient locations, that it’s not a fad, or that the prices are not going to change to eliminate the financial advantage. Eventually, because



of high natural gas supplies and its popularity around the world, it will be widely adopted in the U.S.,” Roeslein said.

Roeslein also knows it will take time and examples of success to restore highly erodible crop ground to native grasslands. He is collaborating with conservation experts to develop best practices. Missouri Department of Conservation Private Land Conservationist John Murphy developed and helped implement a comprehensive management plan on Roeslein’s Putman County farm.

“We saw a lot of potential in seeding erodible acreage and restoring existing remnants, and Rudi and his son Derrick immediately began working hard. Seeing the project six years later, it has far exceeded my expectations,” Murphy said. One of the experiments involves converting highly erodible land to native grasses for RNG production.

“Currently, the closest analog to that is hay production for financial gain. When there are financial incentives for hay ground, people do that today. This is not some great leap into an unfamiliar area,” Murphy said.

Chris Woodson of the U.S. Fish and Wildlife Service in Columbia, MO applauds efforts to use grassland as biomass for energy, provided it is well managed.

“If it is harvested 100 percent every year down to nothing that really is no

different than grazing non-native cool-season fescue down to nothing every year. It does more harm than benefit. Rudi is promoting a percentage of it to be harvested every year, 30 to 50 percent. That’s good because these systems need it,” Woodson said.

Roeslein believes action is urgent for land stewardship, using waste as energy, and realizing that human actions affect the entire planet’s species.

“We are going from seven billion to nine billion people in the next 50 years possibly. The decisions we make right now are going to have a dramatic impact,” Roeslein said. “I don’t foresee that in the next couple years we’ll have all the solutions. But I’m prepared to walk the long crooked path and see it to fruition. Aldo Leopold promoted the ethos that land is a living organism that should be treated with respect and not as a disposable commodity. ‘A thing is right if it tends to preserve the integrity, stability and beauty of a biome. It is wrong if it tends otherwise.’ I believe this mission is right.”

Sheldon Ripson is a veteran electronic journalist and media executive based in St. Louis. He presently operates RS Communications, a strategic communications consulting firm for businesses and non-profit organizations.

Prairie Odonates

Dragonflies and Damselflies of our Grasslands

Odonate images by ©Richard Day/Daybreak Imagery

An Interview with Richard Day

In 2013, the Missouri Prairie Foundation (MPF) contracted a survey of dragonflies and damselflies (also referred to as “Odonates”) from nine MPF upland prairies and one bottomland prairie owned by The Nature Conservancy (TNC). Photographer and entomologist Richard Day conducted the survey, the funding of which was made possible through the bequest from Ms. Linden Trial to MPF in 2012 and 2013.

Ms. Trial was an entomologist specializing in dragonflies and damselflies with the Missouri Department of Conservation from 1972 until her retirement in 1999. An avid field researcher, Ms. Trial discovered the rare Hine’s emerald dragonfly in Reynolds County, MO in 1999. Her contributions to dragonfly data are widely used in both state and national conservation projects.

In the interview below, Day discusses the results of his 2013 survey and shares information about dragonfly and damselfly ecology.

—Carol Davit, Editor



You recorded a total of 35 dragonflies and damselflies during the survey of 10 tracts of land owned by MPF and TNC. Is this high, or low, for upland prairies, and why?

I would say it’s about normal or slightly low. There was very little water on these tracts, which of course determines population. When water was present, it was in ponds, which probably had fish in them and would keep the dragonfly larvae population lower than fishless, shallow prairie potholes.

What is the total number of Odonate species in the entire tallgrass prairie region?

My personal perspective would be fewer than 50 to 70 depending on habitat, location, and water.

Does habitat fragmentation impact upland grassland Odonate populations, or is the limiting factor available fresh water?

Water.

What do Odonates eat?

Any insects including other dragonflies or damselflies. A dragonfly can consume 15 to 18 percent or more of its own body weight a day.

What eats Odonates?

Frogs, spiders, and birds are some of the top predators. Purple martins are voracious predators of dragonfly populations and also other birds in the swallow family, such as tree swallows.

Are some Odonate species more, or less, tolerant of poor water quality?

Odonata larvae can be very sensitive to water-related issues. Pollution from development and agriculture is a threat. Animal waste from farms and ranches can threaten an ecosystem if not managed properly. Mismanaged pastures and storage facilities are ongoing concerns.

Overgrazing exposes soils and makes them more vulnerable to erosion and invasion of undesirable plants. When livestock graze and trample vegetation,

Linden Trial conducting fieldwork; above, a blue dasher (*Pachydiplax longipennis*).



Top, the pond at Penn-Sylvania Prairie provides habitat for larvae of Odonates and other aquatic macroinvertebrates. Above, at left, is an eastern forktail (*Ischnura verticalis*) at Schwartz Prairie, and at right, a jade clubtail (*Arigomphus submedianus*) at Marmaton River Bottoms Wet Prairie.



A female banded pennant (*Celithemis fasciata*) at Penn-Sylvania Prairie.

they can reduce diversity and prevent the regeneration of native plants.

Cropland produces more erosion and sedimentation than any other source, because of the repeated exposure of large expanses of bare soil. Erosion by water and wind can be severe when soil is not protected by vegetation. Sediment from erosion threatens some of our nation’s most vital watersheds, and together with nutrients and toxins, can degrade our rivers, streams, ponds, and lakes, making them inhospitable for aquatic life.

What specific grassland habitats have the greatest species diversity of Odonates? Where would you expect to find the most?

The habitat that includes fishless wetlands or streams flowing through them. Perennial streams are not as productive.

There is much to be learned about Odonates, such as how many species are in decline, and from which specific

natural community types. Currently, researchers don’t have all the answers, which demonstrates how important it is for us to continue conducting research on Odonates!”

Richard Day has been photographing professionally for 30 years. In the early 2000s, a job he had photographing dragonflies developed his interest in these insects, and he spent the next several years learning about them with Dr. Tim Cashatt from the Illinois State Museum. Day went on to conduct several presence/absence surveys from 2006 to 2012 for the Illinois Department of Natural Resources in south-central Illinois. Day has also been involved in surveying and a mark/recapture study in Missouri for the federally endangered Hine’s Emerald from 2007 to present, and has also worked on projects for the Hine’s Emerald in Illinois in 2010-2011 and 2013 and 2014.

Natural History of the Order Odonata

The Class Insecta is the largest class of organisms and accounts for more than 75 percent of all animal species. The Order Odonata is one of 31 orders of insects and is the one to which dragonflies and damselflies belong. “Odonates” is the term often used to refer to both dragonflies and damselflies. There are two sub-orders: Anisoptera (Dragonflies) and Zygoptera (Damselflies). Odonata is a word derived from *odonto-* meaning tooth, which refers to the strong teeth found in most adults.

