A Landowner's Guide to Prairie Strips

Prairie strips can make a big difference in the sustainability of row-cropped farms. Researchers have shown that strips of prairie planted in strategic locations within a crop field provide numerous benefits. Prairie strips can hold soil in place, improve soil health, reduce nitrogen and phosphorus from entering water bodies, and enhance wildlife habitat. They give farmland owners flexible management options and provide numerous benefits that other conservation practices may not offer.

Improving farmland health

Prairie plants keep vital soil and nutrient resources within crop fields. They increase soil organic matter, improve infiltration, and reduce compaction with their deep roots. The stiff, upright stems of the native perennial plants that make up prairie strips help to slow surface water runoff and hold soil in place when it rains, especially when topsoil is bare and vulnerable in the spring and fall. By comparison, exotic grass species such as smooth brome or fescue typically established in buffer strips lay flat under heavy rain and do not impede the flow of water, sediment, or nutrients from crop fields.

In research conducted in Jasper County, Iowa, converting 10 percent of a row-cropped field to prairie strips:

- Reduced sediment transport by 95 percent,
- Reduced overland water flow by 42 percent, and
- Reduced nitrogen transport by nearly 85 percent and phosphorus transport by 90 percent.

On some fields, the nitrate-nitrogen concentration in groundwater can be reduced by 70 percent with prairie strips.

The performance and longevity of prairie strips can be improved when combined with other conservation practices such as no-till or reduced tillage, cover crops, saturated buffers, bioreactors, and streambank buffers. Healthy soil and clean water are essential for all Iowans, rural and urban.

Support pollinators and other wildlife

Prairie strips increase the diversity of plants, pollinators, songbirds, and other wildlife. Since prairie strips are planted with many different native grass and wildflower species, they offer higher quality habitat than exotic grasses or single-species plantings. Prairie strips provide year-round habitat and food for pollinators and other beneficial insects, such as those that prey upon crop pests. With careful management, insect diversity in cropland with prairie strips can approach that of prairie restorations.

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How much will it cost?

The cost of prairie strips compares favorably to other conservation practices that manage nitrogen and sediment. It costs between $200 and $300 to establish an acre of prairie. Using Iowa land rental prices, the average total cost of using prairie strips to treat the runoff from an acre of row crops is $26 to $33 per year. Farmland owners should consider these primary costs:

- Site preparation for seeding,
- Prairie seeds,
- Ongoing management to promote the establishment and maintenance of native plants, and
- Opportunity cost of other potential income-generating uses associated with the land (e.g., crop production).

As of December 2019, CP-43 Prairie Strips are a new practice under the Continuous Conservation Reserve Program (CRP) Clean Lakes, Estuaries and Rivers Initiative. Visit your local USDA service center to learn more. More detailed cost information can be found in Iowa State University Extension and Outreach publication The Cost of Prairie Strips (AE 3166) (store.extension.iastate.edu/product/15222).

Working with tenants

Landowners need to include their tenants early in the discussion of prairie strips establishment. Those who farm the land need to know the reasons supporting prairie strips usage, prairie strip locations within the field, and how they will affect the tenant's yield and profit. Chances are the equipment used on the land will belong to the tenant—a key factor in designing the strips. The tenant will also need to know if prairie strip maintenance is their responsibility; and if so, how to maintain them.

Involving tenants early will help to keep relationships positive, and reduce possibilities for land management errors including tilling up the prairie strips or herbicide and pesticide applications within the strips.

Prairie strips design

Researchers recommend a basic design of a variable-width prairie area at the foot slope of a crop field to filter water and facilitate tractor operations, with additional narrow strips following the contour of the slope to the extent practicable. Places where erosion frequently occurs, where yields are low, or where streams and drainage ditches need extra protection from runoff are areas to consider for prairie strips.

Other considerations for placement include the type of machinery used for planting and harvesting. With the exception of prairie seeding equipment, standard farm implements for tillage, herbicide application, and mowing are sufficient to establish and maintain prairie strips.

A certified prairie strip advisor or other service provider can create individual farm plans. Local USDA Service Centers can provide assistance. An updated list of technical service providers that provide custom planting services can be found through the Tallgrass Prairie Center: tallgrassprairiecenter.org/seed-service-providers.

Types of prairie plants to use

Farmland owners should consider a farm's history to determine the types of prairie plants to use. Ideally, seed should be sourced within 100 miles north

or south, and 200 miles east or west of the farm location so that the vegitation closely resemble prairie native to the region. For best results, mixes should include both grasses and wildflower species in approximately equal ratios by number of seeds per square foot. Basic prairie mixes costing about $150 per acre are widely available. Mixes with a greater number of species will cost more, but may offer better establishment and longevity, better habitat, and more environmental benefits.

Preparing the field and planting seeds

If there were annual row crops with effective weed management in the chosen site, the soil will likely have a reduced seed bank of annual weeds. Farmers should check carefully for herbicide replant issues. If the chosen site contained crops with weeds, pasture, or was an abandoned field, farmers will need multiple rounds of secondary tillage in the spring or two applications of herbicide prior to planting the prairie seed to deplete the seed bank. They also will need to terminate any established perennial weeds, such as Canada thistle, before seeding the prairie mix. Farmers should check the herbicide label for recommendations on dealing with residual or carry-over herbicide from the previous season.

