STRIPS 2020 LANDOWNER REPORT

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

SMALL CHANGES, BIG IMPACTS!

In 2020, the STRIPS Team continued to work towards our mission: to understand the assembly, management, function, and value of prairie strips and to communicate our results to diverse audiences. Thanks to the efforts of our team and partners, we were able to successfully adapt to the conditions of the COVID-19 pandemic and continue to hold events virtually. We also continued our field work, although traveling restrictions made some logistics difficult, it only confirmed that our passion for science motivates us. Our team of scientists, educators, farmers, and extension specialists are currently studying soil, water, plants, pollinators, vertebrate wildlife, antimicrobial resistance, economics, and farmer adoption. To date, STRIPS has 120 publications including 61 peer-reviewed articles, 20 theses, and six dissertations. We've been featured on the news nearly 400 times and have presented over 520 times to a global audience. Of course, our success is due to our partnerships with landowners, farmers, and our supporters; STRIPS thanks you, partners!

We've gained additional support from the Bia-Echo Foundation, 11th Hour Project, and CropLife Foundation. These supporters will help us accelerate the adoption of prairie strips to a regional scale. Over the course of the next three years we will expand on our comprehensive engagement, outreach and professional development program. We will formalize regional partnerships and expand our programming to serve farmers, farmland owners and farm advisers in the Midwest region, including underserved members such as women farmland owners. Enhancing awareness of the prairie strips farmland conservation practice to a regional scale will improve conservation outcomes on tens of thousands of acres of farmland across the Midwest.

We've also begun exploring market development for prairie. How can prairie add additional value to row crop agriculture? Can prairie strips be used as corridors for wildlife habitat to connect farmland that would otherwise be fragmented? Could those corridors serve as multifunctional roads to transport livestock to cover crops? Could the prairie biomass be incorporated into digesters to produce biogas? Can prairie strips play a role in agroforestry and silvopastures? We are perennially inspired by the resiliency of the prairie and its diversity lends itself to seemingly limitless opportunities that we're continuing to explore through science-based trials. 2021 is slated to be an exciting year, no doubt.

This year our report is focusing on a few highlights. If you have specific questions please reach out to us at prairiestrips@iastate.edu.

-Omar de Kok-Mercado
STRIPS Project Coordinator

PRAIRIE STRIPS IN THE CONSERVATION RESERVE PROGRAM GREW TO 9,562 acres*

*These acres are minimums reported by the USDA Farm Service Agency.

PRAIRIE STRIPS & GOVERNMENT COST-SHARE!

There are a lot of options if you want to receive financial assistance to plant prairie on your land. The process with the USDA can be confusing so let us highlight a few basics:

1. To be considered for eligibility your land must have a resource concern. A resource concern is an expected degradation of the soil, water, air, plant, or animal resource base to an extent the sustainability or intended use of the resource is impaired. Your land must have a cropping history.

2. The Conservation Reserve Program (CRP) is administered by the Farm Service Agency (FSA) and the Natural Resources Conservation Service (NRCS) administers the Environmental Quality Incentive Program (EQIP) and other programs. The NRCS provides the technical assistance for CRP.

3. Prairie Strips in CRP is standardized by policy and is designated as CP-43 Prairie Strips. General sign-up CRP is a competitive process that is available during specific enrollment periods. CP-43 is designated under continous sign-up, so enrollment is available at any time.

4. EQIP cost-share for prairie strips is not standardized by policy. Other practice standards that exist that could meet the criteria of prairie strips are 327 Conservation Cover, 332 Contour Buffer Strips, 386 Field Border and 393 Filter Strip.

PUBLICATIONS

Arbuckle, J. Gordon Jr., "Iowa Farm and Rural Life Poll: 2020 Summary Report" (2020). Extension Report. 3094. Iowa State University Extension.

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Damiano, L., Niemi, J., "Quantification of the impact of prairie strips on grain yield at the Neal Smith Wildlife Refuge" (2020). Department of Statistics. Iowa State University.

de Kok-Mercado, O., "Prairie strips in one minute: a six-part series" (2020). Iowa State University.

de Kok-Mercado, O., STRIPS Team, "2019 STRIPS Landowner Report" (2020). Iowa State University.

Flater, Jared S., "Understanding soil bacterial communities for sustainable agriculture" (2020). Graduate Theses and Dissertations. 18311. https://lib.dr.iastate.edu/etd/18311

Kordbacheh, F., Liebman, M., & Harris, M. (2020). Strips of prairie vegetation placed within row crops can sustain native bee communities. PloS one, 15(10), e0240354.

Prokopy, L. S., Gramig, B. M., Bower, A., Church, S. P., Ellison, B., Gassman, P. W., ... & Ulrich-Schad, J. D. "The urgency of transforming the Midwestern US landscape into more than corn and soybean" (2020). Agriculture and Human Values, 37, 537-539. **other related publication of interest*

Schulte Moore, L., Bradbury, S., O'Neal, M., Toth, A., Tyndall., J., Dolezal., A., Hseih, E., "Prairie strips help honey bees and wild pollinators" (2020). FFAR Infosheet. Iowa State University.

