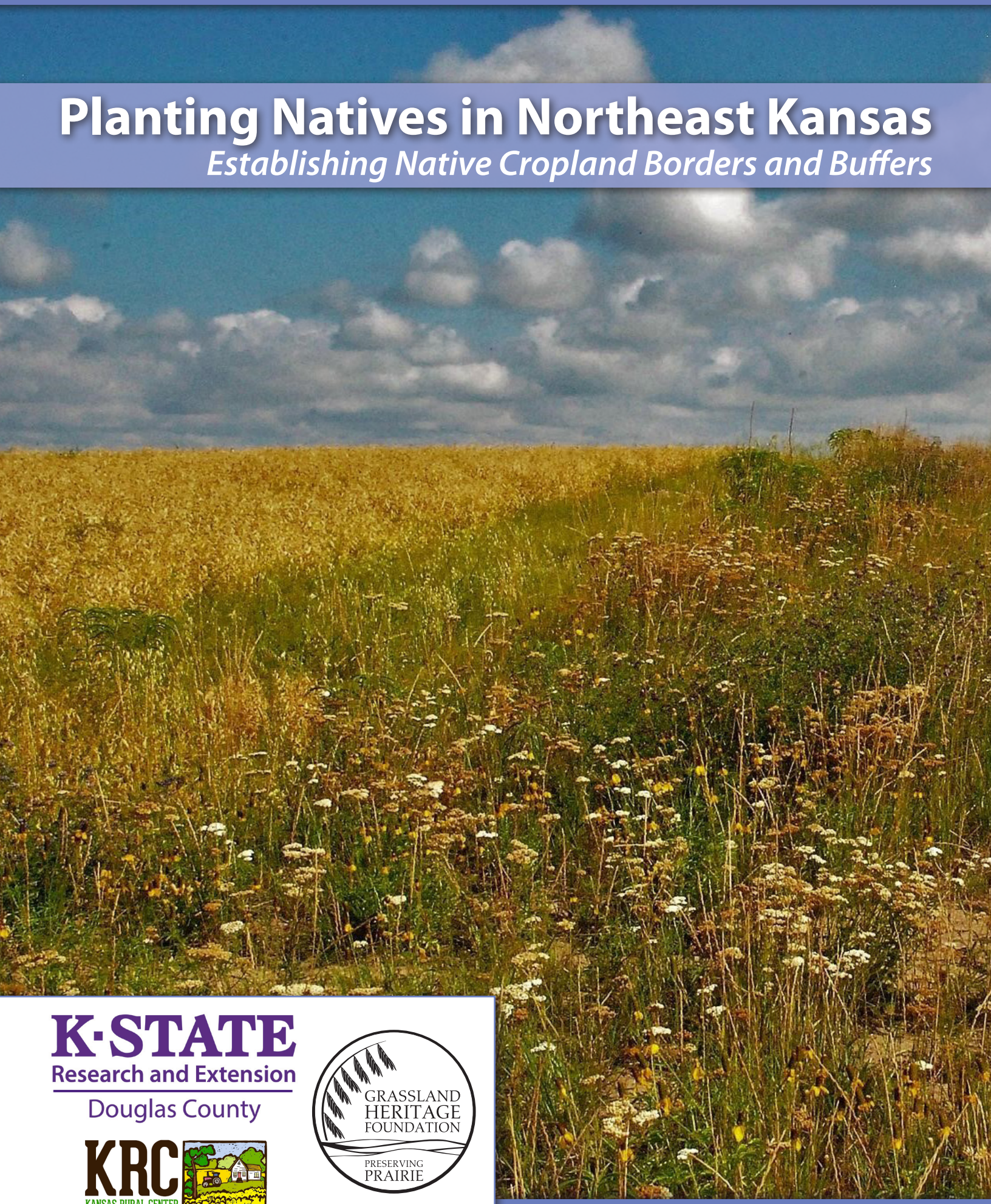
Planting Natives in Northeast Kansas

Establishing Native Cropland Borders and Buffers



K-STATE Research and Extension
Douglas County

KRC
KANSAS RURAL CENTER

GRASSLAND HERITAGE FOUNDATION
PRESERVING PRAIRIE

PLANTING NATIVES IN NORTHEAST KANSAS

ESTABLISHING NATIVE CROPLAND BORDERS AND BUFFERS

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Visit The Companion Website – Native Kansas

A companion website includes a link to this document as well as pictures, interviews with property owners, plant lists, and many other resources to help you with your native planting project. Go to: plantnativeks.org

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Additional Copies
A copy of this guide may be downloaded free of charge at: plantnativeks.org

