

Spirit Mound Trust News

P. O. Box 603 | Vermillion, SD 57069 | info@spiritmound.org | www.spiritmound.org | December 2021

Re-creating the Tallgrass Prairie

By Meghann Jarchow

Tallgrass prairie is the native ecosystem of this region. It is the easternmost part of the North American grasslands and the largest continuous biome on the continent. Although significant portions of the shortgrass and mixed-grass prairies remain, the tallgrass prairie is one of the most endangered ecosystems globally with some estimates stating that less than 1% of the original prairie remains.*

A comparison of the extent of historical tallgrass prairie (Figure 1) to what exists today on recent landcover maps (Figure 2) shows that the tallgrass prairie ecosystem has been almost completely converted into annual row crops, primarily corn and soybeans. Most of the tallgrass prairie loss occurred with EuroAmerican colonization of the region, especially with the Homestead Act, but prairie loss continues to this day. For example, the World Wildlife Fund found that “from 2018-2019 an estimated 2.6 million acres of grassland [in North America] were plowed-up, primarily to make way for row crop agriculture.”

Some people have called the tallgrass prairie a “sacrifice zone,” which is a geographic area that has been permanently impaired due to environmental damage. The former tallgrass prairie is tremendously productive in terms of crop production, and the reduction and fragmentation of the tallgrass prairie has led the prairie experts Samson and colleagues to conclude that “the opportunity to recover or restore that ecosystem on any meaningful spatial scale has been lost.”

Rather than being multifunctional landscapes which provide both saleable products and a range of other functions and services, the former tallgrass prairie has been described as a mono-functional landscape for its laser focus on crop production at the expense of other functions and services. This has led some to advocate for the intensification of agriculture in regions such as ours so that biodiversity in other regions can be spared.

Even at the global scale, grasslands seem to be undervalued. Grasslands are the largest ecosystem globally, covering approximately 40% of the ice-free land area, yet unlike many other ecosystems such as forest, mountain, wetland, dryland, marine, and coastal ecosystems, they are not specifically included in the United Nations Sustainable Development Goals.

My radical hope for the tallgrass prairie is that we bring it back— as Samson and colleagues state, “The debate for [tallgrass] prairie is not one of conservation. Rather, it involves the vision for re-creation.” There are multiple arguments for why we should endeavor to bring it back. Tallgrass prairies can be extremely biodiverse. Tallgrass prairie soil can store large amounts of carbon. Restoring relatively small amounts of prairie into row-crop dominated landscapes has been found to have disproportionate environmental benefits in terms of reduced nutrient and soil loss and biodiversity preservation. Tallgrass prairie can provide farmers and landowners with

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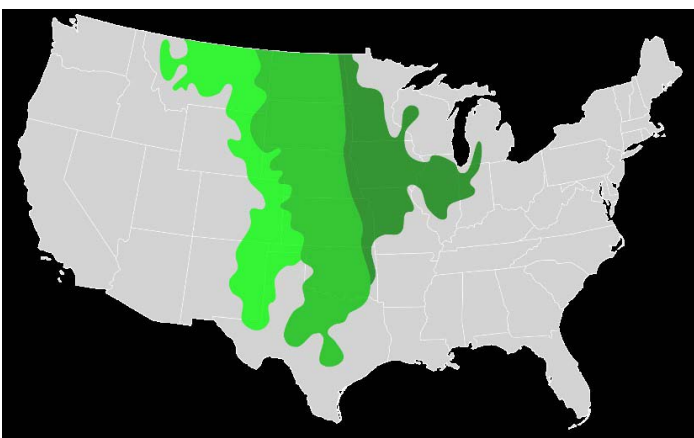


Figure 1. Historic extent of the tallgrass (dark green), mixed-grass (medium green), and shortgrass (light green) prairie in the U.S.