The main difference between dragonflies and damselflies is that dragonfly wings are outstretched at all times. Damselflies fold their wings back along their abdomens when resting. An exception is the family Lestidae (Spreadwings), which rest with their wings partly outspread. Damselflies are also usually much smaller and more delicate than dragonflies—most are between an inch or two in length.

Odonates live as aquatic insects before maturing into flying insects. Weather changes influence how long dragonflies live. Most species in Missouri complete their life cycles in one year. A few, especially those species that lay their eggs in temporary water, mature quickly and emerge as adults in less than a year, as long as the weather is warm.

Some larger species may need more than 12 months to mature before they emerge from the water. Those that live in streams without any flow during portions of the year also may take longer.

Odonates are predators, both when immature in the water and as adults on the



wing. Adults catch and eat their food as they fly. Only occasionally do they need to land to eat. Usually they eat small insects, but sometimes you can see them catch a butterfly or a cicada.

Immature Odonates, as do all insects, shed their skin as they grow larger. When they are ready to transform into adults, they climb above the water before breaking out of that last skin. Some will climb up plant stems; you may find the skins they leave behind on cattails or other plants.

Some stream-dwelling Odonates may crawl out onto tree branches or other vegetation before they emerge as adults. Some species transform into adults on gravel or sand bars near the water's edge.

Newly emerged adults need time to inflate their wings so they can harden enough to fly. Just after emerging, an adult dragonfly is extremely vulnerable. Predators, including insect-eating birds, consume many of them, leaving behind nothing but their bright shiny wings.

At least 65 species of dragonflies live in Missouri. A determined search of the

Above left is the pond at Golden Prairie; at right is a male spangled skimmer (*Libellula cyanea*) and below is a male calico pennant (*Celithemis elisa*). Both species were photographed at Penn-Sylvania Prairie.



state will likely uncover more species. Many common dragonflies live throughout the state, but a few species are restricted to only parts of Missouri. The Ozarks region contains the most species. The specialized habitats there also support a greater variety of species. In addition, more dragonfly surveys have been conducted in this region than elsewhere in the state.

—information from "Pond Dragons," by Linden Trial published in the *Missouri Conservationist*, July 2000, and from Richard Day

Prairie Odonate Survey Results Between June 2 and August 12, 2013, Richard Day surveyed nine MPF tracts of land and one owned by TNC. Surveys were conducted between the hours of 7:00 a.m. and 7:30 p.m. by random walks in these tracts. Day collected Odonates with an aerial insect net. After collection, Day preserved the specimens and sent them to the Enns Entomology Museum at the University of Missouri where they are housed.

Day's survey yielded a total of 35 Odonate species from all sites. Numbers of species by prairie are as follows: Golden Prairie: 12; Penn-Sylvania Prairie: 19; Coyne Prairie: 8; Welsch Tract: 10; La Petite Gemme: 8; Schwartz Prairie: 19; Stilwell Prairie: 16; Marmaton River Bottoms Wet Prairie preserve (owned by TNC): 15; Denison and Lattner Prairies: 15.

The full survey report is available at www.moprairie.org/prairie-research/.

A Tribute to
Edgar



W. Denison

By Carol Davit and Scott Woodbury



This beautiful drift of blue-eyed Mary (*Collinsia verna*) at Shaw Nature Reserve's Whitmire Wildflower Garden originated from a gift of seed from Denison.

In April 2014, the City of Kirkwood, MO, and many of its residents celebrated the life and works of one of its most notable residents: Edgar W. Denison. An extraordinary man with a wide range of interests, Denison was an amateur naturalist, botanist, pianist, artist, photographer, woodworker, geologist, paleontologist, teacher, a pioneering recycler, and enthusiastic promoter of native plant gardening.

The Natural Historian

Denison was born in Stuttgart, Germany in 1904 and immigrated to the United States in 1927. He spent a lifetime enjoying wildflowers, first as a student in Germany, then as an amateur botanist leading hikes in Missouri.

Denison later became one of Missouri's most celebrated wildflower enthusiasts through his popular field guide, *Missouri Wildflowers*, which has educated and continues to instruct thousands of Missourians about the

SCOTT WOODBURY



ROBERT WEAVER

Dr. Peter Raven, president emeritus of the Missouri Botanical Garden, provided remarks at the Edgar Denison Tribute Garden dedication in Kirkwood on April 19. At right, in the Missouri Prairie Foundation's Grow Native! booth is Grow Native! Committee member Bill Ruppert, who helped organize the month-long Denison celebration.



ROBERT WEAVER

Kirkwood Mayor Art McDonnell shared the Kirkwood City Council Proclamation, which proclaimed April as Edgar Denison Month.



ROBERT WEAVER

Missouri Botanical Garden Kemper Center Outdoor Supervisor June Hutson, left, and Grow Native! Committee Member Bill Ruppert unveiled the Edgar Denison Tribute Garden on April 19.

The Edgar Denison Celebration

Thanks to the inspiration and organization of several residents of Denison's hometown, the City of Kirkwood, Kirkwood Living Green, Shaw Nature Reserve, Webster Groves Nature Study Society, and Kirkwood in Bloom highlighted the life and legacy of Edgar Denison through the month of April 2014.

Kirkwood resident Gwyn Wahlmann planted the seed for the idea of a Denison celebration. "Twelve years ago a visit to see the spring ephemerals at Emmenegger Nature Park prompted me to buy a wildflower field guide at Powder Valley," said Wahlmann. A volunteer there said, 'You know, the guy who wrote this was a Kirkwood resident.' I asked around, and everyone who had known Edgar seemed to have a charming story to tell. It was clear he was a very special and unique person.

"Walter Smith, George Yatskievych, and Scott Woodbury responded immediately to the idea of a special Edgar Denison event, and it took some time, but thanks to the efforts of many wonderful people, plans developed into a whole month of events celebrating Edgar's life, values, and interests."

Kirkwood Mayor Art McDonnell proclaimed April as Edgar Denison Month at the April 3 City Council Meeting.

The Edgar Denison Nature Education Series of native plant-related talks and presentations was organized, presented by noted natural community, native plant, and gardening experts, and hosted by the Kirkwood Public Library. In addition, an exhibit of Denison's wildflower illustrations was displayed in the Powder Valley Conservation Nature Center through the month.

Kirkwood's celebrated Edgar Denison Day/Earth Day on April 19 at the Farmer's Market. In addition to many nature and native plant exhibitors, Mayor McDonnell dedicated an Edgar Denison Tribute Garden, featuring many of Denison's favorite plants. The garden, designed by Missouri Botanical Garden Kemper Center Outdoor Supervisor and Kirkwood resident June Hutson, with plants donated from several nurseries and gardeners, is along the Kirkwood Farmer's Market Greenway, and is a living tribute to Edgar Denison.