FOREWORD

Planting Natives in Northeast Kansas is a unique collaborative effort between K-State Research and Extension - Douglas County (KSRE), the Grassland Heritage Foundation (GHF), and the Kansas Rural Center (KRC) to pull together information on and resources for integrating native plants into your landscape, whether it be in your backyard or back 40 acres. Interest in native plants is growing. Evidence for this appeal includes an increased number of native plant sales and selection of natives at garden centers, a flourishing industry of native plant nurseries and seed suppliers, and a swelling demand for information from the public. In recent years, calls to our respective organizations for help and advice on planting native plants, creating pollinator habitats, or restoring prairie have multiplied. This publication is specifically designed for those in the northeast corner of Kansas who wish to plant natives but do not know where or how to start. While the plants, timelines, and resources mentioned in this guide are specific to northeast Kansas, the general principles and methods for planting natives apply not only to the entire state of Kansas but to the whole of the grassland biome in the United States.

For more than a century, KSRE has brought horticultural and agricultural science to landowners. Increasingly, backyard gardeners call or visit the County Extension office for information on native plants, particularly those that attract pollinators. Larger property owners seek advice on converting extensive lawns into pretty meadows or turning old pastures and cropland into prairie habitat. GHF works to preserve tallgrass prairie in eastern Kansas through education, stewardship, and land protection. Founded in the 1980s in an effort to preserve prairie in Johnson County KS, today the organization owns and manages multiple prairie properties and has educated thousands of Kansans about the prairie ecosystem. KRC has long been an advocate for sustainable farming and responsible land use. Founded in 1979, KRC works to promote a farm and food system that is ecologically sound, economically viable and socially just.

This guide for planting native plants compliments many existing resources, including prairie restoration guides available from other mid-western states such as the *Tallgrass Prairie Center's Guide to Prairie Restoration* (Iowa), *Reconstructing a Tallgrass Prairie: A Seeding Guide for Missouri*, and *A Guide to Prairie and Wetland Restoration in Eastern Nebraska*. In Kansas, publications on planting natives are available from Kansas State University, the Kansas Department of Wildlife, Parks and Tourism's Habitat First program, and the Kansas Biological Survey. The Xerces Society's publication *Pollinator Meadows from Seed* is also an excellent resource.

The number and variety of resources available are such that landowners may feel overwhelmed by the process of converting their gardens, lawns, and fields to a landscape filled with natives. In this guide, landowners will find plant recommendations and resources specifically for northeast Kansas. The guide is designed to put necessary information all in one place – instructions, plant lists, plant and seed providers, available financial and planning assistance, reference gardens and prairies, and tips and advice from local landowners who have experience. There is also a companion website with pictures and up-to-date information.

No matter your goal, no matter the size of your property, there is a section of this guide designed for you, including:

- ✓ backyard gardeners
- ✓ property owners wanting to convert old pastures and cropland to prairie vegetation
- ✓ do it yourself landscapers
- ✓ professional landscapers
- ✓ landscape architects desiring to enhance the sustainability and diversity of corporate landscapes
- ✓ suburban property owners wishing to convert traditional lawns
- ✓ schools wishing to install native gardens for education and beauty
- ✓ farmers wanting to enhance crop production and water retention

Choose from one of five publications specific to your goals.

Gardening with Native Plants
For those wishing to tuck some native plants into existing gardens or plant a small front yard or backyard native garden.

Landscaping with Native Plants
For those wishing to replace cool-season lawns, create large native gardens, or establish native wildflower meadows up to an acre in size.

Reconstructing Prairie
For those wishing to reconstruct prairie on old fields, pastures, or cropland.

Establishing Native Cropland Borders and Buffers
For those wishing to plant native forbs and grasses to border croplands in the agricultural landscape.

Restoring Prairie Remnants
For those wishing to restore or enhance degraded, remnant prairies.

Appendices: plant lists, assistance for landowners, places to see prairies and native plantings, and additional resources.

Adding native plants to your landscape, regardless of size, will enhance its beauty, its ability to support native wildlife, and its resiliency.

Thank you.

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ESTABLISHING NATIVE CROPLAND BORDERS AND BUFFERS

INTRODUCTION

Cropland borders and buffers are areas of land bordering a crop field that are planted to permanent vegetation. The vegetation consists of grasses, forbs (wildflowers), legumes, and sometimes shrubs and trees. Cropland borders are planted on one or more edges of a crop field and often involve converting existing cropland back to native vegetation but can also be created by converting grass or woody vegetation to native grasses and forbs.

Cropland borders or buffers are planted to reduce run-off from agricultural fields, increase biodiversity on the farm, provide habitat for wildlife, pollinators and other beneficial insects, and establish a buffer from external elements such as chemical drift.