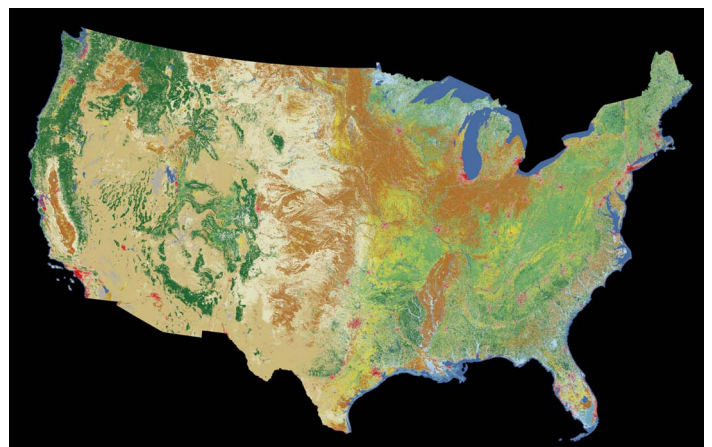


Figure 2. Landcover map of the U.S. from 2011 with the brown color indicating areas of cultivated crop.

Tallgrass Prairie continued from page one

financial support through the products that they produce, including prairie seed, hay, forage, sequestered carbon to reduce climate change, and game habitat.

Spirit Mound and places like it play an important role in helping us to move toward that vision for re-creation, and re-creating tallgrass prairie is long-term work. For example, we have been working on re-creating the prairie at Spirit Mound for twenty years now— the State of South Dakota purchased Spirit Mound in 2001— and Spirit Mound Trust

has been promoting the project since at least 1986. Being able to have the beautiful prairie that we see today at Spirit Mound is the result of thousands of hours of work from dozens of volunteers and SD Game, Fish and Parks staff over decades. Yet it is worth it. Spirit Mound connects people to the tallgrass prairie: it allows people to experience a tallgrass prairie, our outreach activities allow people to engage with the prairie, and your support allows us to continue to invest in this tallgrass prairie that we love.

*The list of citations and references for this article are available on our website (<https://www.spiritmound.org>).

Small Wonder upon Small Wonder

By Mark Wetmore

Readers may know what Queen Anne's Lace (*Daucus carota*, aka wild carrot) looks like. Its display is a flat flower head (an umbel) three to four inches wide, made up of hundreds of one-eighth inch five-petal white flowers. A non-native, it is sometimes considered a weed, but in small numbers the blossoms are attractive to both humans and many insect species.

Looking closely, many, but not all, of the umbels have a single, larger, dark ruby-red, flower in their centers. Beginning with Darwin, there has been much speculation about the function of this dark spot.

On a walk last spring, Jeanette and I noticed a green lacewing insect's tiny egg attached on a stalk to one of the red center flowers.

There's always something to see on the mound.

(There is an extended discussion of the center flower along with this article on [spiritmound.org](https://www.spiritmound.org).)



Queen Anne's Lace



A Lacewing egg on Queen Anne's Lace

Most Beautiful, but Not the Highest

Though by far the most prominent eminence, Spirit Mound, at an elevation of 1,280 feet is not the highest point in Clay County. Though we pointed this out in the 2008 newsletter (see it at [spiritmound.org](https://www.spiritmound.org)), the false claim is still occasionally made. From the Mound's south-east end, the Turkey Ridge landform gradually ascends to the northwest, and to date the Clay County Landfill has risen five feet higher than Spirit Mound.

Tri-State Chapter of the Lewis & Clark Foundation at Spirit Mound

By Mark Wetmore

On April 25th, a clear, cool, windy spring day, 14 members, plus guests of the Sergeant Floyd Tri-State Chapter of the Lewis & Clark Foundation held their spring meeting at Spirit Mound. With members in Iowa, South Dakota, and Nebraska the chapter promotes Lewis & Clark history throughout the region and holds the Sgt. Floyd Memorial Encampment and Burial Ceremony each August as a major event.

At the meeting, I spoke about the history of the Trust and how its efforts to save the site became a success over a period of thirty-five years. Most of the group, including four re-enactors, completed the afternoon by hiking to the summit.



Randy Rumelhart, Brad Holder, Mike Berger, Denny Leonard

New Sign at Spirit Mound

By Mark Wetmore

About once a year, Spirit Mound visitors are frightened by what they think is a rattlesnake. There are none on the Mound. The closest rattlesnake population is about 22 miles southeast, across the Big Sioux River in the Broken Kettle Grassland preserve. It is necessary to go 75 miles west of Spirit Mound, near the Missouri River to find more rattlers.

This year the Trust designed and paid for a "Spirit Mound Snakes" sign with photos and descriptions of the five species that may be seen there. The five are Western Foxsnake, Gophersnake, Plains Gartersnake, Common Gartersnake, and North American Racer. The more common Foxsnake and less common Gophersnake (aka Bullsake) may vibrate their tails in the grass if alarmed; thus (sometimes successfully) imitating a rattlesnake. The new sign allays fears and introduces visitors to the fascinating subject of snakes.