To learn more about Denison, visit the Edgar W. Denison Wikipedia page, newly created thanks to journalist Robert Weaver, with contributions from several Denison devotees.

state's wildflowers. First published in 1972 by the Missouri Department of Conservation, it is now in its sixth edition and remains a best seller.

Missouri Prairie Foundation (MPF) members are familiar with Denison Prairie, the 160-acre original prairie in Barton County whose purchase in 1993 was made possible thanks to a generous gift from Denison and his wife Ruth.

While he loved prairie, Denison was interested in the native plants and natural history of all of Missouri's natural communities, and through his tireless work and ceaseless curiosity, inspired countless conservation professionals and native plant enthusiasts.

Denison led native plant hikes, lectured, taught botany, and translated the hand-written German script of Dr.

George Engelman, a St. Louis physician and botanist. In addition to being an MPF member, Denison was actively involved with the Missouri Native Plant Society and the Webster Groves Nature Study Society.

Denison was recognized for his conservation contributions, with two awards from the Missouri Native Plant Society, the Erna R. Eisendrath Memorial

Education Award in 1985 and the Julian A. Steyermark Award in 1993, and by induction into the Missouri Department of Conservation Hall of Fame in 1994.

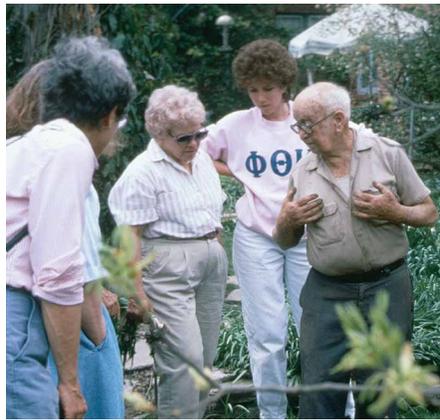
The Kirkwoodian and Native Gardener

After immigrating to the U.S. at the age of 22, Denison soon settled in Kirkwood with his wife, Ruth, an artist and silversmith. Denison's garden at his home was a showplace where visitors were welcome. He grew more than 1,000 species of plants, often potting extras to set on the curb for passersby.

A modern-day Johnny Appleseed, Denison grew native plants from seed because he felt they should not be dug in the wild (and other conservationists concur!). He maintained a blue-eyed Mary patch in his garden where he could easily collect seed to give away.

From shirt-pockets full of seed, Denison sowed blue-eyed Mary along Hidden Valley and the River Trails at Shaw Nature Reserve and at Emmenegger Nature Park in Kirkwood. He shared seed for countless other patches growing at the homes of friends and neighbors, who were given or snatched seed from beneath the boughs of the old white oak by his sidewalk on Adams Street.

There were several other plants that Denison passed around St. Louis; plants like rose turtlehead, southern blue flag iris, and New England aster, to name a few. They were usually given with the appropriate pedigree to a good home and with strict planting instructions. Denison once dug up a gift tree at a



Edgar Denison giving a tour of his garden to Shaw Nature Reserve volunteers in 1992.

neighbor's to see if it had been planted correctly. It was, and he planted it back, satisfied that his instructions had been followed.

Despite all of his volunteer work and explorations of the natural world, Denison did have a professional career as well. He worked as a cost engineer for Union Electric for 37 years, retiring in 1969.

Less than a month after his death in 1993 at the age of 88, friends and family gathered at Shaw Nature Reserve to pay tribute and share their memories. At this celebration of his life, Dr. Peter Raven, now president emeritus of the Missouri Botanical Garden, said in conclusion, "In the glades and prairies and woods of Missouri, Edgar Denison will always be alive with us teaching, urging, and challenging us to continue to do everything possible to enjoy, to cherish, and to preserve the wild things that make this such a wonderful place to live."

Carol Davit is the executive director of the Missouri Prairie Foundation and editor of the Missouri Prairie Journal. Scott Woodbury is the curator of the Whitmire Wildflower Garden at Shaw Nature Reserve, and serves on MPF's Grow Native! Committee.



"As a horticulture student at Mizzou, Mr. Denison's plant-sharing generosity was extremely helpful to assist our student efforts to develop the Woodland and Floral

Gardens behind the Agriculture Building. Back in the late 1970s, herbaceous native plants were extremely difficult to find in the nursery trade and he donated such native woodland classics as celandine poppy and Virginia bluebells. These and other donated plants helped to realize the Missouri native emphasis of this outdoor learning laboratory."

—Bill Ruppert,
National Nursery Products-St. Louis



"Edgar's garden contained a wonderment of plants that reflected his eclectic appreciation of nature. I shall always treasure the times I visited the

garden and listened to all his stories about each botanical treasure. I had no idea that someday I would own this garden and become the caretaker of such a collection. It is a joy to garden in such a space with its rich historical connections."

—June Hutson, Missouri Botanical Garden
Kemper Center Outdoor Supervisor and
current owner of Denison's home



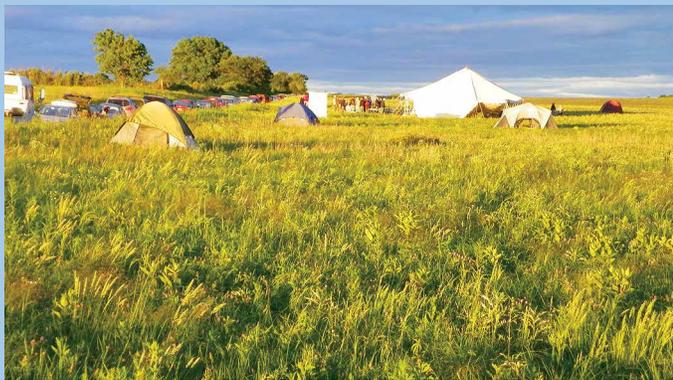
"It is impossible to think of Missouri wildflowers without also bringing to mind the late, great Missouri naturalist and gardener, Edgar Denison. Through his

advocacy for native plants and their habitats, his generous spirit, and his gift to Missourians everywhere in the wonderful Missouri Wildflowers field guide, Edgar made a lasting impression on anyone interested in nature in the state."

—Dr. George Yatskievych,
Curator, Director—Flora of Missouri Project



The *Denison* Prairie Stewardship Fund



ELIZABETH MCINTYRE



ALLEN WOODLIFFE



CAROL DAVIT

The Missouri Prairie Foundation (MPF) purchased the 160-acre Denison Prairie in 1993, thanks to a generous gift from Edgar Denison and his wife Ruth. Since that time, MPF has annually controlled woody brush and invasive, herbaceous species on the property. You can help fulfill MPF's 50th Anniversary Fundraising Campaign by donating to the Edgar and Ruth Denison Prairie Stewardship Fund.

