



## References and Resources for Prairies and Native Plantings

• For the backyard gardener, acreage owner, farmer, or classroom teacher/student •





Note the random pattern of this prairie remnant in the spring—white wild indigo (*Baptisia alba*), pale purple coneflower (*Echinacea pallida*), and porcupine grass (*Stipa spartea*). Porcupine grass has sharp-pointed seed that can injure livestock or people.

## Why plant prairie species in the Midwest?

- Are low maintenance, once established—little water and no fertilizer needed
- Adapted to harsh climate extremes because prairie was the original vegetation
- Prevent soil erosion because of long, deep root systems
- Can restore/rebuild soils damaged by overuse
- Provide interest in the landscape—there are more than 200 prairie plants available in various shapes, sizes, and flower colors
- Create great wildlife habitat
- Are useful for large land areas that may be hard to till or have very dry or very wet soils—there are prairie plants adapted for all soil moisture levels
- Can establish and restore historic vegetation—prior to settlers plowing the land, prairie covered 85 percent of Iowa
- Make a great learning environment for students in science, math, language arts, social studies, history, and the arts.

## Introduction

Prairie plants and other native plants can be used in many different types of plantings. Small prairie plantings near the home, school, or in parks can add interest to the landscape and attract butterflies, birds, and other wildlife. Large plantings may be used on acreages to help prevent erosion, provide feed for livestock, provide wildlife cover/food, or as part of a conservation program.

Resources listed in this publication will provide the background information and guidance so you will become more familiar with prairie plants and using them in plantings. Plant identification and information about establishment and management of native plantings are included in the resources listed.

This publication is the third in a series about prairie and native plantings. The first in the series, *Introduction to Iowa Native Prairie Plants*, SUL 18, discusses some common prairie plants and their growth characteristics. The second publication, *Prairies and Native Plantings as Outdoor Classrooms*, SUL 19, discusses the educational opportunities in a prairie to teach Iowa history, science, math, art, and environmental education.

## General background

Plan your prairie to suit your individual goals—several examples:

- Add prairie plants to your landscape to reduce the amount of mowing, watering, and fertilizing.
- Establish a new prairie planting into bare soil—such as a previous row-crop field. A total reconstruction will be necessary because none of the remnant prairie remains.
- Help a biology teacher at a local school establish a prairie as an outdoor classroom to replace a portion of the turfgrass school yard.
- Restore an overgrazed pasture that has not been tilled or plowed. It will need special management to reestablish/renew the remaining original prairie vegetation and to remove the introduced brome grass that was seeded into the pasture.

## Plan the prairie

There are many resources available to assist you in reaching the goals of your native planting. Information about planting, maintaining, and reestablishing your prairie is plentiful. References including books, brochures, newsletters and Web sites are available. Local individuals, organizations, public planting sites, informational meetings, and agency personnel are good sources of information. Those with experience in prairie establishment and management, seed acquisition, and equipment use are invaluable to you as you start your project.

Learning to **recognize prairie plants** is useful for prairie remnant management and in identifying plants that are growing in a reconstruction. There are many references listed on page 6 in the “Plant identification” section to help with this process.

To establish a **new prairie planting** on your acreage or in your backyard, it is extremely helpful to learn from others who have been successful or at least have experience with prairie plantings. Establishment of a prairie planting is very different from planting a vegetable or flower garden or a field of corn or soybean. Previously growing perennial plants should be killed first so that the prairie seedlings can become established without competition. For example, if you are planting prairie into an existing bluegrass lawn, you will first need to kill the bluegrass before trying to establish the



Landscaping can include prairie plants along with other ornamentals.

prairie. You can do this by removing the sod or using a nonselective herbicide, such as Roundup®, to kill the vegetation.

If there is an **existing prairie remnant**, identify the plants present. Inspect the area several times during the growing season and use reference books to help you with species identification. Next, determine management techniques that encourage the native plants and suppress the weedy plants (if present). The prairie may redevelop fairly rapidly after a few years of mowing, use of fire (with assistance), or suppression of unwanted weeds.