The sign's photos and species descriptions are courtesy of Drew Davis, Ph.D., currently a research scientist with the University of Texas Rio Grande Valley.

Drew completed his dissertation at the University of South Dakota in 2018 and created the Amphibians and Reptiles of South Dakota website (www.sdherps.org). In cooperation with South Dakota Game, Fish and Parks, the site includes comprehensive, up-to-date information, maps, and photographs of all amphibians and reptiles in the state.

Graphic work was done by Trust board member Paulette Wipf; the sign panel was printed by the South Dakota State Penitentiary's Pheasantland Industries (*Made with Pride, on the Inside*); and it was installed by Parks Division staff. A full image of the sign accompanies this article on our website, spiritmound.org.



Dave Blaeser and Cass Pierce installing the sign on August 30, 2021

Bird Feeding Station at Spirit Mound

Check out the new bird feeding station just south of the picnic shelter at Spirit Mound! The station has a variety of feeder types and is set up in a location accessible to woodland, shrub and grassland birds, so it should provide another interesting attraction for visitors to Spirit Mound. The idea for the feeders is to provide food year-round to bring in a variety of birds throughout all the seasons. If you visit Spirit Mound and watch the feeders, please let us know what you see (and upload photos if you have them) on our Facebook page at <https://www.facebook.com/SpiritMound>.



Our Breakfast with the Birds

By Norma Wilson

Six of us met David Swanson for breakfast and bird watching at Spirit Mound on Saturday, May 8th of this year. The morning would have been more pleasant if the wind and rain had waited until afternoon. But soon after we began walking the trail toward Spirit Mound, the rain began falling, and we had to turn back and seek shelter in our vehicles. Nevertheless, on that short hike and drive in the vicinity of Spirit Mound, our ornithologist guided us toward an amazing variety of birds, including American Robins, Red-winged Blackbirds, American Goldfinches, Barn and Tree Swallows, Wood Ducks, Warblers, Western Meadowlarks, White-crowned and Chipping Sparrows, Brown-headed Cowbirds, American Golden Plovers, Hudsonian Godwits, Semi-palmated Plovers, and Blue-winged Teals.

That morning the Academy of American Poets had sent me a poem that seemed particularly pertinent to our prairie walk. I asked poet Brittney Corrigan for permission to use it in our *News*. Along with Swanson's article on grassland birds, her poem illustrates the necessity of prairie habitat for health and diversity.

Spirit Mound: A Refugium for Grassland Birds

By David Swanson

North American grasslands are among the most endangered ecosystems on the continent. This is particularly true for Spirit Mound and other tallgrass prairie habitats, which historically covered much of the eastern third of South Dakota, but have now been mostly converted to row crops and other agricultural uses. Some estimates suggest that only about 1% of the original North American tall grass prairie remains. Due, in part, to this decline in grasslands in North America, grassland birds are showing the greatest population declines of any bird guild on the continent. Most birds breeding in North American grasslands are migrants. Conservation of migratory birds is complicated by habitat requirements throughout the annual cycle. For example, threats to grassland birds can occur not only on the breeding grounds, but also on the wintering grounds or along the migratory route. Loss or degradation of grassland habitats during any or all of these stages of the annual cycle of grassland birds could potentially limit grassland bird populations.

Grassland bird biodiversity and abundance at Spirit Mound may be declining as a function of the large-scale reductions and degradation of grassland habitats across the Americas. One study of breeding grassland birds Spirit Mound during the summer of 2003 detected 34 grassland birds and generated population abundance estimates for these species. The study was repeated during the summer of 2013, but this latter study detected only 20 species of grassland birds. The 2013 study found that population abundances of 11 of these 20 species, including Upland Sandpiper, Horned Lark, Vesper Sparrow, Grasshopper Sparrow, Dickcissel, and Western Meadowlark, had declined over the 10-year interval. The study also showed stable population densities for Ring-necked Pheasant, Sedge Wren, Common Yellowthroat, and Bobolink. Differences in grassland bird biodiversity and abundance could have resulted from differences in weather during those two years (drier in 2013) or from changes (i.e., maturation) in the grasslands at Spirit Mound, but these population trends are consistent with larger-scale population declines in grassland birds, suggesting that changes occurring at continental or inter-continental scales may also be involved.

