

Johnson County Planning Development Sustainability Pocket Prairie Program



"It seems to me that the natural world is the greatest source of excitement; the greatest source of visual beauty; the greatest source of intellectual interest."
David Attenborough



Aldo Leopold (1887-1948)

A Sand County Almanac

“All ethics so far evolved rest upon a single premise; that the individual is a member of a community of interdependent parts. The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively . . . A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.”

Johnson County Pocket Prairie Program *Growing TRENDS*

► Why

- Iowa History
- Changes to the Land
- Benefits/What You Plant Matters

► How

- Location/Site Preparation
- Types of Plants
- Design/Layout

History: Prairies Protect the Land

- ▶ At the time of settlement in the mid-1800s, prairie covered 85% of the land that became Iowa; the rest of the state was tree-covered.
- ▶ Today, 93% of Iowa's land is dedicated solely to crops — making the state one of the most altered landscapes on earth.
- ▶ As Iowa developed land, uses changed. Cities were developed, roads were built and critical habitat diminished.
- ▶ Today, less than 1/100 of 1% of the original prairie remains. In the last 20 years, farm fences have all but disappeared from the landscape as farm fields expand to meet the road.

<https://tallgrassprairiecenter.org/>

Cornelia F. Mutel, editor. *Tending Iowa's Land: Pathways to a Sustainable Future*. University of Iowa Press, Iowa City. 2022.

Sage, Leland L. *A History of Iowa*. The Iowa State University Press, Ames, Iowa. 1974.

Why Native?

- ▶ *When native plants disappear, the insects disappear, impoverishing the food source for birds and other animals.* Doug Tallamy
 - ▶ 2/3 of the Earth's wildlife has disappeared.
- ▶ The U.S. has 135 million acres devoted to typical home landscapes.
- ▶ Only 3.6% of U.S. land is in National Parks; only 2% is federally protected.
 - ▶ 2 million acres of golf courses the size of Delaware and Rhode Island
 - ▶ Pavement covers an area larger than Ohio
 - ▶ U.S. development claims an area the size of a football field every 30 seconds — 2,880 football-sized fields are developed every day
 - ▶ Our parks and natural areas are too small to sustain the biodiversity that humanity needs — as a result wildlife populations that live in natural areas and benefit all of us are shrinking.

Why Native continued

- ▶ Soil is Iowa's most valuable asset. ISU reports 12 million tons of organic carbon are lost every year to nutrient-hungry plants like corn and beans. Also lost are the microbes —fungi, bacteria, lichen, good bugs, etc.!
 - ▶ Some microorganisms make us sick, others are vital for our health.
- ▶ Over thousands of years native plants have adapted to the local climate, soil conditions, and wildlife interactions, making them well-suited for the local environment.
- ▶ Native plants play a crucial role in supporting local ecosystems above ground by providing habitat for native insects, birds, and other wildlife.
- ▶ Diverse, native, perennial vegetation is ideal for any landscape and backyard wildlife habitats. The deep roots of native plants hold the soil during heavy rainfall, increase water filtration and reduce nutrient pollution runoff that goes into our rivers and streams.

<https://www.asla.org/nativeplantssavemoney.aspx>

<https://johnsoncountyiowa.gov/soilhealth>

<https://naturalresources.extension.iastate.edu/wildlife/landscaping-wildlife>

Native grasses and plants have longer roots, are more equipped for the environment in which we live and require less water and maintenance. Most importantly, they provide the appropriate and necessary sustenance to native animals and insects.



Benefits of Native Perennials

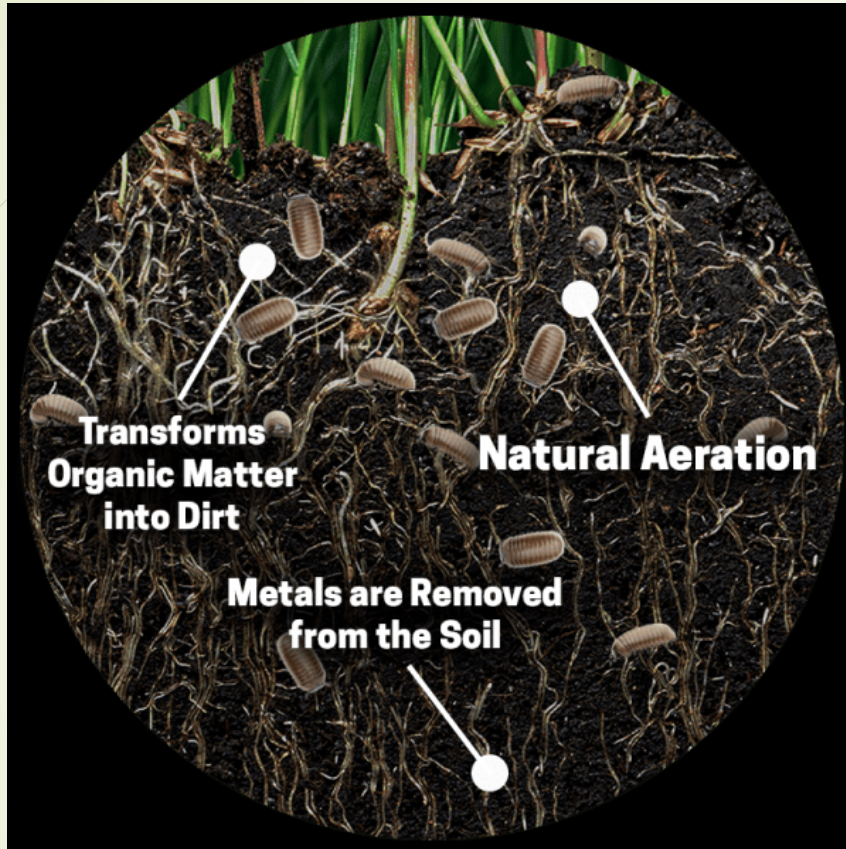
- ▶ Under the Earth's surface is a vast underground kingdom of microorganisms that are critical to human life. Trillions of microbes live in the soil and take the carbon dioxide that plants pull from the atmosphere and turn it into life-giving soil carbon.
- ▶ Soil is the most underappreciated resource in the natural world. As soil health is depleted, so is its ability to provide vital services and functions.
- ▶ Soil has immense biodiversity — nearly 25% of species on Earth live underground, and a single teaspoon contains billions of microorganisms!
- ▶ Soil provides services and functions that are essential for life. The microbes in the soil feed off living or dead plants for their food.
- ▶ Soil health involves treating the soil as the living ecosystem that it is — which includes continually returning organic matter to the soil.