Blue-flag iris (*Iris virginica*) blooms in the spring in this prairie pothole marsh. (Polk County, Iowa)

## Site and size

Start with a planting that you can manage. More area can be added to the prairie in future years. Some people use the seed produced by the initial planting to expand the planting into adjoining areas. If you are planting a small prairie, make sure that the plants won't be too tall. There needs to be enough vegetation so that the plants can support each other and not flop over or need to be staked. Refer to SUL 18, *Introduction to Iowa Native Prairie Plants*, for information on the heights of common prairie plants.

Landowners wanting to establish larger plantings will want to find adequate seed sources before deciding how many acres to plant in one year. To help with larger plantings, special drills are designed for planting native seeds and these may be available for rent. Check with your local county conservation office, County Integrated Roadside Vegetation Management program, or Natural Resources Conservation Service (NRCS) office for the availability of a drill.

### Location/soil conditions

Determine the soil condition of your site—is it dry or sandy, wet, or somewhere in between? If you do not know the soil properties of your site, contact your local Iowa State University Extension agriculture specialist, county conservationist, agricultural consultant, or horticulturalist for assistance. The type of soil and amount of moisture will determine the plants that will grow best in that environment. Refer to SUL 18, *Introduction to Iowa Native Prairie Plants*, for some ideas about matching the soil moisture conditions with the prairie species adapted to the site.

### Seed/plant sources

When purchasing prairie seed know the type of seed, its source (whether grown locally or regionally), and its purity and germination. Ask for assistance in determining the source of seed that is best for your site and the amount of money that you wish to spend. Know the original source of seed that the grower is selling. Use local ecotype seed in your planting as much as possible.

The Native Grass Seeding Calculator is a tool designed to assist in developing seeding mixtures that are adapted to specific sites. The calculator also helps to figure seeding costs for various mixtures. Visit the Iowa NRCS Technical Resources Web site for more information about this planning tool at [www.ia.nrcs.usda.gov/technical](http://www.ia.nrcs.usda.gov/technical).

There are many prairie seed or plant producers in Iowa who have seed or plants (grown from seed) available for your prairie project. A thorough list of private and commercial seed sources is not included because it is ever changing. The following organizations and agencies offer up-to-date lists of local, Iowa, or regional seed



Prairie pothole marsh. (Polk County, Iowa)



Butterfly milkweed (*Asclepias tuberosa*) is grown for ecotype seed at the Tallgrass Prairie Center. (University of Northern Iowa, Cedar Falls)



Seed heads of spiderwort (*Tradescantia* sp.) drying on a tarp. Seed will be used for future plantings. (Tallgrass Prairie Center, University of Northern Iowa, Cedar Falls)

producers. Talking with local people who have experience with prairies can help you to locate the best source of seed for your planting. Note that some of the sources are targeted for larger landowners and farmers.

Iowa Crop Improvement Association. 2007. *Native Species Seeds for Conservation and Restoration*. (515) 294-6921

[www.agron.iastate.edu/icia](http://www.agron.iastate.edu/icia)

Iowa Prairie Network (list of prairie seed growers)  
[www.iowaprairienetwork.org](http://www.iowaprairienetwork.org)

County Conservation Board, office in each county  
[www.mycountyparks.com](http://www.mycountyparks.com) (landowners)

Pheasants Forever, Iowa local chapters  
[www.iowapheasantsforever.org](http://www.iowapheasantsforever.org) (landowners)

## Obtain advice from knowledgeable people

There are helpful people who have experience with prairie establishment. Look locally to find those experts. Local prairie enthusiasts may be members of organizations such as the Iowa Prairie Network or the Iowa Native Plant Society. These organizations hold meetings, conduct tours of prairies and plantings, and have active Web sites that list events and tours.

If you are a landowner trying to establish a prairie as part of a conservation planting or farm program, you may want to contact the Iowa Department of Natural Resources (DNR) Private Lands Program, local NRCS office, local county conservationists, or Pheasants Forever biologists to help with your prairie. The Iowa DNR Private Lands Program has some cost-share opportunities available for both urban and rural clients. The DNR's Private Lands biologists and wildlife specialists have expertise in native prairie establishment. Contact the Private Lands biologist in your region of Iowa.