The Fund goal is \$235,000, which would provide a permanent funding source to enable MPF to protect this prairie long into the future. To make a contribution of cash or securities to this fund, send a check to Missouri Prairie Foundation, c/o Martinsburg Bank, P.O. Box 856, Mexico, MO 65265-0856, and indicate "Denison Fund" on the check. To make a gift of securities please contact MPF at 888-843-6739 or view the Donate page at www.moprairie.org.

Nearly 300 native plant species are documented from Denison Prairie, including pale purple coneflower (*Echinacea pallida*), top, and at far left, blue hearts (*Buchnera americana*). Denison Prairie was the site of MPF's 2013 Prairie BioBlitz, where nature enthusiasts enjoyed tent camping and learned about prairie plants and animals from leaders like ornithologist Dana Ripper.

Missouri's Native Aquatics



BECKY ERICKSON

Chose native aquatic plants to landscape lakes and ponds, and for water gardens in pools or containers.

By Ann Wakeman

There is great joy in having a backyard water garden, for the beauty of the plants and to observe wildlife that gathers there. Natural looking, in-ground water gardens and even large ceramic pots or other containers on a patio present additional ways to landscape with and enjoy native plants. There are numerous references to building a water garden, so this article will focus on aquatic native plants, and my experience with using them in water gardens.



RICHARD DAY

Water Garden Ecology: A Brief Primer

Submerged portions of all aquatic plants provide habitats for many aquatic invertebrates. These small creatures—such as dragonfly larvae—in turn are prey for fish, amphibians, reptiles, and ducks. After aquatic plants die, their decomposition by bacteria and fungi provides food, called “detritus” for many aquatic invertebrates. In addition, waterfowl, game birds, and songbirds will consume seeds of aquatic plants like soft rush.

Emergent vegetation provides perching places for many adult, winged insects. Such vegetation is critical as well for dragonflies, mayflies, and other aquatic insects because the nymphs crawl up it when they emerge from water to become free-flying adults.

To jump start your water garden’s web of life, add a bucket of water from a nearby pond, if available. That will introduce millions of beneficial micro-organisms to help keep the system in check.

Invariably, especially as the water warms in spring, you will likely see a small algal “bloom” in your water garden. I pull out larger, floating masses of the algae in early spring; it’s a great addition to the compost pile.

To bloom well in containers, water lilies and other aquatic plants need periodic fertilizer applications. When applying fertilizer to your submerged, potted aquatic plants, be sure to get it pushed deeply into the soil to help prevent future algal growth. That will feed the plant, not leach excess nutrients into the water, which will contribute to algae growth.

Other aquatic plants that can show up in your water garden are floating natives like duckweed (*Lemna* sp.) and bladderwort (*Utricularia vulgaris*). I find them interesting additions, not problems. If too abundant, however, you can harvest them and add them to compost or mulch. Watermeal—which is a kind



On facing page, pickerel weed and below, a double-striped bluet damselfly (*Enallagma basidens*), one of many aquatic insects that benefit from native water plants. Above are native water lilies, which can be white- or pink-flowered.

of duckweed and the world's smallest flowering plant—can rapidly become a nuisance. Remove it as soon as possible.

Water Garden Preparation and Maintenance

Container water gardens can feature one to several plants, planted in individual pots or all together. Use heavy soil like garden soil and clay, not potting soil, which is too lightweight and will float. An elevated or free-standing container will warm up more than if the same container were plunged into the ground. Smaller container water gardens placed in full sun may overheat, stressing plants and fish. Having midday shade still allows enough sun for blooming plants.

Consider having two water garden containers, one for water lilies and soft rush that need standing water, and a second wet soil container for marsh milkweed, cardinal flower, and copper iris.

The native plants in this article can be found at Missouri's native plant nurseries and many garden centers that carry natives. Consult www.grownative.org, Resource Guide, for a list of plant suppliers.

Maintenance on a container water garden is minimal: natural predators like dragonflies and bats can help control mosquitoes, but if they become a nuisance, add Mosquito Dunks monthly to your container or pool to control the larvae; trim spent vegetation; and overwinter free-standing containers in an unheated garage. I also tidy up the previous year's stems in early spring to allow sun to reach the water for warming, and I pull out leaves that have blown in and sunk to the bottom. Every three years or so in early summer, I drain the pool and clean out the silt from the bottom. I don't like to do this annually because of the insects and frogs that like some mud in the bottom for overwintering.

Ann's Top Picks for Water Gardens

Our native **water lilies** (*Nymphaea odorata*) come in white or pink and are fragrant. If both white- and pink-flowered plants are planted in the same pond or pool, they will cross and you will have future plants with a wide range of white to deep pink blooms. To bloom well, water lilies require full sun, as well as regular fertilizing if grown in pools or tubs.



At top is the native southern blue flag, and above is duckweed, a native flowering plant that likely will appear on its own in your water garden. If you find it bothersome, simply scoop it out and add it to your compost pile.

In mud bottom pools or ponds, their roots are able to take up sufficient nutrients. Water lilies can reproduce by seed, but mostly by way of small tuber "buds" that float and disperse to new territory.

To go with those lilies are our native iris species, which like having their feet wet. **Southern blue flag** (*Iris virginica*) with blues from intense, nearly purple to pale blue and, rarely, even white. These 30- to 40-inch-tall plants bloom in mid- to late May, for about two weeks. Southern blue flag is vigorous, so it is best planted where it can form large clumps. This iris also can re-seed well.

The 18- to 24-inch-tall **copper iris** (*Iris fulva*) is native to southeastern Missouri, but is winter hardy through most of the state. Not as vigorous as southern blue flag, copper iris is quite happy grown in pots on a shelf of a water garden.



Copper iris blooms right after southern blue flag. While their blooms may not be as large as blue flag's, they are magnets for hummingbirds. Flower color ranges from lighter, rusty orange to varying shades of terra cotta. Copper iris tends to go semi-dormant after the seeds mature in August until late fall when they send up new leaves before winter.

Besides being one of the most beautiful flowering aquatics, the 2- to 4-foot tall **pickerel weed** (*Pontederia cordata*) offers many wildlife uses. Erect, spade-shaped leaves clasp pickerel weed's spikes packed with numerous individual blue star-shaped flowers, which are important pollen producers for many pollinators. The flowers provide continuous flowering from June to October. Dragonflies and damselflies lay their eggs on pickerel weed stems near the water surface, and pickerel and other fish seek shelter in pickerel weed clumps, hence the common name.