By reducing run-off from agricultural fields, cropland borders protect water quality by trapping or filtering sediment and other pollutants that are present in the run-off. Sedimentation is an enormous issue in many streams, ponds, and reservoirs in agricultural landscapes, threatening municipal and rural water supplies, reducing water supplies for livestock, and impacting fish, wildlife, and recreation opportunities.

Agricultural chemicals in run-off pose serious threats to aquatic environments, harming aquatic invertebrates and promoting toxic algal blooms that diminish or destroy the health of these ecosystems. Aquatic invertebrates are a critical part of food webs and impacts to these species have serious ramifications for wildlife. Excess fertilizer in agricultural run-off contributes to the occurrence of "dead zones" along the Gulf Coast. In addition to impacting wildlife, agricultural pesticides are frequently found in human water supplies.

Cropland borders and buffers increase biodiversity, improve soil health, and provide habitat for wildlife, pollinators, and other beneficial insects. Cropland borders increase yields in neighboring crops through increased pollination services. They also provide natural pest control by attracting populations of beneficial insects that prey on crop pests, helping to minimize or eliminate the need for harmful pesticides.

Cropland borders and buffers can also provide some protection from pesticide drift for neighboring crops. However, build-up of pesticides in cropland border plant tissues can be harmful to the pollinators, beneficial insects, and wildlife that utilize the border as habitat.

Utilizing native grasses and forbs in cropland borders and buffers provides additional benefits for the farmer and the environment when compared to other vegetation. Native grasses are particularly effective at storing carbon, an important step in mitigating climate change. Native plants also have a disproportionally large impact on reducing runoff and sediment when compared to other vegetation. This is because native prairie plants have very extensive roots which hold the soil in place, provide structure, and allow water to permeate the soil, trapping sediment and other pollutants very effectively.

Additionally, native plants provide critical habitat for native pollinators. Many native pollinators are specialists, meaning they rely exclusively on certain plant species for their survival. Planting a wide diversity of native grasses and flowers helps to ensure that plant species with which native pollinators have evolved over the millennia are available to them, contributing to the survival of both the pollinators and the plants.

Native prairie adds diversity and provides a range of benefits when bordering croplands. (Photo: J. Will)

ESTABLISHING A NATIVE PRAIRIE CROPLAND BORDER OR BUFFER

DEFINING YOUR GOAL

The first step in the process is to define your goals for the prairie border or buffer. Depending on whether you are installing a native border or buffer to reduce run-off, attract beneficial insects, provide habitat for wildlife or pollinators, or increase biodiversity on your farm, your planting strategy and seed mix may vary. See the various publications and technical guides listed under *References* to find the mix of plants best suited to your goals.

A few other things you will need to consider when creating a plan for your cropland border or buffer are a ground preparation strategy, planting dates, and maintenance strategies and schedules.

COST-SHARING

Planting native vegetation and installing cropland borders and buffers are conservation practices eligible for cost-share through several agencies and organizations (see Appendix A). Planting native grasses and forbs can be a relatively expensive undertaking, so the prospect of offsetting out-of-pocket investments can be attractive. Utilizing technical assistance from the organizations and agencies that specialize in planning and implementation of these conservation practices is useful regardless of whether you choose to apply for cost-share. Technical assistance can include ground preparation and seed mix recommendations specific to your site. A possible downside in utilizing cost-share is that you may be required to follow parameters set out in the program that don't suit your needs as precisely as you'd like.

For information on cost-share programs that include cropland borders and buffers, please see Appendix A.

GENERAL CONSIDERATIONS

Many of the principles for implementing native plant borders and buffers will be similar to those for planting a moderate acreage of prairie that does not border a crop field. A few considerations that will make your border as beneficial to you and the environment as possible include the following:

- If possible, plant borders on all sides of the field to maximize the benefits derived from the border.
- Include grasses and forbs that provide diverse pollen and nectar sources to help support pollinator populations.
- Include legumes (nitrogen-fixing plants) to increase soil health and quality, plant diversity, and benefits to wildlife.
- Select plant species and seed mixes suited to your geographic location and soil type.
- Wider strips are generally better. Borders of 30-35 feet or more will provide better habitat for wildlife and increase other benefits as well. Borders of larger widths are also more easily managed with large farm equipment, if that is what is available.

If you are using cost-share, there may be required parameters such as prescribed seed mixes, minimum planting areas, and maintenance practices and schedules.

If your primary goal is to reduce run-off, consider consulting with a local or state conservation agency that offers technical assistance. Your local NRCS office or your county conservation district is a good place to start.

If your primary aim is to attract beneficial insects, provide habitat for pollinators and wildlife, or buffer your crops from drift, consult an organization or individual that specializes in habitat implementation. A list of some of these organizations can be found under in Appendix A.