[www.iowadnr.gov/wildlife/privatelands](http://www.iowadnr.gov/wildlife/privatelands)

## Organizations and agencies

Iowa Association of County Conservation Boards  
[www.mycountyparks.com](http://www.mycountyparks.com)

Iowa Native Lands (prairie specialists listed by county)  
[www.prrcd.org/inl](http://www.prrcd.org/inl)

Iowa Prairie Network (prairie enthusiasts statewide)  
[www.iowaprairienetwork.org](http://www.iowaprairienetwork.org)

Natural Resources Conservation Service (NRCS) offers urban conservation and landowner cost-share programs. Contact Iowa NRCS office (515) 284-4769 or local county NRCS offices.

Local Iowa Resource, Conservation, and Development (RC&D) offices (see map on Web site for the office in your area)  
[www.ia.nrcs.usda.gov/partnerships/rcanddlist.html](http://www.ia.nrcs.usda.gov/partnerships/rcanddlist.html)

Pheasants Forever, Iowa local chapters  
(native seed program)

[www.iowapheasantsforever.org/page/  
Native-Seed-Program.jsp](http://www.iowapheasantsforever.org/page/Native-Seed-Program.jsp)

Trees Forever

[www.treesforever.org](http://www.treesforever.org)

## Plant identification

Most of the books listed below include photos or illustrations of common prairie plants. The identification of many plants can be determined by looking at the pictures and drawings in these books. For detailed identification of unknown plants, you will need to go to more specialized botanical keys (Newcomb, 1977) or find a local person who can identify plants (look at Iowa Prairie Network reference list on their Web site). Faculty or staff at a local college or state university may be able to assist you with plant identification. The Ada Hayden Herbarium at Iowa State University is an excellent resource for especially difficult plant identifications. For more information, go to [www.public.iastate.edu/~herbarium/  
servicespage.html](http://www.public.iastate.edu/~herbarium/servicespage.html).

## Plant keys

Newcomb, Lawrence. 1977. *Newcomb's Wildflower Guide*. Little, Brown and Company. Boston, MA. 490 p.

## Photos and illustrations

Christiansen, Paul, and Mark Müller. 1999. *An Illustrated Guide to Iowa Prairie Plants*. University of Iowa Press. Iowa City, IA. 237 p. [www.uiopress.uiowa.edu](http://www.uiopress.uiowa.edu)

Cochrane, Theodore S., Kandis Elliot, and Claudia S. Lipke. 2006. *Prairie Plants of the University of Wisconsin–Madison Arboretum*. University of Wisconsin Press. Madison, WI. 365 p. [www.wisc.edu/wisconsinpress](http://www.wisc.edu/wisconsinpress)

Denison, Edgar. 1998. *Missouri Wildflowers*. Missouri Department of Conservation, Jefferson City, MO. 276 p. (877) 521-8632 [www.mdcnatureshop.com/mdc.cgi](http://www.mdcnatureshop.com/mdc.cgi)

Elpel, Thomas J. 2004. *Botany in a Day: The Patterns Method of Plant Identification*. Hops Press, LLC. Pony, MT. 221 p. [www.hopspress.com](http://www.hopspress.com)

Ladd, Doug, and Frank Oberle. 2005. *Tallgrass Prairie Wildflowers 2*. Falcon Press. Helena, MT. 272 p. [www.falcon.com](http://www.falcon.com)

Müller, Mark. 2000. *Prairie in Your Pocket: A Guide to Plants of the Tallgrass Prairie*. Bur Oak guide, University of Iowa Press. Iowa City, IA. [www.uiowa.edu/uiowapress](http://www.uiowa.edu/uiowapress)

Müller, Mark. 2005. *Wetlands in Your Pocket: A Guide to Common Plants and Animals of Midwestern Wetlands*. Bur Oak guide, University of Iowa Press. Iowa City, IA. [www.uiowa.edu/uiowapress](http://www.uiowa.edu/uiowapress)



A reconstructed prairie garden, planted and maintained by students, offers many educational opportunities. (Hawkeye Community College, Waterloo, Iowa)



Prairie phlox (*Phlox pilosa*).

Peterson, Roger Tory. 1986. *Peterson First Guide to Wildflowers of Northeastern and North-central North America*. Houghton Mifflin Co. New York, NY. 128 p.

