

# Plant Exchange: Native Plants Established for Heritage

BY **BRENDA K JOHNSON**  
P&D Correspondent

*"Plant Exchange" appears each Friday in February on the Garden page.*

*Spirit Mound Historic Prairie is one of the few existing documented areas where Lewis and Clark actually walked. Prairie restoration continues with increasing plant and animal diversity. The goal is to restore the prairie flora at the site to the level described in the journals of Lewis and Clark. Fall native plants are featured on this walk.*

## Fall Spirit Mound Walk

Jim Heisinger is the current president of the Spirit Mound Trust, professor emeritus from the Department of Biology at the University of South Dakota, and advocate for Spirit Mound.

"In 1968, when I moved to Vermillion from St Louis, I looked for places to hike," he said, looking at the Spirit Mound trail and natural setting around him. "A few years ago, the trail was designated a National Historic Trail. In my research, I studied mammalian renal adaptations to the environment. Attempting to uncover urine concentrating mechanisms, I investigated the kidney structure and function of mammals adapted to both wet and dry habitats." Later, he studied the impact of pollution on fish embryos and has followed many other science interests, including prairie restoration at Spirit Mound.

On this early fall day, we walked the Spirit Mound trail. Heisinger showed us where wild plum, buffalo berry and chokecherries had been recently planted in homage to the plants used by Native Americans.

"Wayne Evans, a retired professor from the University of South Dakota who is Native American, helped us choose these," Heisinger said.

Maintaining fences to exclude wildlife and frequent weeding around plants were challenges to native plant establishment.

Heisinger, who also enjoyed running, explained how he became a Spirit Mound advocate. He was among many in the past that ran in the Spirit Mound Run.



PHOTO: BRENDA K. JOHNSON

**Native blue asters at Spirit Mound attract monarch butterflies. Numbers and diversity of butterflies are considered indicators of the developing native prairie ecosystem. South Dakota Game, Fish & Parks led a monarch banding event at Spirit Mound last fall for migrating monarchs.**

The late Larry Monfore managed the annual race and fundraiser. Larry was the president of the Spirit Mound Trust. Over time, Larry's passion about Spirit Mound had an impact on Heisinger.

Paces behind as we ascended the mound, out of breath, I stopped and asked about the path of the race. Heisinger said that race participants would start at Cotton Park and ran to the mound. That was because, in 1804, the mouth of the Vermillion River was located where Cotton Park is located today. Lewis and Clark had started their historic trek to the mound at the mouth of the Vermillion River.

The race publicized the trust's fundraising efforts.

"That's how I got to know the intensity of Larry's passion to preserve the area as a public treasure," he said. "I ran almost every year."

Heisinger referred to two prominent stones atop Spirit Mound. "I bet Lewis and Clark sat on these glacial erratic stones," he said.

In addition to the glacial fieldstones, he pointed to an outcropping of Niobrara Chalk. The chalk is comprised of skeletal remains of small organisms deposited millions of years ago when the area was covered by a great inland sea. The soft

chalk would have been easily scoured and shaped by glaciers millions of years after the sea retreated.

"Retreating glaciers formed the rivers and landscape about 13,000 years ago," he said. "Mark Sweeney, in physics and Earth Science at University of South Dakota, directed a student who studied recent erosion at Spirit Mound. He estimated the mound's height, and it is about the same as it was when Lewis and Clark visited the mound in 1804, before agriculture uses."

Heisinger showed a plant growing atop Spirit Mound. "Tenpetal Blazing Star. It's here on the Niobrara chalk outcropping. Lewis and Clark first described the plant in their journals. It was growing on similar outcroppings along the Missouri River."

Because of his knowledge with native plants, I wondered if Heisinger grew native plants at home.

"My wife's garden keeps me busy and it does have many native plants," he said.

For additional resources, Heisinger completed South Dakota Master Gardener Training this past summer.

On the mound, we saw several other hikers along the trail below. "It's common to find people who come and walk here and investigate their special interests



PHOTO: BRENDA K. JOHNSON

**Spirit Mound, along South Dakota Highway 19, about five miles north of Vermillion is open to the public year round. Lewis and Clark, on their historic Corps of Discovery, had heard talk of "spirit little people" there. They wanted to stand atop PahaWahan, so called by local Native Americans. Goldenrod adorns the trail.**

in nature, geology, plants birds or insects," he said. "The South Dakota Parks Department recently had their annual fall banding of monarch butterflies here. Monarchs banded at the mound have been recovered in Central America."

"Spirit Mound is an amazing place," Heisinger said. "Perhaps it is most amazing in that it is an example of what a few

citizens can do to save a piece of historic land for future generations. It will allow those future citizens to contemplate both history and the nature of a prairie. The trust struggled to name the site, and after much debate we finally settled on the obvious title 'Spirit Mound Historic Prairie.'"