Now, seven years later, the news about grassland birds at Spirit Mound is not all bad. Amy West recently completed a master's thesis studying migrant bird use of the grasslands at Spirit Mound and other grasslands in Clay County, South Dakota. During surveys of grasslands conducted three times per week during the spring (April and May) and fall (September and October) migration seasons, this study detected 69 bird species in spring and 92 in fall. These birds included not only grassland species, but also some species characteristic of woodlands and shrub lands. The number of bird species detected was higher at reconstructed native prairies, including Spirit Mound, than at Conservation Reserve Program or



Dickcissel – a common breeding grassland bird species at Spirit Mound. Photo by Reza Goljani Amirkhiz.

other managed grassland habitats at both seasons. Overall bird abundance on the grasslands was positively associated with reduced grass cover and bare ground, which are attractive to some grassland bird species. This study used blood metabolite profiling from small blood samples collected from some of the birds to assess how successfully migratory birds were adding fat to fuel the next leg of their migratory journey. These birds showed plasma metabolite levels consistent with high-quality habitat, suggesting that Spirit Mound provides excellent habitat for refueling. Blood samples of the few birds that were captured again at least one day after their initial capture generally showed increases in body mass, suggesting that birds were successfully adding fat at Spirit Mound. This is one of the very few studies to examine grasslands as migratory stopover habitat, and it suggests that reconstructed tallgrass prairies, like Spirit Mound, can serve as suitable migration habitat for grassland birds, providing a critical link in the conservation of these birds.

Another recent study used bird count data from across the Upper Missouri River Basin in North and South Dakota, Wyoming, and Montana to quantify habitat associations and project population changes in 24 species of grassland birds under a variety of future scenarios, including current agricultural practices, increased bio-energy production, or conservation. This study found that the three most important predictors of current grassland bird abundance included distance to woodlands (abundance increased away from woodland edges), median winter and summer temperatures, and elevation. The study found that climate change was generally a more important predictor than land use change, and most species of grassland birds in the region are projected to show increases in population abundance in the future. Population abundance, however, did not change uniformly across the region, as most areas of increasing population abundance occurred



LeConte's Sparrow captured during mist-netting operations at Spirit Mound. This species is a common migrant in the fall and uncommon migrant in the spring in grassland habitats in southeastern South Dakota. Photo by Tim Rice.

in the western portion of the region and at higher elevations. Areas of current highest population densities for grassland birds in the region were uniformly areas where abundances are predicted to decline as populations shift westward and to higher elevations. The projections are not all positive, as some bird species are projected to decline in the region under at certain scenarios. These species include Greater Sage-Grouse, Long-billed Curlew, Lark Bunting and Savannah and Vesper sparrows.

To sum up, Spirit Mound and other similar tallgrass prairie habitats serve as valuable habitats for breeding and migrating grassland birds. Such habitats are rare but serve critically important roles in the conservation of grassland bird species. Management practices that place more grasslands on the landscape in the northern Great Plains are sure to benefit grassland birds throughout the breeding and migratory phases of their life cycles.

The list of references, along with the complete article are available on our website (<https://www.spiritmound.org>).

Spirit Mound Trust Board of Directors

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Spirit Mound Pins

Spirit Mound Trust collector pins available. Start your collection today.

The Bird Series

The first pin in 2016 was the *Bobolink*. A limited number are still available.



The second pin was the *Northern Harrier* in 2017.



Followed the third and final bird pin in 2018 the *Upland Sandpiper*.



The Butterfly Series

The new series of pins showcase the beauty of the butterfly that inhabit the area around the mound.

The first pin in the new series is the 2019 *Monarch*.



The second pin added in 2020 to the series is the *Black Swallowtail*.



Added in 2021 to complete the series is the *Regal Fritillary*.



The 1" by 2" hand painted enamel pins cost \$10 each, plus \$4 shipping for one, or \$5 shipping for two or more pins.

To order the pins, you may use the form on the back of this newsletter, or the pin(s) may be purchased and/or picked up at Pressing Matters, 102 East Main Street, in downtown Vermillion. Email info@spiritmound.org to arrange pickup or delivery.

Help Heal the Scar on Spirit Mound

For years now there has been an unofficial short-cut trail in the mound, descending south from the summit. It is unsightly and an erosion risk. Thanks to the support of a concerned trust member and the efforts of Bill Ranney, the Park's Division's seasonal Mound employee, new signs were installed this October at each end of the prominent scar. We hope visitors will heed them.