Water plantain (*Alisma trivale*) is as charming as its name *Alisma*, of Celtic origin meaning water. Water plantain grows in muddy shorelines to shallow water. Tiny white flowers grace the feathery flowering stalk. May through September, growing 18 to 30 inches. Water plantain reproduces by seed and doesn't crowd other species.

Water canna, also called powdery thalia (*Thalia dealbata*), is statuesque with the



largest leaves of any North American plant other than palms. Water canna grows 3 to 5 feet above the water with clusters of dusty violet flowers that attract hummingbirds. Missouri is on the northern range of water canna, so roots need to be covered by 18 to 24 inches of water, or the container brought indoors to survive winter.

Native to wet prairies, moist ditches, and marshes, **marsh milkweed** (*Asclepias incarnata*) is happy with damp feet. This 3- to 5-foot tall plant prefers moist soil rather than standing water. Its clusters of pink flowers are a favorite nectar source for butterflies, and the leaves are a preferred food source of the monarch butterfly caterpillar.

All three native species of **arrowhead** or **duck potato** have white, three-petaled flowers in whorls of three on a spike: broadleaf arrowhead (*Sagittaria latifolia*), lance-leaf arrowhead (*S. rigida*), and grass-leaf arrowhead (*S. graminea*). Broadleaf arrowhead can grow to a stately 6 feet tall, making it less suitable for a small to medium container. This species has the leaf shape we think of as an arrowhead, and its tuber is the size of a large walnut. I have it in my 4 by 6-foot pool because muskrats eat it out of our pond, and I really like it. The other two species are able to hang on in our pond, perhaps because the tubers are much smaller. All arrowheads add aesthetic value to landscaped ponds and around docks. They spread by tubers—the “duck potatoes.”



BECKY ERICKSON



MDC



MDC

This row, from far left on facing page are copper iris, water plantain, water canna, grassleaf arrowhead, spike rush, and sweet flag. The lower photo on the facing page is marsh milkweed, a preferred milkweed of monarch butterfly caterpillars, which eat the leaves. Marsh milkweed also provides nectar for many butterflies and other insects.

The grass-like **spike rushes** (*Eleocharis* sp.) often grow around edges of ponds and are important for shoreline stabilization. These 24-inch-tall rushes rank very high for frog and fish fry habitat, and waterfowl eat the seeds. The most appropriate rush for a small water garden would be the blunt spike rush (*E. obtusa*). Another attractive species for larger ponds is the square-stem spike rush (*E. quadrangulata*).

Lizard's tail (*Saururus cernuus*) has stems up to 4 feet, and has shiny, dark green heart-shaped leaves. Many small white, orange-like fragrant flowers are in spikes that form an arching, tail-like shape. As the seeds develop, the "tail" takes on a wrinkled appearance like a lizard's tail. Lizard's tail forms colonies from spreading rhizomes, so be sure to choose an area with ample space when planting.

Sweet flag, (*Acorus calamus*), with its 30- to 40-inch-tall upright, sword-shaped, sweet-smelling leaves make a graceful backdrop for any lake. Sweet flag has long been planted as a wetland filter, and, for smaller ponds, is a better alternative to cattails. Propagation is by root division in spring. Appropriate for lakes, sweet flag is a graceful alternative to native yet invasive cattails, though it may not outcompete them.

Aquatics suitable for containers and smaller water gardens

- Water lilies (*Nymphaea odorata*)
- Southern blue flag (*Iris virginica*)
- Copper iris (*Iris fulva*)
- Soft rush (*Juncus effusus*)
- Water plantain (*Alisma triviale*)
- Spike rush (*Eleocharis obtusa*)
- Mud plantain (*Heteranthera reniformis*)*
- Bladderwort (*Utricularia vulgaris*)
- Arrowhead, duck potato (*Sagittaria* sp.)
- Marsh milkweed (*Asclepias incarnata*)*
- Pickerel weed (*Pontederia cordata*)
- Cardinal flower (*Lobelia cardinalis*)*
- Blue lobelia (*Lobelia siphilitica*)*

Quickly spreading, aggressive, or large aquatics more suited for larger water gardens, ponds, and lakes

- Water canna, also called powdery thalia (*Thalia dealbata*)
- Bulrush species from the genus *Schoenoplectus*, formerly *Scirpus*
- Sweet flag (*Acorus calamus*)
- Lizard tail (*Saururus cernuus*)
- Spike rush (*Eleocharis quadrangulata*)
- Broadfruit bur reed (*Sparganium eurycarpum*)
- Marsh mallow (*Hibiscus* sp.)
- Arrowheads (*Sagittaria graminea*, *S. latifolia*)
- Water parsnip (*Sium suave*)
- Button bush (*Cephalanthus occidentalis*)
- Spatterdock (*Nuphar lutea*)

More information on Missouri's native aquatic plants

Water Plants for Missouri Ponds by James R. Whitley, Barbara Bassett, Joe G. Dillard, Rebecca A. Haefner
How to Establish Aquatic Plants in Your Pond: http://mdc.mo.gov/sites/default/files/resources/2010/09/9808_6784.pdf

Recommended references for water gardening in containers

<http://urbanext.illinois.edu/watergarden/container.cfm>
http://watergarden.com/pages/build_wg.html
<http://deepgreenpermaculture.com/diy-instructions/building-a-small-water-garden/>

Recommended references for water garden construction

<http://deepgreenpermaculture.com/diy-instructions/building-a-small-water-garden/>
<http://urbanext.illinois.edu/watergarden/container.cfm>
http://watergarden.com/pages/build_wg.html

In addition to gardening with aquatic native plants, Ann Wakeman maintains and improves the 10-acre savanna she and her husband created with Missouri natives. Visitors are most welcome to come see what can be done with small acreages; contact Ann at mike-ann@socket.net.

A Landowner's Guide To Wildlife-Friendly Grasslands

Steve Clubine was busy trapping greater prairie-chickens in Kansas for translocation to Illinois this past spring, and so has an abbreviated "Native Warm-Season Grass News" in this issue. Watch for news of his trip in the fall/winter issue of the *Missouri Prairie Journal*.

—Carol Davit, *Missouri Prairie Journal* editor



Prairie Grouse Technical Council Meeting

In October 2013, I visited the northern prairies of Minnesota with the Missouri Department of Conservation's Prairie-Chicken Recovery Team, to attend the 25th Prairie Grouse Technical Council meeting at Crookston. Besides presentation of prairie-chicken and sharp-tailed grouse studies and status, we enjoyed a field trip to Glacial Ridge National Wildlife Refuge (closed due to government shutdown so we had to look over the fence at the patch-burn grazing for habitat management) and some other Minnesota public grasslands. Between the two trips, I saw more invasive plant problems than I ever care to again—narrowleaf and hybrid cattails, Canada thistle, and Reed canarygrass in particular. They also have more problems than do we with sweet clover, but at least they don't have serious lespedeza or severe problems with tall fescue.