# Grassroots Restoration Of Spirit Mound And The Tallgrass Prairie

BY **BRENDA K JOHNSON**  
P&D Correspondent

**Local citizens' goal to establish a historic public site was realized, and a 320-acre native prairie is now being restored at Spirit Mound. Native grass enthusiasts may appreciate details of its planting and early years of results.**

When Lewis and Clark journeyed up the Missouri River in 1804, native prairie grasslands extended from Wisconsin to Western Montana and from Central Texas to Canada. Now, due to development and agriculture, less than 1 percent of the original grasslands remain.

Spirit Mound and land around it was homesteaded in 1868. By the end of the 20th century, a cattle feedlot, farmhouse, concrete trench silo, small buildings and shelterbelt occupied the site.

Prairie restoration was expensive and difficult. Local Vermillion citizens formed the Spirit Mound Trust, to "acquire the 320-acre Spirit Mound site, restore it as closely as possible to the tallgrass prairie of 1804, and make it freely accessible to the public," according to Karen Olmstead's report, a source for this article.

Justin Elhoff summarized reasons this grassroots effort succeeded in his University of South Dakota Honor's thesis, a source for this article. Success for Spirit Mound came from the passion of the individuals of the Spirit Mound Trust. Timely public interest in the historic Spirit Mound was raised by Stephen Ambrose's book "Undaunted Courage," Ken Burn's public television documentary on Lewis and Clark, and the national bicentennial celebration of the Lewis and Clark Corps of Discovery journey.

For funds to acquire and restore the Spirit Mound acreage, El-

hoff credited then-Gov. William Janklow and U. S. Sen. Tim Johnson, their staffs, and agencies of the National Park Service, South Dakota Game Fish & Parks, South Dakota Wildlife Federation, and South Dakota Department of Transportation and their staffs, along with Vermillion area individuals.

With funding in place for Spirit Mound, Sen. Johnson addressed the Spirit Mound Trust on July 29, 2001. Johnson stated, "People are not remembered only for what they build, but what they save as well."

Spirit Mound is now managed by South Dakota Game Fish & Parks, in partnership with National Park Service and the Spirit Mound Trust. The trust also raises funds for continued development of the tallgrass prairie ecosystem and promotes research and education opportunities.

### PLANTING NATIVE SEEDS

The 320-acre Spirit Mound site was purchased from five landowners for about \$600,000. The site was cleared of buildings, trees, fences and roads, and prepared for native seed plantings. For best restoration results, they secured seeds from nearby sources where the plants were adapted to climatic conditions. They matched the species of plant to the moisture availability.

Four seed mixtures comprised the fall 2001 and spring 2002 plantings. Seeds were purchased from nearby Ion Exchange in Harpers Ferry, Iowa. Mesic Prairie Mix for areas of moderate moisture was used for 227 acres surrounding the mound. The mix contained 9 native grasses and 19 forbs, which included tall and showy wildflowers.

A Mesic/Xeric Mix was most diverse, with nine native grasses and 27 native forbs. This mixture for somewhat dryer conditions was planted in a 50-foot strip along the walking trail, which contained numerous flowering forbs.

**Captain William Clark noted in his journal during Corps of Discovery (1804): "From the top of this Mound we beheld a most butiful (sic) landscape; Numerous herds of buffalow (sic) were Seen feeding in various directions; and Plain to the North N.W. & N.E. extends without interruption as far as Can be seen."**

CAPTAIN WILLIAM CLARK (1804)



PHOTO: BRENDA K. JOHNSON

**Sunflowers and trail beckon at Spirit Mound, now managed by South Dakota Division of Parks and Recreation, in cooperation with National Park Service and Spirit Mound Trust.**

The Wetter Mix was planted along Spirit Mound Creek in a 10-acre area, with three grasses and 13 forbs.

The Xeric Mix for driest areas was planted on 40 acres of the mound and slopes. It contained eight grasses and 26 forbs.

In 2003, additional plugs were hand-planted on about 10 acres of steep slope on the east side of the mound. These contained five grasses and 16 forb species.

Fluffy native seeds were planted with a Truax drill, while heavier seeds were dropped by disconnecting the drop tubes, prior to the seed reaching the drill mechanism.

To control weeds, sections of the site were mowed after plants were established to prevent weed species from setting seed. Herbicide was spot-sprayed throughout the growing season in areas where mowing wasn't possible. Portions

of the mound have been burned since then to stimulate growth of native plants and control weeds.

Monitoring Grasses and Forbs  
Students from the University of South Dakota assisted in monitoring grass and forb establishment using standard plant ecology transect methods for two years. In 2003, more than 100 species of plants were identified, and by 2004, 132 species were identified. Of these, 61 percent were species common to tallgrass prairie and 35 percent of these were not part of the seed mixtures.

Native seeds that were planted in all the mixtures, but did not germinate in 2003 or 2004 were rough dropseed, prairie dropseed, and porcupine grass. It was noted that some seed takes several years to germinate. In the seed mixtures used at Spirit Mound, 86 percent of the plant species were observed as mature plants.

Prairie forbs increased the second year of the two-year study. Number and species of plants varied among locations. The old feedlot site, east of the mound had the most non-prairie or weed species both years. Areas with more weeds had fewer native species. Weeds dominants included smooth brome, green and yellow foxtail, horseweed, pigweed, kochia, and lambsquarters.