SITE PREPARATION

Eradicating current vegetation and controlling future weeds are the primary concerns when preparing your site for native grasses and forbs. Recommendations for how best to accomplish these tasks vary depending on who you ask. Combining advice from a number of sources, we have outlined some general guidelines for site preparations.

Most sources agree that it is best to start preparations a year or two ahead of planting your native seeds.

Converting Cropland to a Native Prairie Border or Buffer

If planting into land that is currently being used for agricultural crops, there are a few options for preparing the site.

- Plant cover crops or small grains for the year or two prior to planting native seeds. Crops such as wheat, barley, oats or radishes help reduce weeds without use of herbicides, either by suppression or with the aid of cultivation. In addition to controlling weeds, these crops build soil organic matter, benefitting your prairie planting.

- Plant native grass and forb seeds directly into the stubble of a fall-harvested crop such as sorghum. In this case, except for the standing stalks of the previously harvested crop, the seedbed should be relatively free of competing non-native grasses and other weeds, and there should be ample bare soil. If an herbicide is needed to control weeds, check the label to be sure it won't inhibit germination of the native seeds. Also be sure that any herbicide that was used on the previously harvested crop will not impact the germination of the native grass and forb seeds.

Planting into Brome, Fescue or Other Cool-Season Grasses

If planting into brome, fescue or other cool-season grasses, you will need to eradicate the existing vegetation. This is usually done through mowing, haying, or burning in late summer, followed by application of an herbicide or cultivation in the fall. Check herbicide labels to be sure the herbicide won't inhibit the growth of the native seeds. Allowing at least a week to ten days between herbicide application and seeding is typical. You will need to take care that any herbicide you apply will not impact existing crops or future crops to be planted nearby.

Once existing vegetation is eradicated, native seeds can be drilled into the dead residue with a no-till drill.

If you don't want to use herbicides, it is possible to get rid of existing vegetation by utilizing mechanical cultivation, although this can be less effective than herbicides for eliminating heavy sod or highly persistent weeds. Cultivation can result in erosion and provide an excellent seed bed for weeds to establish so it is important to plant a cover crop after cultivation. Cover crops such as barley, wheat or sorghum are good choices.

Crops such as sorghum can be used to help control weeds when planting native grasses and forbs. (Photo: J. Will)

Both USDA-NRCS and The Xerces Society for Invertebrate Conservation have excellent resources available for establishing native prairie without the uses of chemicals. Please see *References* or refer to the *Reconstructing Prairie* section of *Planting Natives in Northeast Kansas*.

Removing Woody Vegetation

If the area you plan to convert includes many woody plants, you should remove them before you begin herbaceous vegetation control (see site preparation steps above) as you will likely have a number of additional weeds spring up once you remove the shade cast by shrubs and small trees.

Shrub removal and control is a perennial commitment. There will always be a bird flying overhead or a mammal scurrying over your property to drop a seed. However, shrub control can become a manageable task through regular burning and/or mowing (see under *Maintenance*). This section will address the initial removal of woody vegetation.

Mechanical Removal

If you have a large area covered with numerous shrubs, use a brush hog attached to a tractor (or hire a service) as a time-saver. If you have a manageable number of shrubs and small trees, a hand-held brush cutter is a good tool to use.

Many of the shrubs and trees that invade old fields and pastures in Kansas will re-sprout after cutting. In sprouting species, new shoots arise from dormant buds at or below the ground often resulting in a multi-stemmed clump. Common trees in Kansas that re-sprout include cottonwood, elm, oaks, Osage orange (hedge), black and honey locust, and Russian olive. Re-sprouting shrubs include smooth sumac, buckbrush, and roughleaf dogwood.

Mechanically controlling each of these re-sprouting trees and shrubs will mean cutting every year. When combined with burning, many will eventually weaken but the effort will be time consuming and costly for larger areas. Also, if you've had to remove a dense collection of shrubs, it might take two or more growing seasons to accumulate enough grass cover to carry a fire.

Red cedars cut close to ground level will not re-sprout. Burning and mowing in subsequent years will prevent new cedars from establishing. If the cedars are small (less than two feet) you can mow (brush hog), cut, or burn. Bigger trees can be removed with a chainsaw or a tree shear.

Mechanical Plus Chemical Removal for Trees and Shrubs that Re-sprout

Cut the shrub or tree and treat the stumps with an herbicide labeled for such a purpose (certain formulations of glyphosate can be used). Stump treatment is not necessary for red cedar. Cutting and treating the stump with an herbicide is far more effective at controlling woody invaders than cutting alone - you won't have to battle re-sprouting shrubs each year. Cut and treat stumps in the late summer or fall. Treat stumps as soon as they are cut, before the surface of the stump dries. You can find publications that include a comprehensive list of chemicals for stump treatment and advice on treating particular species in the reference section below.