<https://www.asla.org/nativeplantssavemoney.aspx>

<https://johnsoncountyiowa.gov/soilhealth>

<https://naturalresources.extension.iastate.edu/wildlife/landscaping-wildlife>

Ohlson, Kristin. *The Soil Will Save Us*. Rodale, New York, NY. 2014.



Pill & Sow bugs — Roly-polies facilitate decomposition. They can remove metal contamination from the soil.



Native Benefits continued

- ▶ Plants native to an area establish quickly and are naturally hardy — they grow in harmony with the environment, the soil, the water supply, the varying weather throughout all the seasons, and other native companions.
- ▶ Their root systems are deep, acclimated to the soil, and adjust to average precipitation. Their stems and leaves handle harsh sun and winds. These plants are part of a larger natural ecosystem.
- ▶ When native plants thrive in their original environment, they create a natural habitat for wildlife that is beneficial and adds life to your landscape — pollinators — bees, birds, butterflies, and small animals, warm and cold-blooded, and microscopic organisms live in the soil. These microbes have jobs to do in the natural environment.

<https://johnsoncountyiowa.gov/soilhealth>

Ohlson, Kristin. *The Soil Will Save Us*. Rodale, New York, NY. 2014.

Vogt, Benjamin. *Prairie Up: An Introduction to Natural Garden Design*.

<https://www.asla.org/nativeplantssavemoney.aspx>

Native Benefits continued

- ▶ Microorganisms help clean the environment. They breakdown harmful substances, decompose dead and decaying matter from plants and animals converting the material into simple substances that feed other plants and animals.
- ▶ Native plants help the environment — they require less watering, fertilizer, and pesticides, prevent water run-off, improve air quality by reducing air pollution because they reduce the need for mowers and other equipment.
- ▶ Native plants help prevent erosion. The deep root systems of many native Midwestern plants increase the soil's capacity to store water. Native plants can significantly reduce water runoff and pull and store excess carbon in the soil.

Native Benefits continued

- ▶ Native plants are low maintenance after they are established. The long-term upkeep of native plants is less costly than turf grass, and takes less time to maintain.
- ▶ Native plants add splendor to your landscape. A native garden can be a formal/informal space designed with harmony, unity, and interest. Native plants provide a wealth of colors, textures, varying heights, and bloom times, resulting in a stunning display over multiple seasons.

Iowa City Lawn Love

https://www.youtube.com/results?search_query=iowa+city+lawn+love

Vogt, Benjamin. *Prairie Up: An Introduction to Natural Garden Design*.
<https://www.asla.org/nativeplantssavemoney.aspx>



New Approach to Conservation

- ▶ Ask people to
 - ▶ Reduce the size of the lawn
 - ▶ Plant more natives
 - ▶ Remove invasive species
 - ▶ Protect the natural areas
- ▶ Measurable ecological products
 - ▶ Increases in biodiversity
 - ▶ Measurable reduction in invasive species
 - ▶ Significant drawdown of atmospheric CO²
 - ▶ Transformation of areas into viable habitats