Researchers advise seedings that provide an average coverage of 40 seeds per square foot. If the seeds are sown in the autumn or after frost, equipment such as a broadcast seeder can be used. Freeze-thaw cycles will prepare the seeds for germination and work them into the ground. Prairie seeds need to be planted in the dormant season. If the area is small, farmers can plant seeds by hand.

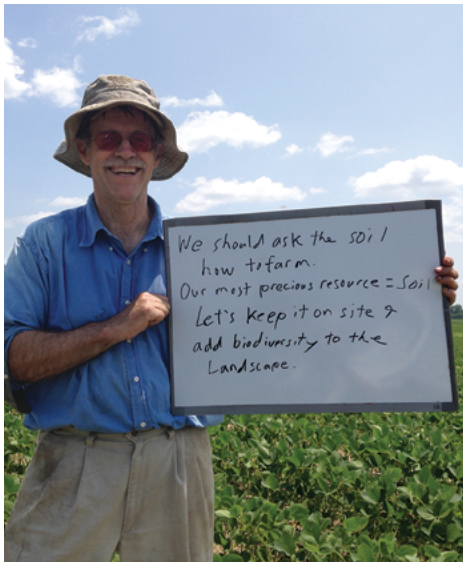
For springtime planting, farmers may use a prairie seed drill to avoid losing seeds to birds and wildlife. They should drill prairie seed directly into soybean, corn, or cover crop residue, no deeper than one-quarter inch with good seed-to-soil contact. Spring plantings are most successful if conditions are moist for the first three to six weeks.

Maintaining prairie strips

Native prairie plants establish slowly, so in the first growing season they can be out-competed by annual weeds. Weeds can be suppressed by mowing the prairie strips three or four times the first year, when the tallest vegetation reaches one foot tall. The mower should be set to cut at six inches. A diverse mix of prairie species with an approximately equal ratio of grasses to wildflowers and seeded at 40 seeds per square foot can fill all available root space in the soil and reduce available space for weeds to germinate.

In the second year, the strips can be mowed one or two times at the height of eight inches to suppress any remaining weeds and to encourage the prairie plants to thrive. After prairie plants are established, farmers should remove the top growth once every one to two years to prevent invasion of woody species. Mowing or burning in the fall is not ideal as it removes valuable winter cover for wildlife habitat. Fall burning can be done to remove thatch, but no more than half of the prairie strip should be burned at one time. Burning should not be conducted until the fall of the second growing season, or spring of the third growing season. A private lands biologist (Farm Bill biologist) can help with planning a prairie strips burning.

Once the prairie plants are established, they are highly competitive against annual weeds. Research data have shown no significant difference in weed cover in cropland next to the prairie strips compared to cropland without prairie strips. Prairie plants are unlikely to become weeds within cropland where herbicide is applied.



Harvesting or grazing the prairie strips

Farmers can use material harvested from prairie strips in many ways. After mowing, prairie clippings can be used as livestock bedding. They also could supply biomass feedstock for future markets. These are suitable uses for plants at the late stage of their yearly life cycle because grasses and forbs are low in nutrients after frost.

Prairie strips also can be managed specifically for haying, which requires attention to nutrient concentrations. The wildlife value of prairie strips will be compromised with haying. Early season haying negatively impacts nesting birds while late summer and early fall haying compromises their value for monarch butterflies, honey bees, and other pollinators. Prairie strips should not be grazed during the first two growing seasons.

Some farmers harvest and sell the native prairie seeds from their prairie strips. In this case, extra attention should be given to eliminating weeds during prairie strip establishment and prior to seed harvest.

For beef or dairy cattle growers, rotational or high-intensity grazing can help maintain prairie diversity. Native warm-season grasses planted in "paddocks" or strips will create valuable grazing in the summer when cool-season pastures need rest and recovery.

Getting financial or technical support

Iowa landowners can receive financial support and technical assistance from these programs:

- USDA Farm Service Agency offers annual cost-share and incentive payments through the Conservation Reserve Program CP-43 Prairie Strips practice: www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index
- Environmental Quality Incentives Program may assist with prairies to be harvested or grazed: www.nrcs.usda.gov/wps/portal/nrcs/main/ia/programs
- US Fish and Wildlife Partners Program works with landowners to restore wildlife habitat: www.fws.gov/midwest/partners
- Resource Enhancement and Protection awards small grants for soil and water protection: www.iowadnr.gov/Conservation/REAP
- Pheasants Forever funds habitat projects including native prairie seedings: iowapf.net/NativeGrassProgram.aspx
- Trees Forever funds pollinator projects: www.treesforever.org
- Plant Iowa Native maintains a list of prairie seed suppliers and contractors who can provide custom planting services: tallgrassprairiecenter.org/pin-resources

Learn more about prairie strips

These resources offer additional information on prairies and prairie strips:

- A full list of STRIPS project partners can be found at www.nrem.iastate.edu/research/STRIPS/content/partners
- Tallgrass Prairie Center website: tallgrassprairiecenter.org
- This and other publications can be found on the ISU Extension Store: store.extension.iastate.edu
- Fields with prairie strips are located at the Iowa State University Research and Demonstration farms across the state: farms.ag.iastate.edu/farms
- Prairie strips research fields are located at the Neal Smith National Wildlife Refuge, Prairie City, Iowa: www.fws.gov/refuge/neal_smith

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