Thank you, Tim Cowman and Nick Lamkey

South Dakota Geological Survey Director Tim Cowman has served as our Vice President for four years, and Web Editor for the past 15 years. At our Board meeting on September 28, he announced that he will be leaving our Board of Directors at the end of this year. He is working with Nick Lamkey, our Board Secretary, who has agreed to serve us as Web Editor in the coming year. Both Tim and Nick have been dedicated and energetic members of our Board, and we hope they will continue to provide us with their well-researched articles so pertinent to the natural history and environment of Spirit Mound.

Vanishing

By Brittney Corrigan

Nearly one-third of the wild birds in the United States and Canada have vanished since 1970, a staggering loss that suggests the very fabric of North America's ecosystem is unraveling.

—The New York Times (September 19, 2019)

*As the world's cities teem
with children—flooding
our concrete terrains with shouts
and signs—as the younglings balance
scribbled Earths above their heads,
stand in unseasonal rain
or blistering sun,
the birds quietly lessen
themselves among the grasslands.
No longer a chorus but a lonely,
indicating trill: Eastern meadowlark,
wood thrush, indigo bunting—
their voices ghosts in the
chemical landscape of crops.
Red-winged blackbirds veer
beyond the veil. Orioles
and swallows, the horned lark
and the jay. Color drains from
our common home so gradually,
we convince ourselves
it has always been gray.
Little hollow-boned dinosaurs,
you who survived the last extinction,
whose variety has obsessed
scientific minds, whose bodies
in the air compel our own bodies
to spread and yearn—
how we have failed you.
The grackles are right to scold us,
as they feast on our garbage
and genetically-modified corn.
Our children flock into the streets
with voices raised, their anger
a grim substitute
for song.*

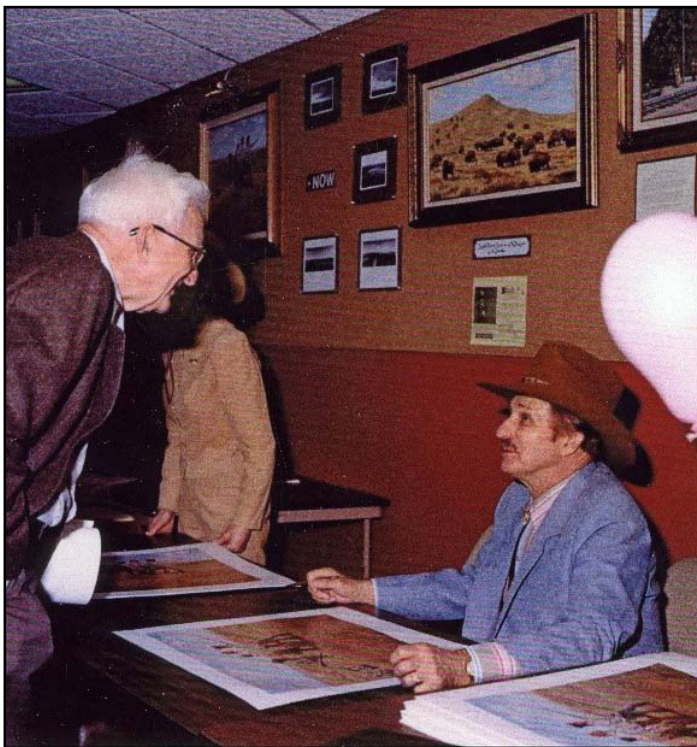
Copyright © 2021 by Brittney Corrigan. Originally published in Poem-a-Day on May 8, 2021, by the Academy of American Poets

Artist Ron Backer and Spirit Mound

By Mark Wetmore

Ron Backer, the South Dakota artist who painted the image Lewis & Clark Ascending Spirit Mound, died Christmas morning, 2020. When he gave the Trust permission to reproduce and sell the painting as a print, he gave us an iconic image to represent our cause.