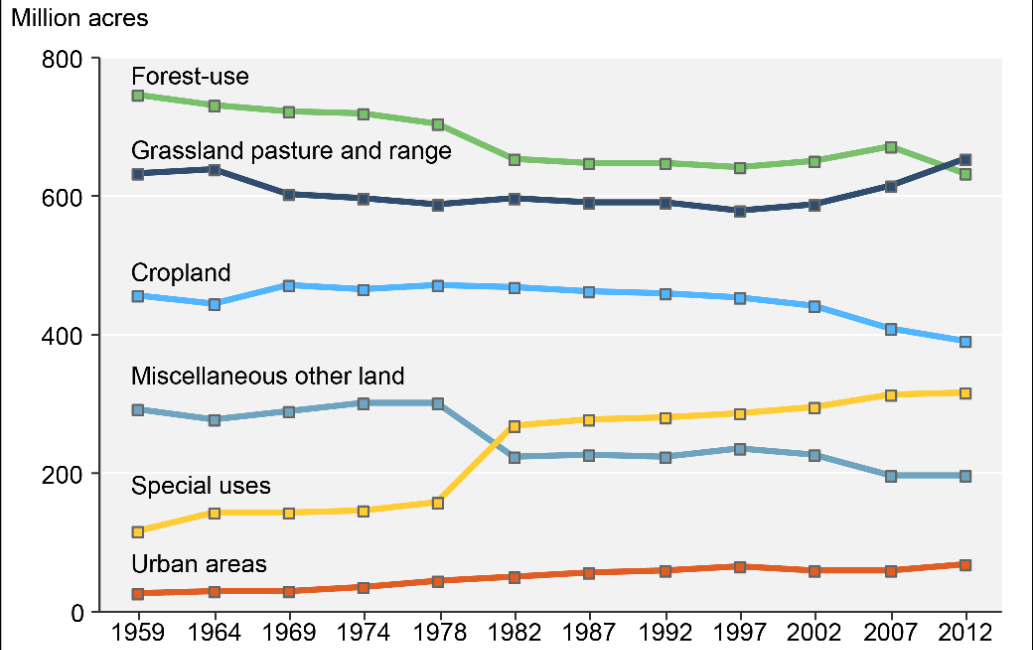
Tallamy, Doug. *What's the Rush? The Solution to Biodiversity Crisis*. <https://homegrownnationalpark.org/videos/>
Vogt, Benjamin. *Prairie Up: An Introduction to Natural Garden Design*.
<https://www.asla.org/nativeplantssavemoney.aspx>
<https://homegrownnationalpark.org/>

“When native plants disappear, the insects disappear, impoverishing the food source for birds and other animals.”

Doug Tallamy

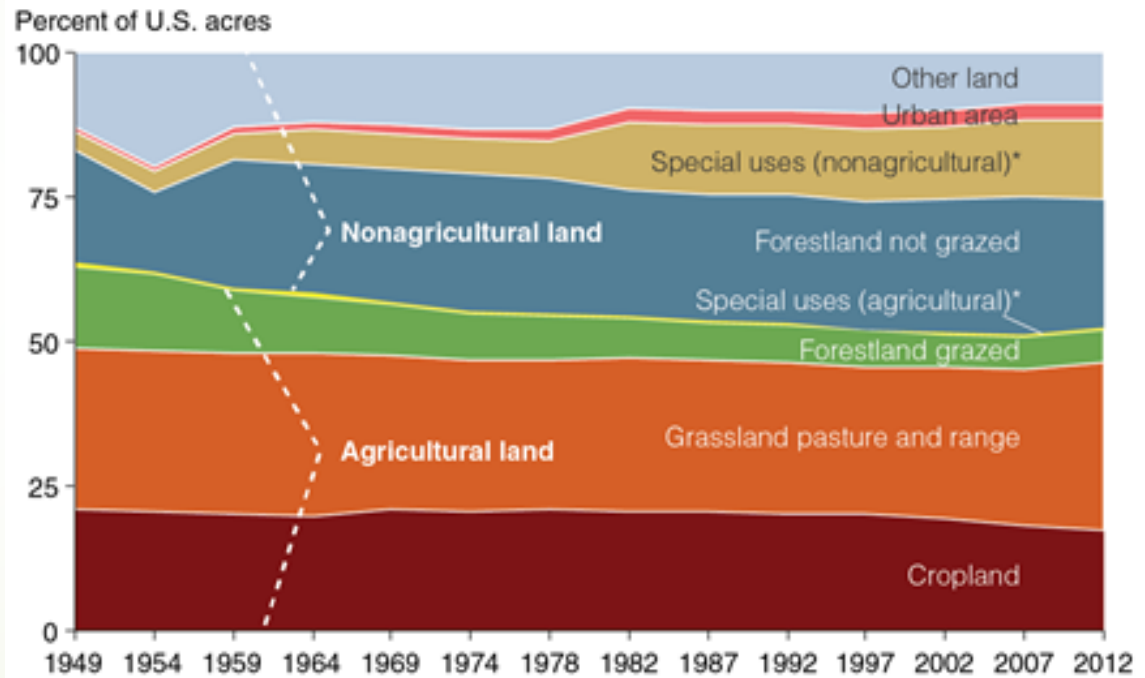


Major uses of land in the United States, 1959-2012



Source: USDA, Economic Research Service using data from the *Major Land Uses* data product; see sources in Bigelow et al., 2017.

Share of land used for agricultural purposes has decreased 11 percent since 1949



*Special uses include rural parks and wilderness areas, rural transportation areas, defense/industrial lands (all nonagricultural uses), and farmsteads/farm roads (agricultural uses). Source: USDA, Economic Research Service calculations using data from USDA, U.S. Department of the Interior, U.S. Department of Commerce, and other sources.