Once you have removed woody growth, proceed with site preparation as you would an old field or pasture as described above.

Illinois bundle flower and Indian grass in a native prairie border. (Photo: J. Will)

CHOOSING A SEED MIX AND SOURCING SEED

Your seed mix will vary depending on location, soil type, and your goals for the native prairie buffer. A forb-heavy mix will benefit pollinators to a greater extent, while a grass-heavy mix might be more efficient for reducing run-off and filtering sediment and pollutants.

Commonly planted native grasses in Kansas include big bluestem, little bluestem, switchgrass, Indiangrass, and sideoats grama. Common forbs include maximilian sunflower, Illinois bundleflower, partridge pea, purple prairie-clover, and prairie coneflower. However, there are many more native forbs and grasses that can be incorporated into your prairie border or buffer and planting a greater diversity of species will offer a wider range of environmental benefits.

Nationwide there are many native plant nurseries that can customize a seed mix for you based on desired species or the unique characteristics of your site. However, it is best to buy seed from a supplier that not only carries species native to northeast Kansas but also grows them in this general region. K-State recommends purchasing seed grown no more than 400 miles to the south (southern border of Oklahoma) or 150 miles to the north (Nebraska City). While a nursery in Oregon might have species native to Kansas, the plants grown in Oregon may not be adapted to the conditions found in Kansas. Regional plants are adapted to regional conditions. You can also purchase seed from the Conservation District and the Kansas Department of Wildlife, Parks, and Tourism (KDWPT). Sources for regionally grown native plant seeds are listed in Appendix B and on the companion website.

If you have chosen to utilize a cost-share program to help cover the cost of implementing a cropland border, it is likely that you will need to follow the seed mix requirements of the agency through whom you are receiving funds.

Seeding Rate

For small areas and broadcast seeding, the total seeding rate should be 9 to 12 pounds pure live seed per acre. If a grassland drill is used, 6 to 8 pounds pure live seed per acre is adequate. Recommended amounts for various species are listed in the table below.

Seeding Rates for Native Plant Species that are Recommended for Eastern and Central Kansas
(Owensby, 2015)

	POUNDS OF PURE LIVE SEED PER ACRE	
SPECIES	DRILLED	BROADCAST
Big bluestem	1.5 – 1.75	2.5 – 3.75
Indiangrass	1.5 – 1.75	2.5 – 3.75
Little bluestem	1.0 – 1.30	1.75 – 2.5
Sideoats grama	1.5 – 1.75	2.5 – 3.75
Switchgrass	0.5 – 0.65	0.7 – 0.85
Native forbs	0.5 – 0.65	0.7 – 0.85

Illinois bundle flower and Goldenrod in a native prairie border. (Photo: J. Will)

PLANTING YOUR CROPLAND BORDER OR BUFFER

Once you have prepared the area adjacent to your crop field for planting your border and procured your seeds, you are ready to plant. Below are a few options outlined by conservation agencies involved in providing cost-share and technical support for implementing cropland borders. Nitrogen should not be added to the prepared field as it will encourage undesirable weed growth.

Recommended seeding dates for native grasses, forbs and legumes range from December 1st through May 15th. Many native seeds need a cold wet period of at least 30 days in order to break dormancy and germinate, a process called stratification. For that reason, it's usually not recommended to seed in the late spring or summer. Dormant seeding is a common seeding practice in prairie restorations, and it is exactly what the name implies – seeding while the prairie is dormant. Dormant seeding generally occurs late fall through early spring, but December and January are the ideal times. Seeding during winter helps stratify the seed and the cycle of freeze and thaw will help incorporate the seed into the soil. If you plant seed earlier in the fall, you'll need to increase the amount to make up for any lost to predation. Planting too early in the fall can also result in early germination and seedling death over the winter.

Advantages and Disadvantages for Spring Versus Dormant Season (Winter) Planting

Spring Planting

Higher seed germination for warm-season grasses, lower germination for flowers as compared to winter planting.

Surviving forb seeds may bloom in year two, after they have stratified* over the winter.

Wet weather may delay planting until the soil is dry enough to run equipment.

A dry summer will delay germination due to lack of moisture.

Dormant Season Planting

Higher forb germination.

Planting forb seeds in winter (November through January) will allow seeds to stratify*, increasing the chance of germination in spring.

Lower germination rates for grasses.

Seed predation might be higher over the winter.

**Stratification occurs when the seed experiences a cold, moist period that triggers the seed's embryo to grow and break through the seed coating, allowing it to germinate.*

It is possible to begin your prairie planting in the spring. Spring seeding should occur one month before the average last frost date to three weeks after the last average frost date (the average last frost date is April 9th). Refer to the table below for a list of advantages and disadvantages of spring and dormant season seeding.