But Spirit Mound also had an impact on Ron's life. He grew up on a farm near Worthing, South Dakota; he carried a bazooka in the 104th Infantry in Europe during WWII; and worked for NASA until 1979, when he retired with the rank of colonel. After that he returned to an earlier love of painting, but said that for a time, he was "groping for a direction." He told a reporter that one day he and his wife Elie climbed Spirit Mound. Leaning into a hot prairie wind, they snapped photos and took turns posing as expedition members wielding make-believe muskets. One of the paintings Ron made from the day's photos became our print. The popularity of his Spirit Mound paintings helped give Ron his focus as a narrative artist. One of his most important series of paintings consisted of scenes from the Lewis & Clark Journals. In 1996 he was listed as Artist of the Year in the South Dakota Hall of Fame.



Backer signing prints and visiting with trust board member Charles Wetmore - January 27, 1989

Another Spirit Mound painting, links to Ron Backer's obituary, and an article about him from California Desert Art accompany this article in the on-line version of the newsletter on our website, spiritmound.org.

Spirit Mound Historic Prairie Maintenance 2021

By Jason Baumann, District Park Supervisor

The year 2021 like all years presented new challenges for Spirit Mound Historic Prairie. After several years of record rain and floods with a robust stream that affected access to and management of the Mound, the weather pattern shifted last year due to a drier air mass. Now in 2021 we are experiencing drought, and Spirit Mound Creek is dry. What we have discovered is that the prairie is capable of adjusting to all weather conditions. Over thousands of years, the prairie has become very drought tolerant.

One of the biggest prairie management tools we use is fire. Over the last several years we have conducted two prescribed burns on the prairie, and the third was planned for 2021. Due to excessive drought and heat in the area, we were forced to cancel the burn. In discussion with burn crews we are planning for a burn earlier next spring to help ensure that fire will happen, and we can create that disturbance the prairie needs to stay viable and healthy.

The ongoing challenge we have been working on is the old feedlot/agricultural field. In order to bring back the prairie there during the past two decades, attempts have been made to reestablish grass and also to farm the property in order to reduce the nutrient load. A few years ago after taking soil samples, we decided to try once again to establish a prairie. While several factors caused our planting to be lackluster, we continue to work with the land to make it sustainable. We will continue to manage what we have now in this area in hope that the perennial grasses and forbs will grow, spread, and become a prairie. If necessary we will replant the site.

One constant battle waged on the Mound and everywhere prairie grows is the fight against invading noxious weeds and trees. Bill Ranney, the seasonal employee at the Mound, and Cass Pierce from Adams Homestead are the generals in this battle. They have used mowing, spraying, and the chainsaw to keep it a prairie.

Now that the 2021 growing season is done for the year, it's time to turn our attention to 2022 and our list of maintenance duties. Many of those I've mentioned will be ongoing next year, but we never know what a new season will bring. I think we can all agree a "normal" year would be nice for a change.

Spirit Mound Trust

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Mound photo by Paulette Mehen-Wijf

Spirit Mound Historic Prairie Membership Renewal and Order Form

Spirit Mound Trust membership is \$10 per year. Additional donations are welcome, and all are tax deductible. Your support helps to develop a better, more diverse historic prairie and fund other programs to make the Mound a more interesting place to visit. If you live in the Vermillion area and want to avoid shipping charges on the pins, send an email to: info@spiritmound.org to make arrangements. Please join us:*

Please add my name to the 2022 membership roll of the **Lewis and Clark Spirit Mound Trust**. I enclosed my check for \$10 (tax deductible*). Members will receive our newsletter.

Name _____

Address _____

City _____

State _____ Zip _____

Phone/email (Optional) _____

*Tax exempt 501 (c) (3) organization (No 93-0921345)

Please send me the following:

- ___ Ron Backer print \$100 ea \$ _____
- ___ 2016 Bobolink Pin \$10 ea \$ _____
- ___ 2017 Harrier Pin \$10 ea \$ _____
- ___ 2018 Sandpiper Pin \$10 ea \$ _____
- ___ 2019 Monarch Butterfly \$10 ea \$ _____
- ___ 2020 Black Swallowtail Butterfly \$10 ea \$ _____
- ___ 2021 Regal Fritillary Butterfly \$10 ea \$ _____
- + \$4 shipping for 1 pin / print or
- \$5 for 2 + pins / print \$ _____
- Membership \$10 form on the left \$ _____
- Total Amount Enclosed \$ _____