New Approach continued

- ▶ One landscape does nothing — lawns
- ▶ Homegrown National Park goals – preserving 30% of the U.S. by 2030
 - ▶ To add 1,000 acres each month would take 11,250 years to meet
- ▶ Make common knowledge — that the landscape has four ecological responsibilities
 - ▶ Support local food webs
 - ▶ Sequester carbon
 - ▶ Clean and manage the watershed
 - ▶ Support pollinators

New Approach continued

- ▶ Plant choice matters — choose wisely
 - ▶ Contribute energy – oak trees, native perennials
 - ▶ Non-contributors – non-native plants
 - ▶ Detractors – push out native contributors – invasive species



Wild Bergamot *Monarda fistulosa*

New Approach continued

- ▶ Four ways to increase biodiversity
 - ▶ Manage roadsides better — plant natives not grasses that must be mowed
 - ▶ Bring back hedgerows
 - ▶ Add prairie strips
 - ▶ Ban neonicotinoid (neo-knee-cot-noids) insecticides
 - ▶ 7,000 times more toxic than DDT
 - ▶ 5% of the product is used by the plant – the other 95% enters the watershed or is carried away on dust

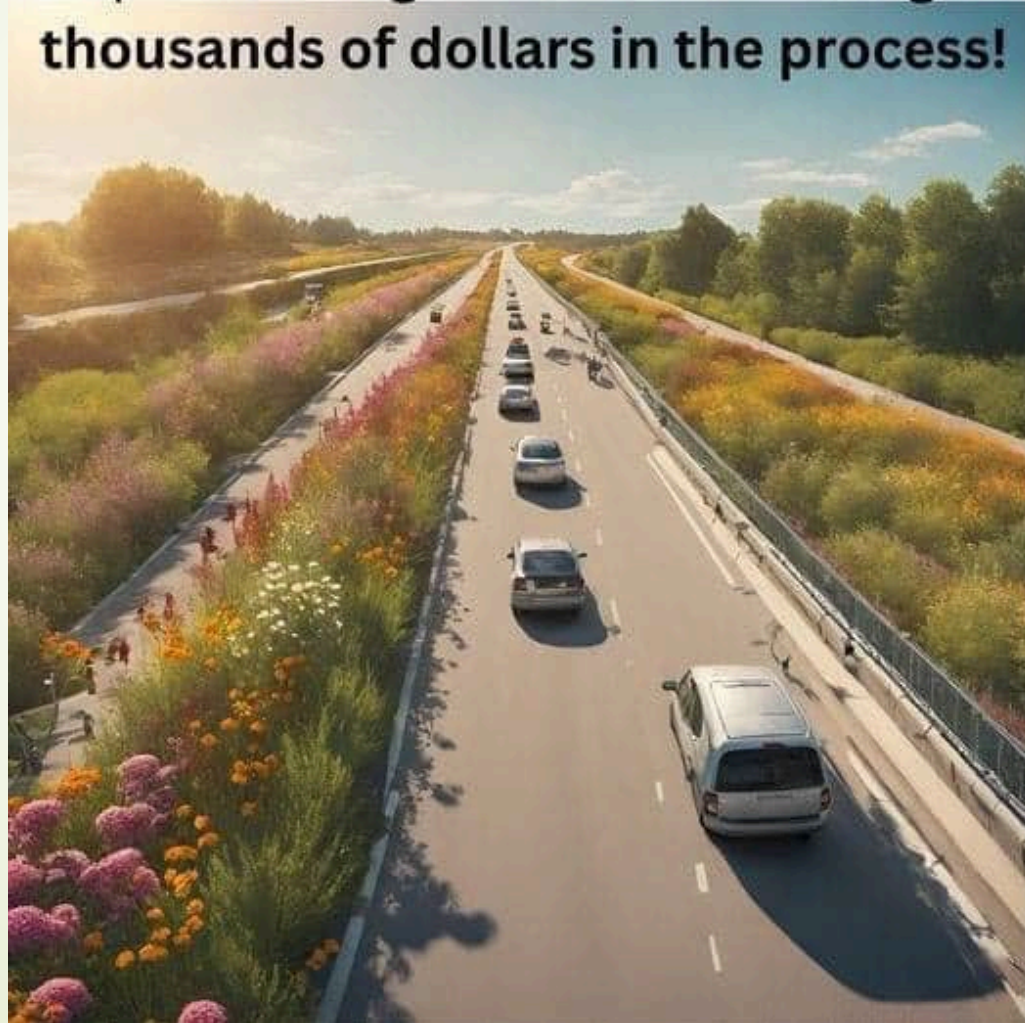


New Approach continued

- ▶ Prairie strips
 - ▶ Creates habitat
 - ▶ Reduces topsoil lost by 95%
 - ▶ Reduces water pollution by 90%
 - ▶ CRP supports farmers and reduces marginal land



Cities all around the world are making the switch from mowing along roadways to growing pollinator gardens - and saving **thousands of dollars in the process!**





New Approach continued

- ▶ Biologist Edward O. Wilson (1928-2021): *“Insects are the little things that run the world.”*
 - ▶ 90% of insects only feed on host plants that they share evolutionary history.
 - ▶ 80% of plants and 90% of angiosperms (produce flowers and seeds) are pollinated by animals (birds, butterflies, insects).
 - ▶ Light pollution kills insects – easy solution replace white bulbs with yellow bulbs
 - ▶ Mosquito foggers kills pollinators. To control mosquitos kill the larva stage using a bucket of water and mosquito dunk (from hardware store).