Planting the Seeds with a No-till Drill

In most cases, cropland borders will be planted with a drill seeder, and most experts recommend seeding with a no-till drill into existing cover (stubble or cover crop).

A no-till drill opens rows of shallow slits in the soil and plants the seeds. The seeds are placed in boxes that are calibrated to release seeds into the slits at a set rate. The boxes and seeding rate options vary depending upon seed size. The advantages of using a no-till drill for seeding are better seed contact with the soil (no need to cultipack) and reduced seed predation.

When using a drill, it is very important not to drill the seed too deep, no deeper than ¼ inch. The drill must include a grass seed box with an agitator in order to allow the fluffy native grass seeds to flow through the drill. Setting the drill properly is very important, so it is wise to consult with someone who has expertise in using the drill if you are unfamiliar with it.

Your local NRCS office or county conservation district may have a seed drill available for rent. Be sure to check early to ensure availability and be sure that the seed drill will work for the fluffy seeds in native prairie seed mixes. See Appendix A for a list of agencies that may have equipment for rent and a list of contractors for hire.

Seeding by Hand

If planting in the winter, seeds can be broadcast by hand and allowed to work their way into the soil when it freezes.

To help spread seeds evenly by hand, mix your seed with a carrier – sand, sawdust, or rice hulls will work. You will need 2.5 cubic feet of carrier for 1,000 square feet of area to be planted. Dampen the carrier with water and then mix in your seeds. Divide your seed mixture in half. To ensure coverage of your whole planting area, spread one-half of your mixture walking in one direction and then cover it again with the second half while walking in a perpendicular direction. For example, walk west to east for the first pass and then north to south on the second pass. Try to cover the entire site with each half of the seed mixture. Remember to use a higher seeding rate if you hand broadcast, as predation by birds and rodents will likely be greater than would be if planting with a seed drill. After seeding, pack the soil by rolling over it with a cultipacker, tractor or your vehicle to ensure good contact with the soil.

MAINTAINING YOUR CROPLAND BORDER OR BUFFER

While it is generally recommended that the previous year's growth should be removed each spring (no later than mid-March) for the first several years, some experts recommend no mowing at all the first year after seeding.

After year one, mowing or fire can be used in early March to remove old growth. Your prairie planting should not be mowed at any other time during the first three years. Mowing after mid-March will negatively impact the forbs in your mix. Nitrogen fertilizer should never be used as it highly favors annual and perennial cool-season grasses and broadleaf weeds.

YEAR 1

If you choose to mow in early March, a flail mower is recommended as it will chop up the vegetation such that it will not smother the new prairie seedlings. You can mow to a height of 6 to 12 inches (recommendations vary) as prairie plants will be shorter and struggling in the shade of the non-native vegetation. Mowing the cool-season annuals in the spring allows more sunlight to reach the germinating native seeds and prevents the cool-season weeds from setting seed.

While your planting may look like a failure, native plants grow slowly and are likely establishing themselves.

YEAR 2

Early successional species (e.g. Canada wild rye, partridge pea, and black-eyed Susan) will be recognizable and may bloom. Unless there is considerable weed pressure, mowing is not necessary if you mowed in year one. Spot spraying can be used in year two if there are weedy areas.

YEAR 3 AND BEYOND

By the third year, most cropland borders will begin to resemble a diverse native tallgrass plant community. Mowing or burning in early March can be used to remove old growth and to control weeds, if necessary. Thereafter, maintenance will consist of monitoring and removing weeds and invasives as needed and mowing, haying, or prescribed burning of the buffer if desired. Note that mowing or haying will likely diminish the vigor of forbs in your prairie as mowing favors the native grasses.

If the buffer becomes dominated by weeds or invasive species, maintenance mowing, targeted grazing and, as a last resort, application of herbicide can be used to control them. Weeds and invasive species can be held in check by planting a diverse mix of native species in the initial planting and mowing in early March during the first year.

Key to maintaining a diverse and healthy prairie ecosystem is utilizing a diverse management plan. There are a few key elements of a successful management plan to keep in mind: 1) alternate management techniques, 2) alter the time of year you apply management techniques, and 3) maintain a portion of your acreage as a refuge for prairie fauna.

Once you have established a good stand of native vegetation, it is not necessary to burn or mow every year. If you plan on managing your property with fire, it is beneficial to let the prairie rest for at least one year in between burnings. Burning less than 2/3 of the total area in any given year will help pollinators, beneficial insects, and wildlife, and help retain native seeds. Burning or mowing once every three years or utilizing grazing animals (if allowed by your cost-share program) will help control woody invaders and cool-season grasses.