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*Thank
You!*

Re-creating the Tallgrass Prairie

By Meghann Jarchow

References

- Fischer J, Meacham M, Queiroz C (2017) A plea for multifunctional landscapes. *Frontiers in Ecology and the Environment* 15(2): 59. <https://doi.org/10.1002/fee.1464>.
- Foley JA, DeFries R, Asner GP (2005) Global consequences of land use. *Science* 309(5734): 570-557. <https://doi.org/10.1126/science.1111772>.
- Foley JA, Ramankutty N, Brauman KA, Cassidy ES, Gerber JS, Johnson M, et al. (2011) Solutions for a cultivated planet. *Nature* 478: 337-342. <https://doi.org/10.1038/nature10452>.
- Homer C, Dewitz J, Yang L, Jin S, Danielson P, Xian G, et al. (2015) Completion of the 2011 national land cover database for the conterminous United States – Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing* 81: 345-354.
- Jarchow M, Swanson D, Kerby J (2020) North American Grasslands as multifunctional landscapes. *FINISH National Park Service* (nd) A complex prairie ecosystem. <https://nps.gov/tapr/learn/nature/a-complex-prairie-ecosystem.htm>. Accessed 26 October 2021.
- Samson FB, Knopf FL, Ostlie WR (2004) Great Plains ecosystems: past, present, and future. *Wildlife Society Bulletin* 32(1): 6-15. [https://doi.org/10.2193/0091-7648\(2004\)32\[6:GPEPPA\]2.0.CO;2](https://doi.org/10.2193/0091-7648(2004)32[6:GPEPPA]2.0.CO;2).
- Schulte LA, Niemi J, Helmers MJ, Liebman M, Arbuckle JG, James DE, et al. (2017) Prairie strips improve biodiversity and the delivery of multiple ecosystem services from corn-soybean croplands. *PNAS* 114(42): 11247-11252. <https://doi.org/10.1073/pnas.1620229114>.
- Sikowis (Nobiss C) (2021) End-stage Iowa: Big-ag's sacrifice zone and Indigenous resistance. <https://www.greatplainsaction.org/single-post/end-stage-iowa>. Accessed 26 October 2021.
- Theshibboleth at Wikimedia Commons (2011) US Great Plains map. https://commons.wikimedia.org/wiki/file:US_Great_Plains_Map.svg, CC BY-SA 3.0 (commons licensing). Accessed 26 October 2021.
- United Nations Sustainable Development Goals (2021) Sustainable Development Goals. <https://sdgs.un.org/goals>. Accessed 26 October 2021.
- World Wildlife Fund (2021) 2021 PlowPrint. <https://worldwildlife.org/publications/2021-plowprint-report>. Accessed 26 October 2021.
- White RP, Murray S, Rohweder M (2000) Pilot analysis of global ecosystems: grassland ecosystems. World Resources Institute. https://pdf.wri.org/page_grasslands.pdf. Accessed 26 October 2021.

Small Wonder upon Small Wonder

Supplementary information

Function of the Queen Anne's Lace central florets (from Wikipedia)

The function of the central dark florets has been the subject many treatments of *Daucus carota* beginning with Darwin who speculated that they are a vestigial trait.^[11] Researchers have also suggested that the dark florets' have adaptive functions of mimicking insects toward discouraging herbivory^[12] or attracting pollinators^[13] by indicating the presence of food or opportunities for mating.^[14] One study in Portugal investigating the relationship between *D. carota* and the beetle *Anthrenus verbasci* found that the dark florets contributed to visitation by *A. verbasci* and that higher numbers of dark florets correlated with increased visitation whereas inflorescences with removed dark florets had decreased visitation. Replacing the dark florets with one or more freeze-killed *A. verbasci*, who are similar to the florets in size and shape found similar results to those observations of inflorescences with intact florets.^[15]

<https://www.minnesotawildflowers.info/flower/queen-annes-lace>

<https://content.ces.ncsu.edu/lacewings>

SPIRIT MOUND SNAKES

Five different species may be seen here. **NONE ARE VENOMOUS.**

If you respect their space, they are all harmless.

(Prairie Rattlesnakes, South Dakota's only venomous snake, are found primarily in the western part of the state.)



WESTERN FOXSNAKE: Adults are large, robust snakes, with dark brown or black blotches down their back on a gray or light brown background and range from 36–50" long. Frequently active during the day, when disturbed, they will often vibrate their tails. They primarily consume rodents and are much more abundant in the area than Gophersnakes.