Iowa Regent Institutions focus on unique aspects of Iowa's environment

- ▶ UNI – Tallgrass Prairie Center is a force for prairie conservation to improve the environment
- ▶ ISU – is a powerful influence for education and research in agriculture, science and engineering and Extension Education and Outreach in each Iowa county
- ▶ UI – offers guidance for air and water quality management, specialization in Environmental Engineering and Science (EES), Hydraulics, Hydrology, and Water Resources (HWR), and Sustainable Water Development (SWD). The Iowa Flood Center, Iowa Nutrient Research and IIHR (Iowa Institute of Hydroscience & Engineering) are located on campus

Iowa's Roadside Management Efforts

- ▶ Iowa is nationally recognized for its approach to roadside management. It was one of the first states to implement integrated roadside vegetation management using native plants to save money on mowing fuel in the 1970s.
- ▶ Iowa is also the only state to have consistently funded this management at state, county, and city levels for over 35 years.
- ▶ Since the early 1990s, counties have planted native vegetation in over 35,000 acres of county road right-of-way. These diverse stands of 30–45 prairie grass, sedge and wildflower species — all naturally adapted to local growing conditions — provide miles of stable, low-maintenance roadsides for Iowa.
- ▶ Johnson County's Integrated Roadside Management is a model of success, managing over 6,000 acres of roadside right of way and monitoring for noxious weeds, clearing brush, implementing erosion control practices, and responding to weed complaints.



BioBlitz at UI Ashton Prairie Living Laboratory



Importance of Prairies and Natural Gardens

- ▶ Dr. Doug Tallamy, entomologist, ecologist, conservationist and author: *What you plant in your garden matters*.
- ▶ The U.S. has lost over 3 billion birds since 1970 (first Earth Day) due to loss of habitat.
- ▶ The global population of arthropods — chiefly insects has declined 45 percent since preindustrial times.
- ▶ Introduced plant species (non-natives) yield on average 68% less food for insects than natives.
- ▶ 86% of the land east of the Mississippi River is privately-owned — a large percentage is either under cultivation for food or planted in a monoculture lawn.

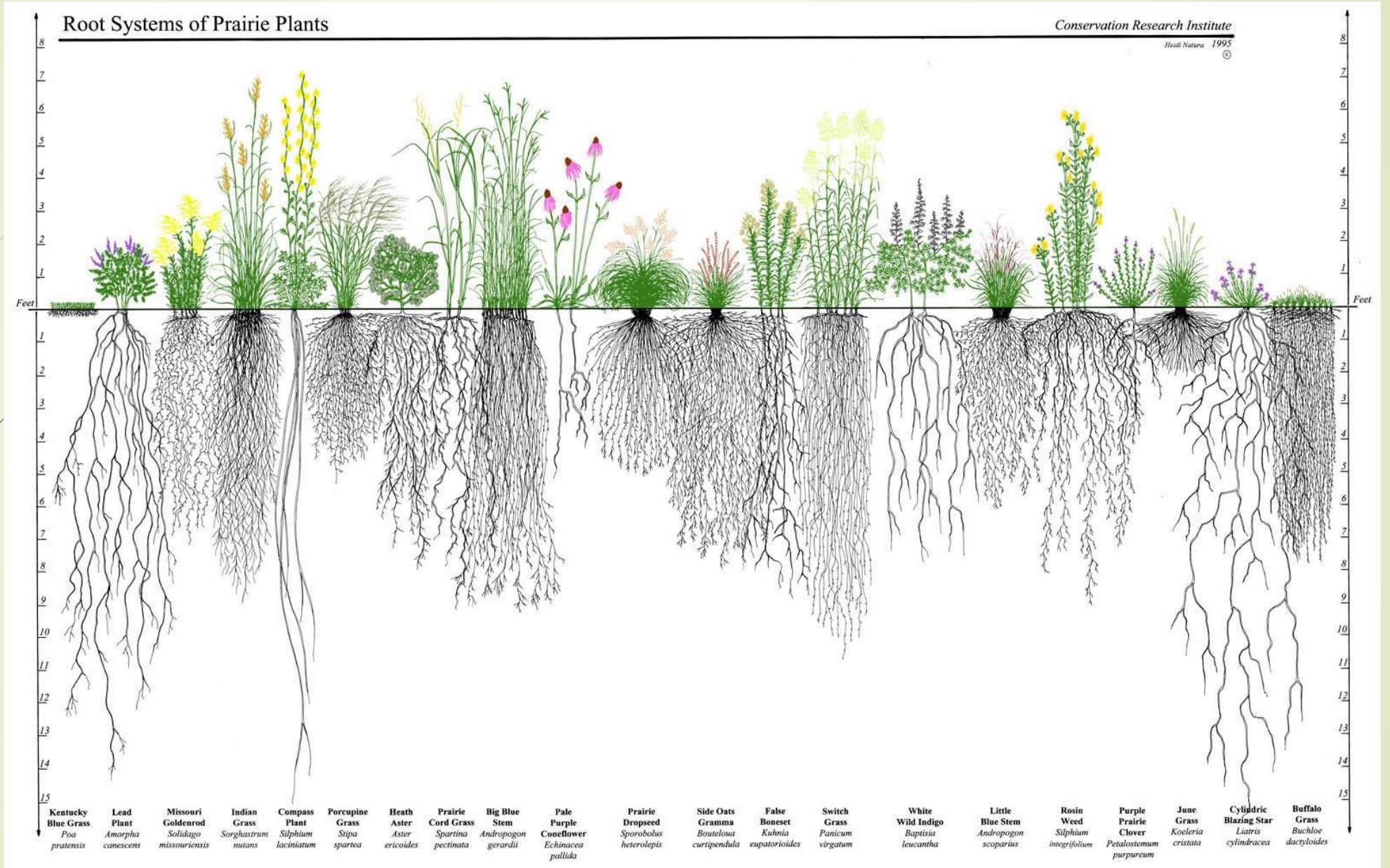
How We Act Determines Nature

- ▶ Shrink the size of your lawn
- ▶ Modify lights
- ▶ Add a pollinator garden
- ▶ Remove invasive plants
- ▶ Add keystone plants — most productive plants that support the most species
- ▶ Stop fogging for mosquitos