After the first three years, change the time of year you mow or burn so that a limited group of plants do not establish dominance. However, we do not advise mowing or burning between April 15th and July 15th if your buffer is large enough to attract grassland nesting birds. Grassland birds begin nesting in April and may be able to establish two broods by the end of July if undisturbed. To encourage warm-season grasses, burn or mow in the early spring – from late March to early April. To encourage native forbs, burn or mow in late summer, fall, or winter. *Note: Sericea lespedeza is encouraged by spring burning, so if you wind up with sericea in your prairie, you will need to forego spring burning. Fall burning is recommended, along with other control measures, for sericea lespedeza although there is no recognized treatment to completely eradicate it.*

RESOURCES

SITE PREPARATION

Establishing Native Grasses and Forbs

Spencer, Doug. USDA-NRCS, Kansas. Planting Native Grasses.

USDA-NRCS Establishing Native Grasses, Conservation Reserve Program Job Sheet CP 2. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_017880.pdf

Establishing Native Grasses and Forbs without Herbicides

Organic Site Preparation for Wildflower Establishment – The Xerces Society for Invertebrate Conservation - https://xerces.org/guidelines-organic-site-preparation/

Organic Site Preparation Methods: A Comparative Overview – The Xerces Society for Invertebrate Conservation - https://xerces.org/organic-site-preparation-methods-a-comparative-overview/. This fact sheet provides a brief overview of the site preparation methods covered in Organic Site Preparation for Wildflower Establishment and is intended to help you quickly assess the suitability of each method for a given site.

USDA-NRCS, Establishing Native Grasses, Conservation Reserve Program Job Sheet CP 2. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_017880.pdf

The Xerces Society for Invertebrate Conservation website – The Habitat Restoration page has numerous references that will be helpful in planning and preparing for a native prairie border. An emphasis on protecting and promoting pollinator populations is an added benefit - https://xerces.org/pollinator-conservation/habitat-restoration.

SEEDING RATES AND INFORMATION ON PLANTING NATIVE SEEDS

K-State Extension, Agronomy eUpdate: Establishing and managing native prairie plants in small areas
https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=1157

Purdue Extension. Seed fillers and carriers for planting native warm-season grasses and forbs.
https://www.purdue.edu/fnr/extension/seed-fillers-and-carriers/.

PLANT LISTS

The Xerces Society: Native Plants that Attract Pollinators – Southern Plains
https://xerces.org/wp-content/uploads/2016/10/2017-054_SouthernPlainsPlantList_Dec2017_web-3page.pdf.

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USDA-NRCS Conservation Practice Overview, 386, Field Border. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1255019.pdf

USDA-NRCS Conservation Practice Standard, Field Border, Code 386. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_026293.pdf.

NRCS Conservation Practice Standard 550, Range Planting – https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046903.pdf

APPENDIX A

SOURCES FOR COST-SHARE & TECHNICAL ASSISTANCE

Listed below are several organizations that can assist landowners. They include state and federal agencies, non-profits, and private consultants. Much of the assistance falls into three different categories:

1. Development of a restoration plan and budget. Private consultants or contractors provide great information and advice, but many government organizations and some nonprofits can help with plan development as well.

2. Cost-share assistance. Federal and state funds are available to help landowners pay for different conservation practices. Some of the practices include brush clearing in grasslands, streambank stabilization, and prairie restoration. Most programs require that landowners sign a contract agreeing to complete their conservation practice within a specific time period and provide receipts or other proof that they've completed the outlined tasks. There are several programs, all with different requirements, so it's best to call the organizations below and talk with a representative to find out which fits your needs. The representatives from those organizations will work with you to develop your plan and connect you with contractors who can help with parts of the process. Some even have equipment you can rent. Private consultants can also help with cost-share application processes and connecting with contractors.

3. Conservation easements. Conservation easements are legal agreements between landowners and land trust organizations that prescribe the type of land use allowed and provide guidance for how the land can be developed or used in the future. Landowners retain ownership of the property and may receive some federal income tax benefit.

All the programs have different advantages, so it's important to talk to each organization and see which program works best for you. All the organizations that provide cost-share programs will help you put together a restoration plan with a budget and timeline.

MONARCH BUTTERFLY SPECIFIC HABITAT ENHANCEMENT

Monarch Watch – Free Milkweeds for Restoration Projects
https://monarchwatch.org/bring-back-the-monarchs/milkweed/free-milkweeds-for-restoration-projects/

Monarch Joint Venture – Seed a Legacy Program
https://monarchjointventure.org/news-events/news/seed-a-legacy-new-pollinator-habitat-program-launches-in-11-midwest-states

PRIVATE CONTRACTORS

Most NRCS offices, county conservation districts, and the KDWPT maintain a list of contractors who can assist with seeding, site prep, and other tasks. Private contractors/consultants can also help with plan development.