NORTH AMERICAN RACER: These are a slender, medium-sized snake with adults ranging from 20–65" long. Adults are shiny olive-green in coloration with a yellow underside and juveniles have reddish-brown blotches that fade away as they age. Fast-moving, visual predators, often hunting with their heads raised above the ground.



GOPHERSNAKE: This is South Dakota's largest snake. Often called Bullsnares, they have heavy bodies and are 36–72" long. They look like Western Foxsnakes but can be differentiated by the presence of black bars on their upper lip. They primarily consume rodents and will vibrate their tails and hiss loudly when disturbed.



PLAINS GARTERSNAKE: This is a slender snake reaching 16–28" long, with a bright yellow or orange stripe along their back. They are South Dakota's most common and widespread snake, found across the entire state. They frequently live in residential areas, feeding on earthworms and small rodents.

Photos and text by Drew Davis

ABOUT SNAKES

Snakes are fascinating members of the natural world, but are often persecuted and killed due to fear. Present for more than a hundred million years, snakes smell with their tongue, have transparent scales covering their eyes, and help to keep the rodent populations in check. As both predator and prey, snakes play an important role in balancing native ecosystems. **They deserve our interest and respect.**

To learn more about snakes, visit www.sdherps.org



COMMON GARTERSNAKE: These are slender snakes that range from 18–30" long, with a tan or pale-yellow stripe down the middle of their backs and red coloration that is often visible along their sides. They are frequently found near streams or wetlands, where they eat frogs, small fish, and earthworms.

South Dakota Game, Fish & Parks and the Spirit Mound Trust

Spirit Mound: A Refugium for Grassland Birds

By David Swanson

References

1. Jarchow, M.E., D.L. Swanson and J.L Kerby. 2020. North American grasslands as multifunctional landscapes. In: Leal Filho W., Azul A., Brandli L., Lange Salvia A., Wall T. (eds). *Life on Land. Encyclopedia of the UN Sustainable Development Goals*. Springer Nature, Switzerland. DOI: https://doi.org/10.1007/978-3-319-71065-5_123-1.
2. Schipper, A. M., J. Belmaker, M. D. de Miranda, L. M. Navarro, K. Böhning-Gaese, M. J. Costello, M. Dornelas, R. Foppen, J. Hortal, M. A. J. Huijbregts, B. Martín-López, N. Pettorelli, C. Queiroz, A. G. Rossberg, L. Santini, K. Schiffers, Z. J. N. Steinmann, P. Visconti, C. Rondinini, and H. M. Pereira. 2016. Contrasting changes in the abundance and diversity of North American bird assemblages from 1971 to 2010. *Global Change Biology* 22:3948-3959.
3. Rosenberg, K. V., A. M. Dokter, P. J. Blancher, J. R. Sauer, A. C. Smith, P. A. Smith, J. C. Stanton, A. Panjabi, L. Helft, and M. Parr. 2019. Decline of the North American avifauna. *Science* 366:120-124.
4. Stoy, P.C., S. Ahmed, M. Jarchow, B. Rashford, D. Swanson, S. Albeke, G. Bromley, E.N.J. Brookshire, M.D. Dixon, J. Haggerty, P. Miller, B. Peyton, A. Royem, T. Sohl, L. Spangler, C. Staub, and B. Poulter. 2018. Opportunities and tradeoffs between BECCS and food, water, energy, biodiversity and social systems at regional scales. *Bioscience* 68:100-111. DOI: 10.1093/biosci/bix145.
5. Carlisle, J. D., H. Hoff, and P. Mabee. 2004a. Breeding bird inventory of Spirit Mound Historic Prairie in Clay County- an area being restored to tallgrass prairie. *South Dakota Bird Notes* 56:32-35.
6. Soluk, E. L., M. E. Jarchow, and J. D. Carlisle. 2016. Declines in prairie bird populations in a restored tallgrass prairie. *South Dakota Bird Notes* 68:85-93.
7. West, A. 2020. Stopover biology of grassland migrant birds. M.S. Thesis, University of South Dakota, Vermillion, SD.
8. Baltensperger, A., M.D. Dixon, and D.L. Swanson. 2020. Implications of future climate- and land-change scenarios on grassland bird abundance and biodiversity in the upper Missouri River Basin. *Landscape Ecology* 35:1757-1773. <https://doi.org/10.1007/s10980-020-01050-4>.

Artist Ron Backer and Spirit Mound

Supplementary information

Defender of the Buffalo painting by Ron Backer 1989



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