Peterson, Roger Tory, and Margaret McKenny. 1968 (renewed 1996 by Virginia Marie Peterson). *Peterson Field Guides, Wildflowers: Northeastern/Northcentral North America*. Houghton Mifflin Co. New York, NY. 420 p.

Runkel, Sylvan T., and Dean M. Roosa. 1999. *Wildflowers and Other Plants of Iowa Wetlands*. University of Iowa Press. Iowa City, IA. 388 p. [www.uipress.uiowa.edu](http://www.uipress.uiowa.edu)

Thieret, John W., revising author. 2001. *The Audubon Society Field Guide to Wildflowers: Eastern Region*. Alfred A. Knopf, Inc. New York, NY. 879 p.

U.S. Department of Transportation. FHWA-EP-03-007. *Common Roadside Wildflowers: A Field Guide to Native Forbs and Grasses*. Federal Highway Administration publication.

Vance, FR., J.R. Jowsey, J.S. McLean, and FA. Switzer. 1999. *Wildflowers of the Northern Great Plains*. University of Minnesota Press. Minneapolis, MN. 336 p. [www.upress.umn.edu](http://www.upress.umn.edu)

## Establishment and management of the prairie planting

There are many successful methods for reconstructing your prairie. Most successful plantings require trial and error and patience. After planting a prairie from seed, you will need patience during the establishment period. It takes two to three years for the root systems of the (mostly) perennial prairie plants to crowd out other weedy plants that have grown there in the past. Prairie plants will eventually outcompete weeds, that are mostly annuals and biennials.

## Prairie reconstruction and restoration

Bismarck Plant Materials. March 2005. ID#5933. *Getting Started in Prairie Revegetation: A Recipe for Success*. Bismarck, ND. 12 p. [www.plant-materials.nrcs.usda.gov/pubs/ndpmcpu5933.pdf](http://www.plant-materials.nrcs.usda.gov/pubs/ndpmcpu5933.pdf)

Hamilton, Ray. 1994. *Native Prairie Management Guide*. Iowa Prairie Network, 10 p. [www.iowaprairienetwork.org](http://www.iowaprairienetwork.org)

Iowa Natural Resources Conservation Service. October 2006. *Prescribed Burning*. 8 p.

Kurtz, Carl. 2001. *A Practical Guide to Prairie Reconstruction*. Bur Oak guide, University of Iowa Press. Iowa City, IA. 57 p. [www.uipress.uiowa.edu](http://www.uipress.uiowa.edu)



Note the non-native birdsfoot trefoil in the mowed area in this reconstructed prairie. (United Community Schools, Boone County, Iowa)

Lown, Loren. 2001. *Going Native: A Prairie Planting Guide*. Polk County Conservation Board, Granger, IA. 36 p.

*Midwest Woodlands & Prairies* (journal). Wood River Communications. Monona, IA (563) 539-4145.

Naeve, Linda, Rich Pope, and Janet Anderson. 2007. SUL 19. *Prairies and Native Plantings as Outdoor Classrooms*. Iowa State University Extension, Ames, IA. 16 p. [www.extension.iastate.edu/store](http://www.extension.iastate.edu/store)

Nichols, Stan, Lynn Entine, and Evelyn Howell. 1997. G2736. *Prairie Primer*. University of Wisconsin Extension, Madison, WI. 59 p. <http://learningstore.uwex.edu/Prairie-Primer-P187C0.aspx>

Pope, Rich, Linda Naeve, and Joyce Hornstein. 2007. SUL 18. *Introduction to Iowa Native Prairie Plants*. Iowa State University Extension, Ames, IA. 8 p. [www.extension.iastate.edu/store](http://www.extension.iastate.edu/store)

Svedarsky, W.D., M.A. Kuchenreuther, G.J. Cuomo, P. Buessler, H. Moechnig, and A. Singh. 2002. *A Landowner's Guide to Prairie Management in Minnesota*. Northwest Research and Outreach Center, University of Minnesota, Crookston, MN. 39 p.