At our stop at *Stipa* and *Tympanicus* Prairies southeast of Crookston, we saw great prairie diversity and a few prairie grouse (greater prairie-chicken and sharp-tailed grouse both use the areas) roosts, and a greater prairie-chicken was flushed. It was depressing to learn that both these tracts, 162 and 848 acres, respectively, had until last spring been surrounded by several sections of private native prairie or Conservation Reserve Grasslands that now are corn or soybeans.

Another important point, which Len Gilmore of the Missouri Department of Conservation and I noted during our hunting expedition before the meeting, is most of the public prairie and remaining CRP grasslands were difficult for us to walk across and were too dense for prairie grouse habitat. Fortunately, many of the Minnesota Department of Natural Resource (MDNR) administrators hunt grouse and are aware of the challenge this poses for these particular species. We were told that MDNR administrators have instructed area managers to develop grazing management plans for at least 50,000 acres of these grasslands by spring 2014. Such plans will incorporate light to moderate grazing and patch-burn grazing that will improve nesting and brood habitat for these grouse and provide vegetative structure for flora and fauna at each end of the habitat scale.

Ask Steve

Question: *If summer rains create very wet soils, I'm concerned about getting our prairie cut for hay. When is it too late to hay without hurting it?*

Answer: If you hay as late as mid-August, the native warm-season grasses may be weakened a bit by not having as much time to rebuild root carbohydrates before frost, but effects aren't lasting unless it is continuously hayed late. Forbs will benefit slightly from less grass competition. If you're concerned about maintaining optimum grass yield, hay earlier next year to allow more time for root rebuilding. Forage quality will be lower due to lower protein and higher lignin in late cut hay.

Another option is to hay only half this year, let the other half rest, and reverse the acreages next year. Hay yields often double on the rested tract, offsetting the lost of the unhayed half and reducing harvest (mowing and raking) cost.

Historically, big prairie contractors began cutting in late June and continued into September, but to ensure balance, often began the next year with the last prairie cut. Varying management, for example, different cutting dates, grazing some years with varying start dates, burning at different times, etc., are all means to healthier, more diverse prairie. No treatment results in long lasting change.

Question: *Can I cut hay higher to reduce damage from late cutting and maintain future yield?*

Answer: Cutting higher than the optimum 3" to 4" for prairie won't help much because the growth point is already well above that. Cutting height isn't as important as cutting date for consistent yields. Cut as early in July as feasible, but remember what I said above about mixing up management for diverse prairie.

Also, remember that about eight pounds of phosphorus and 22 pounds of potassium are removed with each 1,000-pound bale, effectively mining the soil of these and other nutrients over time. You need to replace these nutrients from time to time with phosphorus and potash fertilizer even though the cost of fertilizer usually equals the value of the hay harvested.



Ornate Postcards



JEFF CANTRELL

Postcards are the thoughtful notes we send to friends and family about the experience, sights, and wonder of a travel adventure. If we follow that “train of thought” while hiking—or “traveling”—in a native grassland, and look at what catches our attention, it allows us to ask questions, which can be the process for real naturalist inquiry.

The process of inquiry applies to students of all ages—from third graders investigating food webs and habitats to adult learners seeking specific natural history facts. An engaging activity for all ages is to ask students to design a postcard with a prairie scene or specific animals or plants on one side. On the other side of the postcard, the student can inform the reader of new information learned from questions posed.

For example, a common technique for a naturalist or educator leading a prairie hike is to ask students, during a designated stop, to consider the ground and duff they are walking on. Carefully observing the open space, bare soil, and vegetative litter below the flowers, sedges, and grasses is the focus. The take-home message of this activity is to ascertain how easy or difficult it would be for a small mammal, grassland bird, or reptile to travel along the prairie floor. Further inquiry for the students can be to compare and contrast the “down under” area to other parts of the same prairie, a field of tall fescue, or a lawn.

Ease of travel is imperative for adult grassland sparrows, fledglings of other prairie birds, turtles, and many other animals. The box turtle makes a readily understandable model for all ages. Our prairies are home to the ornate box turtle—colorful, a strong digger, and more of a carnivore than its three-toed cousin.

To help students gain a turtle’s perspective for asking questions and writing a postcard, teachers of younger grades can begin by placing a surrogate turtle—a tennis ball—on the ground. Using a ruler, the student can see how easily the ball is to maneuver around clumps of grass through the area. When the students move the ball for a designated time they can settle on a location to compose a postcard—hopefully a location with a view!

In summary, the postcard activity is enjoyable, cross-curricular, inquiry based, and accessible. The final products can be showcased, but it is the process that will teach us why critters from box turtles to baby bobwhite quail need travel lanes—and many other lessons from the prairie.

Ornate Box Turtle Facts

- One of two Missouri box turtle species: three-toed (*Terrapene carolina triunguis*) and ornate (*Terrapene ornate ornata*)
- Has distinct yellow lines on carapace, or upper shell
- Highly insectivorous; up to 90 percent of diet is grasshoppers, caterpillars, beetles, and true bugs
- Lives on prairies, glades, and savannas
- Females lay eggs late spring/early summer
- The young can’t completely close their plastron (lower shell) for protection against predators
- Box turtles can be “interviewed” for postcard information and then let go. Most don’t stay healthy as pets and they slowly starve. Letting them live in the wild is the right thing to do!

Do you have a question about using prairies for in-depth learning for scout, school, or homeschool studies? Please feel free to contact Jeff at swampcandle1@gmail.com.

News from Feaster Glade



CÉCILE LAGANDRÉ PHOTOS

Arrow-leaved violet (*Viola sagittata*) and scurfy pea (*Psoralea tenuiflora*) cast shadows on Feaster Glade on a spring day.

Feaster Glade varies in aspect on the eastern side of the compass, but also covers some flat ground with no significant aspect. Since its southern slope is so spectacular and already presents an open area to work from, we have mainly concentrated our attention to its restoration.

Also, we have found out that on freezing days, this slope is the only place where we can eat lunch out and, incidentally, work in relative thermal comfort. On a sunny day around Winter Solstice, this slope receives theoretically about twice as much daily direct solar radiation as any gently rolling prairie in Benton County. In addition, its rock outcroppings immediately reflect a lot of the solar energy received, contributing, though, to a regular, near winter midday inferno.