STRIPS Team, "Prairie strips mitigate the spread of AMR" (2020). AMR Infosheet. Iowa State University.

Smith, C., de Kok-Mercado, O., "Prairie strips and transmission corridors" (2020). Fact Sheet. Center for Rural Affairs.

Tamburini, G., Bommarco, R., Wanger, TC., Kremen, C., van der Heijden, MGA., Liebman, M., Hallin, S., "Agricultural diversification promotes multiple ecosystem services without compromising yield" Sci Adv. (2020). doi: 10.1126/sciadv.aba1715.**other related publication of interest*

Zhang, Ge., "Honey bee nutritional health in agricultural landscapes: Relationships to pollen and habitat diversity" (2020). Graduate Theses and Dissertations. 18257. https://lib.dr.iastate.edu/etd/18257.

Zhang, Ge., A., St. Clair., A., Dolezal, A., Toth, M., O'Neal, "North American Prairie Is a Source of Pollen for Managed Honey Bees (Hymenoptera: Apidae)", Journal of Insect Science. doi.org/10.1093/jisesa/ieab001.

IN THE MEDIA

Iowa Public Radio, "Iowa State researchers' prairie strips now part of federal conservation program" January 20th, 2020.

Successful Farming, "The power of prairie: a dynamic resource is put to work to conserve the land" January 24th, 2020.

Ag Web Farm Journal, "Wisconsin farmer receives national conservation legacy award" March 1st, 2020.

PBS News Hour, "How women in Iowa are leading farmland conservation efforts" March 7th, 2020.

Successful Farming, "Mother Nature rules. So why not follow her lead?" March 9th, 2020.

Successful Farming, "Enhanced cost-share available for prairie strips" March 23rd, 2020.

Iowa Public Radio, "Prairie research could help farming become more resilient, sustainable" March 26th, 2020

Soil and Water Conservation Society, "STRIPS Team awarded Conservation Innovation Award" June 29th, 2020.

Iowa Farmer Today "Prairie strips play multiple roles on farm" July 3rd, 2020.

Wallaces Farmer "Conserve your farmland with prairie strips" July 9th, 2020.

The Conversation "Smaller fields can reduce biodiversity loss and increase wild plants, birds, beetles, and bats" July 10th, 2020.

National Public Radio "How absentee landowners keep farmers from protecting water and soil" July 14th, 2020.

USDA "Busineswoman turned farmer earns 2020 Iowa Conservation Woman of the Year" August 30th, 2020.

The Gazette "Help is available for Iowa farmers doing prairie restoration" August 31st, 2020.

Wallaces Farmer "Prairie strips: interest strong and growing" September 3rd, 2020.

The Conversation "To save threatened plants and animals, restore habitat on farms, ranches and other working lands" October 29th, 2020.

Anthropocene "In the most comprehensive study to date, researchers found that greener farming methods don't compromise yields" November 20th, 2020.

Conservation Corridor "Integration of a grazing network into row crop agriculture" November 30th, 2020.

Successful Farming "Lighting a fire for farm conservation" December 12th, 2020.

Students, Ellen Audia (top) and Jordan Giese (bottom) conducting vegetation surveys in prairie strips.

RESEARCH HIGHLIGHT

PRAIRIE STRIPS HELP HONEY BEES AND WILD POLLINATORS

BACKGROUND:
This project tested in a multi-year, on-farm experiment if the prairie strip practice improves honey bee-keeping while maintaining a community of wild pollinators compared to farms without them.

GOALS:
Measure availability of flowering plants in prairie strips.
Determine if honey bee productivity improves with access to prairie.
Compare the insect pollinator community in fields with and without prairie strips.
Provide farmers and landowners tools to take advantage of this new practice.

FINDINGS:
Prairie strips within or adjacent to crop fields provided forage for pollinators throughout the growing season, especially in late summer for honey bees. New findings show prairie strips increased wild plant-bee interactions, increasing the opportunity for pollination, supporting specialist plant and bee species, while reducing the foraging effort of select bee species. Overall, prairie strips provide a more balanced diet and better nutrition for native bee species and honey bees. Prairie strips produced more flowering plants, especially in the late summer when more Monarch butterflies were observed in farms with strips than without. This seasonal dynamic was observed in the honey produced by honey bees kept at farms with and without prairie strips.

WHAT IT MEANS FOR FARMERS:
Conserving pollinators, especially honey bees, can be achieved by integrating prairie into farm land. Prairie strips also reduce the loss of sediment and nutrients from farms. By employing this one practice, farmers and land owners can achieve multiple conservation goals.
Federal funding for establishing prairie strips is available through the Conservation Reserve Program and Environmental Quality Incentives Program. Contact a local USDA Service Center to sign up for cost-share.
Our online support tool(PT2) can help landowners get the most out of this practice.
Beekeepers in need of sites to keep colonies may see improvements in honey production on farms with prairies strips compared to farms without native plants.
This is an active area of research.