How We Act Determines Nature

- ▶ The roots of plants are varied to form networks that absorb moisture during dry periods. Each year some of the plant roots die, allowing large quantities of organic matter/nutrients to be added to the soil as they decompose, creating rich and fertile soil and feeding microorganisms that live in the soil.
- ▶ What we see above ground is typically only a third of the overall plant. Roots exist out of sight and out of reach. The extensive roots play an important role in helping a plant grow, thrive and improve the environment around them.
- ▶ The roots anchor the plant in the soil as plants try to reach for sunlight.
- ▶ Store excess food for future needs underground.
- ▶ Fix nitrogen in the soil (legumes),
- ▶ Increase bio-productivity, by absorbing and holding toxins and heavy metals, carbon sequestration,
- ▶ Prevent erosion — fibrous roots hold the soil and absorb more runoff (as in a rain garden),



How We Act Determines Nature


- ▶ Location — Types of Plants — have been selected by location to offer best opportunities for successes
 - ▶ Full Sun Pocket Mix (**Summer Sun**): This pocket requires 6 hours or more of direct sunlight.
 - ▶ Part Sun Pocket Mix (**Speckled Shade**): This pocket requires 4-6 hours of direct sunlight.
 - ▶ Wet Pocket Mix (**Drizzle Drizzle**): This pocket requires 4-6 hours of direct sunlight (preferably morning sun).
- ▶ Sunny, open, and well-ventilated — minimum of 6 hours of sun
- ▶ Good air movement is critical — poor air circulation can lead to fungal disease
- ▶ Avoid areas with heavy weed growth — especially perennial noxious weeds

Location, Location, Location

- ▶ Good site locations are areas presently in turf, cornfields, soybean fields, and alfalfa fields — but be aware of residual herbicides that may have been applied to agricultural fields in previous years, and test the soil for residual herbicide activity if in doubt.
- ▶ New construction sites are usually good, if the soil is not compacted or exposed raw subsoil and no residual weeds remain.
- ▶ Beware of areas with adjacent weedy vegetation that cannot be eliminated or controlled. Although an established prairie meadow is resistant to invasion by most weeds, three to four years of growth is required for full development. During these first few years, weed seeds can blow onto the site and establish.
- ▶ Rhizome weeds can creep onto the site from adjacent areas. If herbaceous perennial weeds are located near a new site, they should be mowed before they set seed, or completely eliminated and replaced with non-invasive plants.

Site Preparation

- ▶ Has the area been planted before?
- ▶ Preparing the planting site is a significant deciding factor in your prairie's success and your on-going stewardship requirements. You need to spend the necessary time to build the right foundation for your native plants to thrive.
- ▶ This critical step if overlooked can lead to disaster — especially in areas with a history of weedy growth.
- ▶ All weeds and existing vegetation must be removed before planting. It takes only a few rhizomes of noxious weeds to re-colonize the planted area. “Take No Prisoners” when preparing a site for a prairie planting.



Site Preparation – Mapping Exercise

- ▶ Provide the requested information
- ▶ Show rough proposed location of plot
 - ▶ Should be mowed/maintained currently
 - ▶ Think about light needs and preferred plant mix
- ▶ Maps collected for program use

Site Preparation

- ▶ Different methods of preparing a site for seeding to a prairie.
 - ▶ Outline the selected area, curves are easier to mow around – use a hose, rope or spray paint.
 - ▶ Remove existing plant material to make room for native prairie plants. The easiest method is to smother the area with cardboard, layers of newspapers for a full growing season, or use a tarp instead of herbicides.
 - ▶ Use a sod-cutter to remove lawns with no weeds.
- ▶ Loosen the soil in the spring but don't go too deep — some seeds can remain viable for years, even decades — deep rototilling may activate seed growth.