I had sworn to myself that, this spring, I wouldn't disturb this sun-primed soil with hardly the gait of a mountain goat. I would have almost cherished a few weekends stuck in Kansas City where Xochiquetzal, the Aztec goddess of vegetation, couldn't

have tempted me with a call of the glade.

Instead, I fell for few peeks, first from the red cedar-covered edges, then by venturing squarely into its heart, where I felt compelled to gather the following details. On the restored southern slope, many plants seemed to like growing next to their own kind: ground plums (*Astragalus crassicaarpus*) on one side, Indian plantains (*Arnoglossum pantagineum*) on the other. At the lowest terrace (geomorphologic bench) level, some grouped pussytoes (*Antennaria* sp.) surprised me by the absence of their basal leaves, which would have allowed an easy species identification but seemed to have been munched away. Gregarious in another way, Missouri black-eyed Susans (*Rudbeckia missouriensis*) were coming up everywhere.

While clearing some *Rosa multiflora* from the glade's southeastern slope, feet in gooseberries, sun rays foaming nearby above a patch of cool spring cress, I started to wallow into some childhood French poetry. Not all my restoration work is that idyllic: locust trees growing at the edge of the historically used/maintained/mowed areas give me some painful grief.

—MPF member Cécile Lagandré and her husband Dave Van Dyne have the privilege of calling Feaster Glade their own. Cécile shares tales of its restoration in the *Missouri Prairie Journal*.

Call for MPF Award Nominations

MPF members are encouraged to nominate individuals who have displayed outstanding contributions to prairie conservation efforts for an MPF award: the Clair M. Kucera Prairie Landowner of the Year, the Bill T. Crawford Prairie Professional of the Year, and the Donald M. Christisen Prairie Volunteer of the Year. Nominations should state why nominees merit an award, with details about their work. Current MPF board members are not eligible for an award. Written nominations should be emailed to Award Committee Chair Doris Sherrick at djsher@fairpoint.net by August 15, 2014.



LEE PHILLION

Bob Lee, left, former volunteer coordinator for the Missouri Master Naturalist Confluence Chapter, presented Bruce Schuette with honorary membership to the chapter on April 26, 2014.

Congratulations to Bruce Schuette

As a board member, MPF Vice President Bruce Schuette contributes hundreds of hours a year to the organization, guiding the conservation of MPF's properties and research projects.

In his professional life, Schuette devoted 36 years to serving as park naturalist at Cuivre River State Park near Troy, MO. Retiring in June 2014, Bruce leaves a legacy of outstanding prairie, glade, and woodland restoration and conservation at the 6,400-acre park.

During his career with the Missouri State Parks system, Bruce conducted more than 250 prescribed burns, annually provided invasive species control on well over 600 acres, and worked on many other projects to plan and complete the restoration of natural communities at Cuivre River and other state parks in northeastern Missouri. He conducted many surveys of rare species, plant, bird, herpetological, and invertebrate resources, and monitored those resources and effects of management activities. Bruce also gave hundreds of natural history presentations to park visitors, school groups (from kindergarten to college), scouts, and other civic groups (including Missouri Master Naturalists).

Schuette's work has inspired conservation work beyond northeastern Missouri as well. "Bruce was a pioneer in expanding prescribed burning from the prairie into the woods," said Dr. James Trager, biologist at Shaw Nature Reserve and MPF technical advisor. "Indeed, his work at Cuivre River State Park, demonstrated to myself and my co-workers from Shaw Nature Reserve, led to the institution of a woodland burning program at SNR, this past winter in its 23rd year."

At a retirement party for Schuette this past spring, the Confluence Chapter of Missouri Master Naturalists presented him with honorary membership in its chapter. "Bruce has been a mentor, supporter, and friend of the Confluence Chapter of Missouri Master Naturalists since its inception in 2005," said MPF and Confluence Chapter member Lee Phillion. "He has generously shared his incredible expertise as well as his time. Bruce is *the* naturalist we all strive to become, and this honorary membership is just a small gesture wrapped in a huge thank you from all of our members."

Honorariums & Memorials

In Honor of Lillian Collins

MPF would like to thank Elisabeth Collins for her gift in honor of Grow Native! Professional Member Lillian Collins.

In Honor of MPF's Grow Native! Program

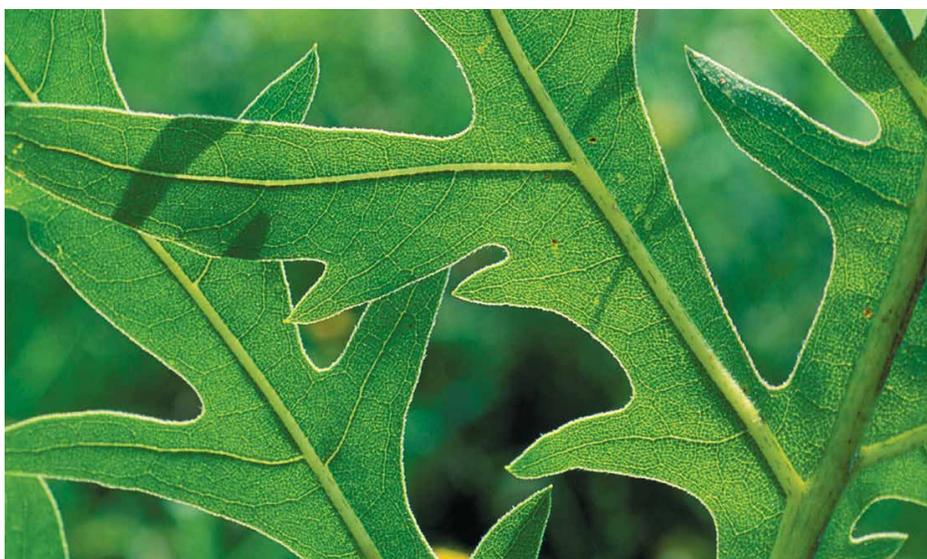
MPF would like to thank Charlotte Adelman for her lifetime membership in honor of the Grow Native! program.

In Memory of Stephen Morris

MPF would like to thank K. Gray and Irene Bettinger for their gifts in memory of Stephen Morris.

In Memory of Laurence H. Lambert

MPF would like to thank Marjorie Inden for her gift in memory of Laurence H. Lambert.