NEXT STEPS:
Field work is complete. Lab experiments exploring impacts of interacting stressors on bee health are nearly done. Data summarized in articles will be shared with scientist, farmers and the general public. These results will inform future efforts to improve honey bee health. We've also received funding to investigate the feasibility of beekeepers using prairie strips for honey production, marketing sustainabilty-focused "prairie strip honey" and the potential relationship between landowners with prairie strips and honey beekeepers.

Prairie strips at the Iowa State University Armstrong Research and Demonstration Site near Lewis, Iowa. We conducted a burn in December of 2020.

PARTNERS
Tallgrass Prairie Center

ASSESSING SURFACE AND DRILL SEEDING METHODS:

Photo Courtesy of Justin Meissen

Both broadcast and drill seeding methods are commonly employed to establish tallgrass prairie vegetation, but is one more cost effective than the other given the high price of seed? Does surface seeding favor small seeded species that may easily be buried or rely on light to germinate? We installed a demonstration site with a completely randomized design consisting of four replicates in May 2019. We randomly assigned a seeding method, surface seeding or drill seeding, to each plot. We used a seed mix with 31 species of contrasting seed sizes, where we included small-seeded species (defined as having 1,058 seeds/g or greater) at approximately 10 times the rate of large-seeded species (defined as having 423 seeds/g or fewer). We found that surface seeding is a more cost effective method than drill seeding when it comes to small seeded species. Small seeded species were roughly twice as abundant in surface-seeded compared to drill-seeded treatments. Though small seeded plants were more abundant, both methods still produced stands with similar native cover and species richness. Our research shows that to improve establishment and cost effectiveness, prairie strip seed mixes should be sown in planting equipment that allows large seeded species to be drilled into the ground while small seeds are placed on the surface (most native seed drills can be modified or calibrated to achieve this).

OPTIMIZING THE GRAMINOID COMPONENT OF PRAIRIE STRIPS:

In our previous seed mix design research, we found that a graminoid/forb balanced seed mix is both multifunctional and cost-effective. However, the specific composition of graminoids in the seed mix will likely impact ecological outcomes. The seed mix used in our previous study consisted of diverse grass and sedge species; however, cost considerations typically simplify the composition of grasses in seed mixes to lower-cost, warm-season (C4) grass species. Previous studies have demonstrated that high seeding rates of C4 grasses can lead to grass dominated stands where forbs do not persist. This not only wastes money spent on forb seed, but increases susceptibility to weed invasion and reduces the benefits to wildlife. We established a new demonstration site at Roadman Farm to investigate whether ecosystem benefits will be maximized by limiting the seeding rate of certain dominant C4 grasses, while increasing the seeding rate of C3 grasses, sedges, and smaller C4 grasses. We began planting the site in November 2020, and will complete the seeding in May 2021.

-Justin Meissen
Research and Restoration Program Manager

Tim Youngquist (top) and crew (bottom) burning prairie strips at the ISU Armstrong Research and Demonstration Farm in December of 2020.

PARTNERS
Sand County Foundation

MODELING THE WATER QUALITY BENEFITS OF PRAIRIE STRIPS IN WISCONSIN: Farmers in Wisconsin are asking if the soil and nutrient runoff reductions measured from prairie strips in Iowa will be similar here in America's Dairyland. With no such research yet underway on Wisconsin farms, we turned to modeling to estimate prairie strip performance on soils and landforms common to our state.

The Soil Nutrient Application Planner (SnapPlus) is a software tool used on farms across Wisconsin to inform manure and fertilizer application decisions and protect water quality. SnapPlus calculates soil and phosphorus runoff losses on a field-by-field basis. Users can select "Filter Area" options for a strip of cool-season grass of either 30' width at the footslope or 15' width in-field on the contour. Dr. Laura Ward Good, leader of the SnapPlus project at the University of Wisconsin Soil Science Department, ran the program's models using the soils, slope and field management data from the STRIPS research trials at the Neal Smith Wildlife Refuge. Her analysis found modeled results to be reasonably close to the measured values, with SnapPlus estimating sediment and phosphorus trapping efficiencies of 87% and 85%, respectively.

These results gave us confidence in using SnapPlus to estimate runoff reductions from prairie strips on Wisconsin farms. To date we have applied the program on three farms with prairie strips, comparing results with versus without the Filter Area options enabled. Modeled phosphorus trapping from strips vary from minimal (no-till cash grain/hay operation), to 27% (conventional cash grain with manure application), to 50% (strip-till cash grain operation). Reduction efficiencies for sediment were slightly higher than for phosphorus on each farm.

We will model additional farms in the coming year. Future needs for Filter Area options in SnapPlus include adding native perennial grass/forb vegetation communities and additional prairie strips configurations, and to research effect of prairie events on runoff over frozen ground and on nitrogen leaching.

You can find out more details at our website: www.sandcountyfoundation.org.

-Craig Ficenec
Program Director

Jordan Giese, PhD student, monitoring pheasants at a STRIPS research site.

FOR MORE INFO VISIT

WWW.PRAIRIESTRIPS.ORG