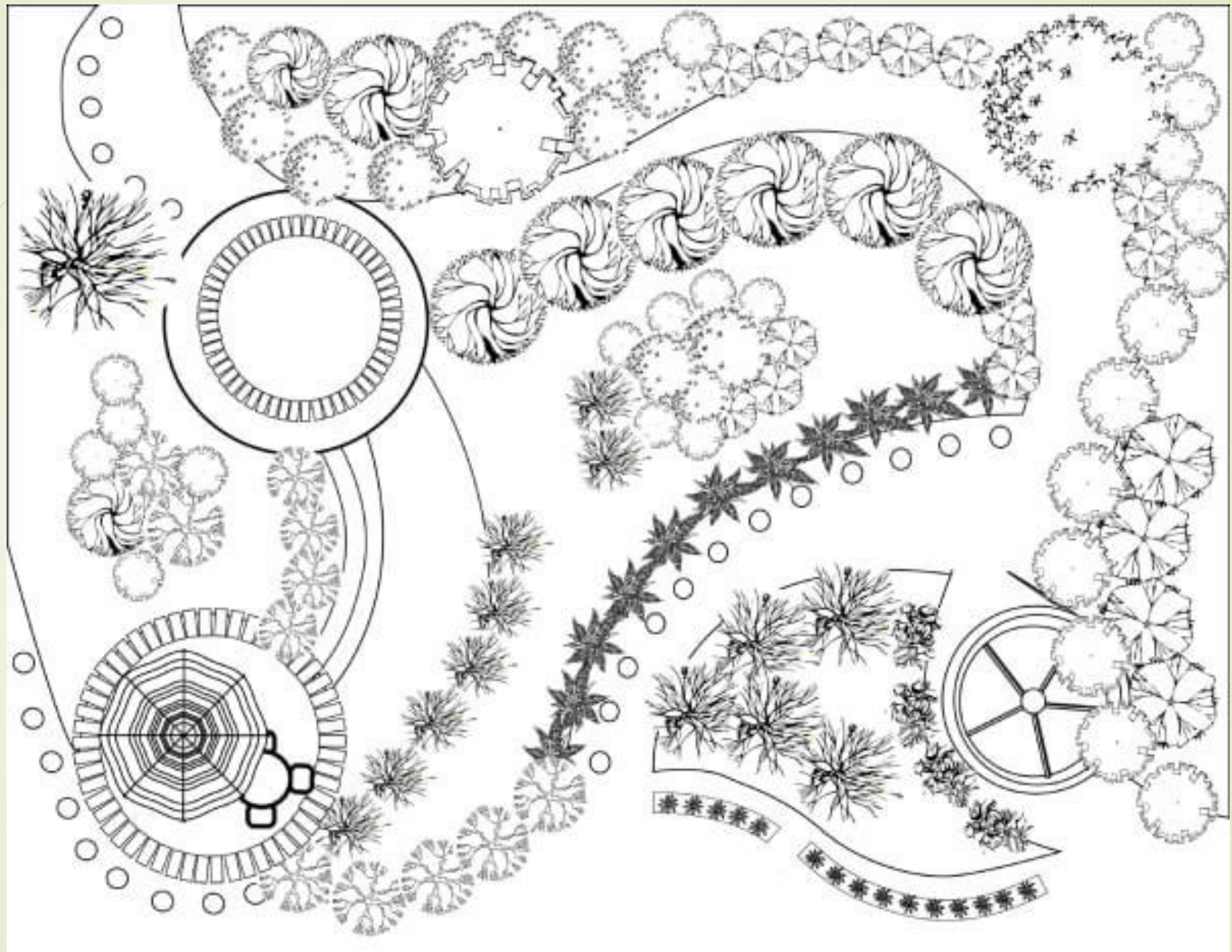


How We Act Determines Nature

- ▶ Establishing a native prairie is not simple. However, once established, a prairie lives on year after year, and serves as a living legacy of the person who plants it. The natural beauty, ecological value, and significant maintenance cost savings make prairie gardens an attractive landscape option.
- ▶ Design/Layout
 - ▶ Layout depends on your property and the location of your pocket prairie — a 10 by 10 foot garden plot is manageable
 - ▶ Plants will be offered as plugs that can be planted individually — one every foot — or in groups — two or three every two feet
- ▶ Start with a focal point – a tree, shrub, garden art, or even architectural feature.
- ▶ Place plants in groups of the same species for visual effect.
- ▶ Use odd numbers – plant clumps of three, five, or seven plants.
- ▶ Include organic and geometric shapes such as curves and sweeps.
- ▶ Remember to place taller plants in the middle or back of the bed.

Arrange Plants in Your Pocket Prairie





Post Planting Management

- ▶ Prairies are low maintenance, but not “no maintenance.” A few simple maintenance procedures are all that is usually required for success. Be careful not to disturb the young prairie plants during the critical first growing season.
- ▶ Perennial prairie species take time to mature. In the first few years, native plants are developing their vast root system before they show maturity above ground. Keep weeds contained in the first year.
- ▶ In the first two years, annual and biennial weeds will grow much faster than the slow-growing perennial native plants — this makes them easier to spot. The small prairie plantings are easily disturbed, and are often pulled along with the weeds. Pull weeds carefully.
- ▶ By the third year, the wildflowers and grasses will grow taller and take over weed growth.
- ▶ Many perennial flowers and grasses mature in the third growing season.

Post Planting Management

- ▶ At the beginning of the third season, large, young prairie plot should be cut to 6 inches between in early April in the Midwest.
- ▶ Plant debris should be removed from the site to expose the soil directly to warming rays of the sun. Exposing the soil surface helps encourage rapid soil warming in the spring.
- ▶ Trimming favors native “warm season” prairie plants over “cool season” weeds (quackgrass). Rapid soil warming encourages the prairie plants over the weeds.
- ▶ Most prairie plants are dormant or just beginning growth, and are unharmed by spring trimming. Cool-season weeds will be actively growing at this time and will be significantly damaged. The advantage goes to the prairie plants.
- ▶ The secret to success with prairie areas is to establish the native plants across the entire area, so that they colonize the soil completely. Once the prairie sod is established, usually by the fourth or fifth year, weeds have no openings into which they can invade. Let the plants do the work for you!



Cardigan Park, Iowa City



Melrose Avenue median

Every square foot of native plants counts!

- ▶ Join Homegrown National Parks — A call-to-action to restore habitat where we live and work, and where we farm and graze, extending national parks to our yards and communities.
- ▶ Consider registering your property — Get On the (interactive) Map.
- ▶ <https://homegrownnationalpark.org/about-us/>
- ▶ The goal is to inspire and track 20 million acres of native plantings across North America.