Crawford and Christisen Compass Society 2013 Members

The Missouri Prairie Foundation (MPF) would like to recognize the following Crawford & Christisen Compass Society 2013 members. These individuals are existing lifetime members who made a cumulative or lump sum gift of at least \$1,000 in 2013. The Society is named for MPF's co-founders, Bill Crawford and the late Don Christisen, who set MPF's direction for permanent prairie protection. MPF is grateful to the following individuals for their generosity:

Robert and Martha Barnhardt

Ronny and Suzanne Berry

Dale and Marla Blevins

Bill Crawford

Mrs. Henry Day

Leo and Kay Drey

Judith Felder

James and Joan Garrison

Robert and Cathleen Hansen

Page and Fonda Hereford

John and Lucia Hulston

James and Charlene Jackson

F. Leland Russell and

Mary Jameson

Harold John

Pat Jones

Andrew Love

Margaret Holyfield and

Maurice Meslans

Michael McMullen

Wayne Morton

Frank and Judy Oberle

Rudi Roeslein

Ed Schmidt

Doris and Bob Sherrick

Estate of Ms. Linden

Trial

W. Randall Washburn

MPF 50th ANNIVERSARY CAMPAIGN MEMBERSHIP GOALS

To broaden its membership support, which will **increase MPF's prairie protection capacity and also strengthen the collective voice for prairie conservation**, MPF has established the following membership goals by 2016:

- Grow membership to 2,000 or more by 2016.
- Welcome 50 or more new lifetime members by 2016.
- Recognize 30 or more lifetime members as Crawford & Christisen Compass Society Members in 2014, in 2015, and in 2016.

For more information on MPF's 50th Anniversary Campaign membership goals, please see page 10.

YOUR MEMBERSHIP MATTERS!

Member support is crucial to MPF's work. If you are not a member, please send your membership dues today. If you are a current member, please note that your expiration date is printed above your name on the back cover. Prompt renewal helps our conservation work. If you are able, please consider increasing your membership level.

To become a new member, renew your membership, give a gift membership, or make an additional donation outside of annual membership, please send payment and address information to

Missouri Prairie Foundation
c/o Martinsburg Bank
P.O. Box 856
Mexico, MO 65265-0856

(Please use MPF's Columbia, Missouri address only for general correspondence.)

You may also contribute on-line via PayPal at www.moprairie.com, Donate.

If you have any questions about your membership, please contact Jane Schaefer, who administers MPF's membership database, at janeschaefer@earthlink.net or call 1-888-843-6739.

Membership Levels

(individual, family, or organization)

Regular and gift memberships: \$35

Friend: \$50

Supporting: \$100

Contributing: \$250

Sustaining: \$500

Life (no membership expiration): \$1,000

Crawford & Christisen Compass Society:

Annual Gift of \$1,000 or more from lifetime members (cumulative or lump sum in a year)

See www.moprairie.org, Donate, for contributor benefits.



PLEASE NOTE that your MPF membership expiration date is now printed with your address. Renewing promptly will save MPF costs of mailing renewal reminder letters. To renew, see page 31.

Calendar of Prairie-Related Events

* Missouri Prairie Foundation Events



MDC/MOPRAIRIE PATRONG

* **Thursday, June 26, 2014**—Prairies & Pollinators A Special Evening to Benefit MPF

5:30 to 8:00 p.m. Enjoy an hors d'oeuvres buffet, wine, and other drinks and learn why native pollinators are critical to sustaining our natural world and our food supply at this special event to benefit MPF's conservation work. Guest speaker: Native Bee Expert Mike Arduser, above left. Door prizes will be given, and free prairie and native landscaping information will be available. Cost: \$75 per person. RSVP at www.moprairie.org or call 888-843-6739. Hosted by **Posty Cards, 1600 Olive Street, Kansas City MO, 64127**. In partnership with *Greenability* magazine.

* **June 28, 2014**—Tour of MPF's Welsch Tract Restoration Project. 7:00 p.m. Join MPF Past President Stan Parrish for an evening walking tour of the restoration in progress at MPF's Welsch Tract, an 80-acre addition to MPF's Coyne Prairie in Dade County. See and learn about the savanna restoration, brush clearing and invasives removal techniques, and see the one-year-old, 47-acre prairie planting. Directions: At the junction of State Highways E and D in Dade County (2 miles north of 160), go east one mile on E then turn south on County Road 41. Go approximately 1 mile and park along the road. Dress for a walk through some tall vegetation. Free. RSVP to 417-788-2308.

* **July 26, 2014**—MPF Board Meeting, 1:00 to 4:00 p.m. Prairie Fork Conservation Area. If you wish to attend the meeting, please call 888-843-6739 or email info@moprairie.com.

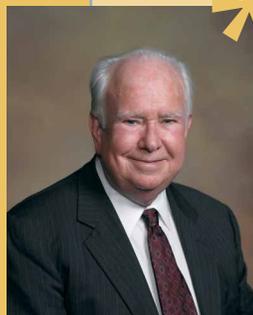
* **September 20, 2014**—Grow Native! Advanced Native Landscape Design Workshop, Springfield, MO. Featuring Ronda Headland on rain gardens, Alan Branhagan on native trees, and Mike Arduser on pollinators. See www.moprairie.org and www.grownative.org for details, or call 888-843-6739.

* **October 11, 2014**—MPF Annual Meeting, Prairie Day, and Evening on the Prairie at Dr. Wayne Morton's prairie by Cole Camp,

MO. In conjunction with the Hi Lonesome Chapter of Missouri Master Naturalist's Prairie Day and the town of Cole Camp's Oktoberfest.

Tours of Dr. Morton's prairie, live music, astronomy, a photo contest, bird mist netting with the MO River Bird Observatory, and more will be part of the event. Watch for a postcard invitation in the mail. Members are also welcome to attend the MPF fall board meeting to be held at 9:00 a.m. on Sunday, October 12.

* **October 25, 2014** 10:00 a.m. to 4:00 p.m. Barnett Mountain Hike. Join MPF member and Natural History Biologist Susan Farrington for a rugged hike to the top of Barnett Mountain on Rocky Creek Conservation Area in Shannon County near Eminence. Created one billion years ago by volcanic activity, Barnett Mountain is encircled just below its peak with igneous glades with robust prairie grasses and amazing views. This will be a steep off-trail, 1.5-mile hike up to the top, a 1-mile loop hike around the glades, and possible detours to see the fen or the dolomite glade in the area as well. Hike will be a minimum of 4.5 to 5 miles (4 to 5 hours, plus time to break; bring a sack lunch). Free. RSVP by October 21 to susan.farrington@mdc.mo.gov or 314-402-3345.



* **August 23, 2014**—MPF Benefit Dinner with Dr. Peter Raven, President Emeritus of the Missouri Botanical Garden, recipient of the National Medal of Science, former Guggenheim Fellow, and *TIME* magazine "Hero of the Planet," among numerous other honors and achievements. White River Conference Center, Springfield. Members will receive a personal invitation in the mail. \$100 per person; \$700 for table of eight. Complimentary admittance for two for existing or new lifetime members. To RSVP and pay securely on-line, visit www.moprairie.org.