Prairie grasses that showed most change included a decrease in Side-Oats Grama. The more non-prairie plants, the more competition for prairie grasses. The southwest area had the most native prairie species and least amount of weeds. The northeast and northwest areas had fewer prairie plants to start, but more established by the end of the second year.

The East Mound, which was the former feedlot, had more weeds and least established prairie species. This area also had high nutrient loading in the soil, with phosphorus averaging 640 parts per million (ppm), very high for new seedlings.

Potassium levels were also quite high at 161 ppm.

Three Growing-Season Restoration Results

High soil nutrient levels were expected to affect prairie restoration. Competitive non-prairie plants tolerate high nutrient levels. "Rate of prairie seed establishment on former agricultural soils where nutrient levels are high have been found to be very slow," according to the Olmstead report.

After three growing seasons, 74 percent of the planted species were observed. Because the area had been converted from a feedlot, building sites and agriculture land, over time the prairie grasses and forbs would out compete the non-prairie plants, but now are hindered by high soil nutrient levels of phosphorus and potassium.

For the restoration to be considered successful, the prairie grasses and forbs at the site would sustain themselves and demonstrate resilience to environmental stress. With rejuvenating burns, the management effort of the site is expected to decrease over time as the native plants increase and out-compete the non-native species.

At the Spirit Mound website, grasses and forbs are pictured and noted. In 2012, the trust will have a public contest to see who can identify the most newly observed native plant species — that is, species not listed on the website. Seeds of more than 80 species have been planted since 2004. Prizes include a Ron Backer print of the Corps of Discovery expedition members at the mound.

Sources: Karen Olmstead, FINAL REPORT, Biological Inventory and Other Studies at Spirit Mound, Summers 2003 – 2004. Justin Elhoff, University of South Dakota honor's thesis From Feedlot to Prairie: The Recent History of Spirit Mound and the Spirit Mound Trust.

## Dibbles And Bits

- Wild plum, buffalo berries, and chokecherries growing at Spirit Mound had many uses by Native Americans. Fruit was eaten fresh or dried for winter. Omaha Indians knew it was time to plant corn, beans and squash when the wild plums bloomed in spring. Dakota wasna or pemmican often had dried chokecherries mixed in with the dehydrated mincemeat. — "Uses of Plants by the Indians of the Missouri River Region" by Melvin R. Gilmore.

- National Garden Bureau is a non-profit organization that showcases 2012 "Year of the ..." annual geranium, perennial Heuchera and edible herbs. New varieties and gardener fact sheets are available on the website. Geraniums, a common regional annual, were grown in genteel England in the 1600s. Thomas Jefferson introduced them in the United States in 1786. Geraniums can be grown from cuttings, but bacterial disease can be spread by this method. Seed geraniums are now available to gardeners but are slow

growing and need to be started ahead of garden transplants. Hybrids have larger and varied color flowers and leaves and sturdier stems, along with ivy leaf and scented forms.

- Seed catalogs have garden planning, planting, seed growing tips and more:

- Burpee: Seed packages for décor color flowers (800) 888-1447
- Harris Seeds: Arizona Apricot Gaillardia seed (800) 544-7938
- High Country Gardens: water-wise plants for small spaces (800) 9259387

- Johnny's Selected Seeds: garden bed design (877) 564-6697

- Jung Seed & Plants: Cool Wave Hybrid pansy seed (800) 247-5864

- Park Seed: Unusual seeds for kids' garden (800) 845-3369

- Territorial Seed: Grafted tomato plants (800) 626-0866

- White Flower Farm: Design using foliage instead of flowers (800) 503-9624

## February Plant Tips

**Sonnie LaCombe, a designer at Monta's Framing and Design, 209 West Third St. in Yankton. (605) 664-0622:** She grew up in a coal mining community in rural southwest Virginia. "I acquired my love for flowers and color from my mother." There, she said that many bare roots came in the mail from Gurney Seed & Nursery. "Flowering bushes and roses brightened up our little world where everything was covered in coal dust."

LaCombe has been a floral designer of fresh and silk flowers for more than 20 years. "It is always a pleasure to take someone's ideas and design an arrangement for their home." She shares tips for cleaning live potted plants and silk flowers.

- Lightly dust plants or silk flowers with a feather duster once a week to avoid dust build-up.
- Use pressurized canned air, usually for cleaning computers, to blow off excess dust.
- For silk flowers, try a rice bath for cleaning. Place one or two cups of rice in a paper bag. Add flowers and give them a gentle shake.
- Before using any liquids on your plants or silk flowers, be sure to test one first to see how it will hold up under the liquids. Some silk colors may run or plants may be damaged. Never use hot water.
- Use commercial silk flower and plant cleaner, found at your local florist or make your own cleaner. Combine one-part vinegar to two-parts water. Mix in a spray bottle and lightly spray your silk flowers or plants outside or in the bathtub.
- Blow dryer on cool will remove dust and also bring a squashed flower back to life.

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