Jay Walljasper (1947-2020)

“What We Share: A Field Guide to the Commons”

“A thriving town or city depends on plentiful public places where people can gather as friends, neighbors and citizens to enjoy all sorts of activities. This common ground is what makes democracy, prosperity, social justice and community resilience happen.”

“The commons refers to a wealth of valuable assets that belong to everyone. These range from clean air to wildlife preserves; from the judicial system to the internet.

“Some are bestowed to us by nature; others are the product of cooperative human creativity.

“Anyone can use the commons, so long as there is enough left for everyone else. This is why finite commons, such as natural resources, must be sustainably and equitably managed.”

Resources:

- Burns, John. *The Kinfolk Garden: How to Live with Nature*. Artisan, Workman Publishing Co. Inc., New York. 2020.
- Bockenstedt, Paul. *Prairie Seedling and Seeding Evaluation Guide*. Iowa Department of Transportation Living Roadway Trust Fund. 2020.
- Dean, Thomas. *The Little Village. The Community, Crisis and the Commons*. Issue 108. Iowa City. November 2011.
- Diekelmann, John & Schuster, Robert. *Natural Landscaping: Designing with Native Plant Communities* (Second Edition). University of Wisconsin Press. 2002.
- Hamilton, Neil D. *The Land Remains: A Midwestern Perspective On Our Past and Future*. Ice Cube Press, Iowa City. 2022.
- Hill, Patricia. *Design Your Natural Midwest Garden*. Trail Books. Madison, Wisconsin, 2007. (Designing for any landscape.)
- Kurtz, Carl. *A Practical Guide to Prairie Reconstruction*. University of Iowa Press. Iowa City, 2001, 2013.
- Mutel, Cornelia F., editor. *Tending Iowa's Land: Pathways to a Sustainable Future*. University of Iowa Press, Iowa City, 2022.
- Norris, Kelly. *New Naturalism. Designing and Planting a Resilient, Ecologically Vibrant Home Garden*. The Quarto Group (Cool Springs Press), Beverly, Massachusetts. 2021.
- Ohlson, Kristin. *The Soil Will Save Us*. Rodale. New York, NY. 2014.
- Oudolf, Piet and Darke, Rick. *Gardens of the High Line: Elevating the Nature of Modern Landscapes*. Timber Press, Portland, Oregon 2017.
- Oudolf, Piet and Gerritsen Henk. *Planting the Natural Garden*. Timber Press. Portland, Oregon, 2019. (Plant descriptions, uses, and combinations.)
- Roth, Sally. *Natural Landscaping: Gardening with Nature to Create a Backyard Paradise*. Rodale Press, Inc. Emmaus, Pennsylvania, 1997. (Inspiration and ideas to design with wildlife.)
- Sage, Leland L. *A History of Iowa*. The Iowa State University Press, Ames, Iowa. 1974.
- Tallamy, Douglas W., *Bringing Nature Home. How You Can Sustain Wildlife with Native Plants*. Timber Press, Inc., Portland Oregon. 2007, 2018.
- Tallamy, Douglas W. *Nature's Best Hope. A New Approach to Conservation that Starts in Your Yard*. Timber Press, Portland, Oregon. 2019.
- Vogt, Benjamin. *Prairie Up: An Introduction to Natural Garden Design*. 3 Fields Books, University of Illinois Press, 2023.
- Williams, Florence. *The Nature Fix: Why Nature Makes Us Happier, Healthier, and More Creative*. W.W. Norton & Company, 2018.

Resources continued

- <https://www.bloomingprairieiowa.com/>
- <https://deeproots.org/>
- <https://www.kcrg.com/2023/09/28/iowa-has-lost-half-its-soil-richness/>
- <https://dyckarboretum.org/roots-of-native-plants/>
- <https://www.earthday.org/factsheets/>
- <https://homegrownnationalpark.org/whats-the-rush/> Doug Tallamy
- <https://www.houzz.com/magazine/how-to-bring-native-plants-into-an-established-garden-stsetivw-vs~86155797>
- <https://www.iowadnr.gov/conservation/prairie-resource-center>
- https://www.iowadnr.gov/portals/idnr/uploads/Wildlife%20Stewardship/native_plants_low.pdf
- <https://www.iowapublicradio.org/gardening/how-to-create-a-backyard-prairie>
- <https://littlevillagemag.com/ur-here-the-community-the-crises-and-the-commons/>
- <https://www.parkbugle.org/supporting-pollinators-the-little-things-that-run-the-world/>
- <https://publications.iowa.gov/43148/1/PrairieSeedlingGuide.pdf>
- <https://www.scientificamerican.com/blog/anthropology-in-practice/the-american-obsession-with-lawns/>
- <https://www.smithsonianmag.com/science-nature/meet-ecologist-who-wants-unleash-wild-backyard-180974372/>
- <https://www.washingtonpost.com/news/wonk/wp/2015/08/04/lawns-are-a-soul-crushing-timesuck-and-most-of-us-would-be-better-off-without-them/>
- <https://store.extension.iastate.edu/product/12595>
- <https://www.storycountyiowa.gov/DocumentCenter/View/12007/Native-Planting-Establishment-and-Management-NRCS>
- <https://www.thenation.com/article/archive/struggle-commons/>
- <http://uipress.lib.uiowa.edu/ppi/index.php>
- <http://uipress.lib.uiowa.edu/ppi/counties.php?record=64> – Prairie Plants found in Johnson County, Iowa