Trees Forever. *Iowa's Living Roadways Implementation Guide Series: Maintenance of Small-scale Native Plant Gardens*. [www.treesforever.org](http://www.treesforever.org)

Trees Forever. *Iowa's Living Roadways Implementation Guide Series: Maintenance of Large-scale Prairie Plantings*. [www.treesforever.org](http://www.treesforever.org)



Prairie reconstruction with gayfeather (*Liatrix pycnostachya*), gray-headed coneflower (*Ratibida pinnata*), and stiff goldenrod (*Solidago rigida*) at the ISU Field Extension Education Laboratory. (Boone County, Iowa)



Mountain mint (*Pycnanthemum virginianum*).

## Prairie restoration

Packard, S., and C.F. Mutel, editors. 2005. *The Tallgrass Restoration Handbook for Prairies, Savannas, and Woodlands: Science and Practice of Ecological Restoration*. Island Press. Washington, DC. 463 p.

Shirley, Shirley. 1994. *Restoring the Tallgrass Prairie*. University of Iowa Press. Iowa City, IA. 330 p. [www.uipress.uiowa.edu](http://www.uipress.uiowa.edu)

Thompson, Janette R. 1992. *Prairies, Forests, and Wetlands: The Restoration of Natural Landscape Communities in Iowa*. University of Iowa Press. Iowa City, IA. 139 p. [www.uipress.uiowa.edu](http://www.uipress.uiowa.edu)

## Invasive species

Czarapata, Elizabeth J. 2005. *Invasive Plants of the Upper Midwest*. The University of Wisconsin Press. Madison, WI. 215 p. [www.wisc.edu/wisconsinpress](http://www.wisc.edu/wisconsinpress)

Huebner, Cynthia, Cassandra Olson, and Heather C. Smith. 2005. *Invasive Plants Field and Reference Guide: An Ecological Perspective of Plant Invaders of Forest and Woodlands*. U.S. Department of Agriculture, Forest Service, Northeastern Research Station, Morgantown, WV. E-mail [ryoung@fs.fed.us](mailto:ryoung@fs.fed.us) to request a copy.



## Seedling growth—illustrations/photos

Bockenstedt, Paul J., and Beau Thunshelle. 2006. *Prairie Seedling and Seeding Evaluation Guide*. Pheasants Forever, Iowa Department of Transportation and Bonestroo Rosene Anderlik & Associates. 118 p.

Trees Forever. *Iowa's Living Roadways Implementation Guide Series: Prairie Seedling Identification*.

[www.treesforever.org](http://www.treesforever.org)



Prairie seedlings in a screen house. (Ion Exchange, Harpers Ferry, Iowa)



Prairie plants around a street sign. Purple coneflower (*Echinacea purpurea*) and black-eyed Susan (*Rudbeckia hirta*).



Pale purple coneflower (*Echinacea pallida*) and white sage (*Artemisia ludoviciana*) in the Pohl Prairie Preserve. (Ames, Iowa)

## Additional resources Online

Tallgrass Prairie Center

[www.tallgrassprairiecenter.org](http://www.tallgrassprairiecenter.org)

Integrated Roadside Vegetation Management

[www.uni.edu/irvm](http://www.uni.edu/irvm)

The Living Roadway Trust Fund

[www.iowalivingroadway.com](http://www.iowalivingroadway.com)

Iowa Natural Heritage Foundation  
(section about prairie management)

[www.inhf.org/prairiengmt.htm](http://www.inhf.org/prairiengmt.htm)

The U.S. Environmental Protection Agency  
Green Landscaping

[www.epa.gov/greenacres](http://www.epa.gov/greenacres)

## Natural history of the prairie

Manning, Richard. 1995. *Grassland: The History, Biology, Politics, and Promise of the American Prairie*. Viking Penguin, USA. 306 p.

Madson, John, and Frank Oberle. 1993. *Tallgrass Prairie*. Falcon Press. Helena, MT. 112 p.

Madson, John. 1982. *Where the Sky Began: Land of the Tallgrass Prairie*. Sierra Club Books. San Francisco, CA. 321 p.



Field day in a prairie remnant in the Pohl Prairie Preserve. (Ames, Iowa)

### Prairie references for children and young adults

- Collard III, Sneed B. 2005. *The Prairie Builders: Reconstructing America's Lost Grasslands*. Houghton Mifflin Co. Boston, MA. 66 p.
- Lynch, Wayne. 2006. *Prairie Grasslands*. NorthWord Books. Minnetonka, MN. 64 p.
- McGehee, Claudia. 2004. *A Tallgrass Prairie Alphabet*. University of Iowa Press. Iowa City, IA. 32 p.  
[www.uiowa.edu/uiowapress](http://www.uiowa.edu/uiowapress)
- Patent, Dorothy Hinshaw. 2002. *Life in a Grassland (Ecosystems in Action)*. Lerner Publications. Minneapolis, MN. 72 p.
- Prior, Jean C., and James Sandrock. 2007. *The Iowa Nature Calendar*. University of Iowa Press. Iowa City, IA. 12 p. [www.uiowa.edu/uiowapress](http://www.uiowa.edu/uiowapress)
- Scullin, Wendy Munson. 2006. *Young Person's Guide to the Prairie*. South River Press. Indianola, IA. 148 p.
- Sievert, Terri. 2005. *Prairie Plants*. Bridgestone Books. Mankato, MN. 24 p.
- Stone, Larry A., and Jon W. Stravers. 2003. *Sylvan T. Runkel: Citizen of the Natural World*. Turkey River Environmental Expressions. Elkader, IA. 167 p.
- Wallace, Marianne D. 2001. *America's Prairies and Grasslands: Guide to Plants and Animals*. Fulcrum Publishing. Golden, CO. 48 p.

### Events and prairies to visit

Every county in Iowa has either a park, reconstructed roadside, or private land that contains prairie for you to enjoy. To find out where these areas are located, contact your local county conservation office. Several examples of places to visit:

Decorah Parks and Recreation, 24-acre reconstructed prairie and 11-acre filter strip; (563) 382-4158  
[www.decorahia.org](http://www.decorahia.org)

Neal Smith Wildlife Refuge, Prairie City, IA, more than 5,000 acres of restored or reconstructed prairie that includes an area of grazing buffalo; (515) 994-3400  
[www.fws.gov/midwest/nealsmith/](http://www.fws.gov/midwest/nealsmith/)

Loess Hills, Annual Loess Hills Prairie Seminar in early June, Loess Hills Wildlife Area, Onawa, IA; contact Western Hills Area Education Agency, Sioux City, IA, (712) 274-6000

Iowa Native Plant Society, an organization for plant enthusiasts, gardeners, and professional botanists that encourages conservation and ethical use of Iowa's plants; promotes education about Iowa's plants, their habitats, and preservation of these plants and their environment; statewide field trips  
[www.public.iastate.edu/~herbarium/inps/index.html](http://www.public.iastate.edu/~herbarium/inps/index.html)

Jones, Stephen R., and Ruth C. Cushman. 2004. *North American Prairie, Peterson Field Guides*. Houghton Mifflin Co., New York, NY. 528 p. Provides profiles of 48 major North American prairie preserves and descriptions of 120 small preserves to visit



New England asters (*Aster novae-angliae*) bloom beautifully along an Iowa roadside in the fall.



Michigan lilies (*Lilium michiganense*) along an Iowa roadside.

## Glossary

**Local ecotype seed** is produced from plants that naturally evolved on or near your site and are adapted to the climate and soil conditions in your area.

**Prairie reconstruction** means the establishment of a new prairie planting on a site that contains no prairie species because the native prairie was eliminated; often the site was in cropland, converted pastureland, or a construction area.

**Prairie remnant** is an area containing some component of the original native vegetation, surviving intact on undisturbed soils. It is a relic of the native prairie vegetation that covered more than 85 percent of Iowa prior to European settlement.

**Prairie restoration** is the rejuvenation of a prairie that has been degraded by overgrazing, some mechanical disturbance, or mismanagement. Restoration generally involves a combination of removal of animals that overgrazed, prescribed burning, and perhaps exotic or woody species control.

## About the covers

### Front

Top, l to r: Spiderwort (*Tradescantia ohiensis*), Wild rose (*Rosa* sp.), Black-eyed Susan (*Rudbeckia hirta*)

Bottom: Prairie remnant.

### Back

Top: Prairie planting to reduce erosion on hillside at Pinicon Ridge Park. (Linn County, Iowa)

Bottom, l to r: Prairie pothole marsh. (Polk County, Iowa)  
Big bluestem (*Andropogon gerardi*) in limestone-edged landscape planting.

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File: Horticulture 2-10

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