Custom Forestry Applications ..... https://www.facebook.com/CFA.kansas/
Native Lands LLC ..... https://www.facebook.com/ForThePrairie/
Norman Ecological Consulting ..... http://normanecological.com/
Terra Technologies ..... http://www.terratechnologies.com/index.html
Nickels Farms & Old School Guide Service..... https://oldschoolguideservice.com/farm-management-services-2/

You can find an updated list of contractors on our website.

COST SHARE AND FINANCIAL INCENTIVE PROGRAMS

Cost-share and financial incentive programs provide financial assistance for habitat improvements on agricultural and rural land. Depending on the improvement practice, programs may pay up to 75% of the project cost or provide rental payments for removing agricultural land from production. Contact your state or local office for more information. Agencies providing incentive programs include:

County Conservation Districts
Conservation district offices provide cost-share opportunities for several habitat improvement practices. Some offices cover several counties so check out the website below to find your county's representative. Depending on the county, a conservation district may also oversee the State Water Resources Program and Non-Point Source Pollution Program.

http://agriculture.ks.gov/divisions-programs/division-of-conservation/conservation-districts

Farm Service Agency (FSA)
The FSA funds the Conservation Reserve Program, the Grassland Conservation Program and others. www.fsa.usda.gov/programs-and-services/conservation-programs/index

Natural Resource Conservation Service (NRCS)
NRCS oversees several grants and incentive programs including the Environmental Quality Incentives Program, Conservation Stewardship Program, and Conservation Innovation grants. NRCS can also work with landowners to create conservation easements on their property. FSA, NRCS, and county conservation districts have related funding streams and oversight, so they often work together. To learn more about the NRCS specifically visit www.nrcs.usda.gov/wps/portal/nrcs/main/ks/programs/financial/

KS. Dept. of Wildlife Parks, and Tourism (KDWPT)
KDWPT private land biologists provide technical and cost-share assistance to private landowners in Kansas through the Habitat First Program. Biologists conduct site visits, write management plans, and provide cost-share assistance on eligible practices. The program assists landowners with acreages as small as one acre up to several thousands of acres. Information on Habitat First along with the local biologist for your county can be found at http://ksoutdoors.com/Services/Private-Landowner-Assistance.

Partners for Fish and Wildlife
The Partners for Fish and Wildlife Program voluntarily assists private landowners in restoring, enhancing, and developing functional wetland, grassland and woodland habitats throughout Kansas. Since 1990, they have worked with over 500 landowners.
http://www.conservationhabitat.org/local-resources/Partners-for-Fish-and-Wildlife-Program-in-Kansas/10432/

Bee Better Certified – Xerces, NRCS, Oregon Tilth
The Bee Better certification program is for producers. While it is not a cost-share program, certification could easily include use of NRCS cost-share programs for habitat implementation. https://beebettercertified.org/

BURN MANAGEMENT INFORMATION

Prescribed fires are an important grassland management tool. Proper management is crucial, however, and fire should not be used without training. Listed below are organizations that can provide guidance, training, or assistance in planning a prescribed burn. Also check with your county NRCS office to see if they conduct trainings or provide other burn-related resources.

Eastern Kansas Prescribed Burn Association
Membership group which provides education, tools, and other resources for conducting prescribed burns. www.facebook.com/EKPBA/

KSU Dept. of Agronomy Prescribed Fire Workshops
Conducts prescribed fire workshops in collaboration with state organizations. Check their website for a list of upcoming trainings. www.agronomy.k-state.edu/extension/range-and-forage/prescribed-burning.html

Local Fire Departments
Some local fire departments will conduct a burn on private property for training purposes. Contact your local fire department to inquire.

APPENDIX B

SOURCES FOR REGIONALLY GROWN NATIVE PLANTS AND SEEDS

Retail Source	Location	Phone	Website
KANSAS SEEDS			
De Lange Seed, Inc.	Girard, KS	620-724-6223	www.delangeseed.com
Douglas County Conservation District	Lawrence, KS	785-843-4260	http://www.douglasccd.com/
Feyh Farm Seed	Alma, KS	866-765-3415	http://www.feyhfarmseed.com/
Happy Apple's Farm	Tonganoxie, KS	816-260-6417	https://happyapplesfarm.com/
Leavenworth County Conservation District	Leavenworth, KS	785-338-9946	http://www.sccdistrict.com/
Sharp Bros. Seed Co.	Healy, KS	800-462-8483	www.sharpseed.com
Star Seed	Osborne, KS	800-782-7311	https://www.gostarseed.com/
Tri Star Seed Company	Springhill, KS	800-874-3308	http://www.tri-starseed.com/index.cfm
KANSAS PLANTS			
Grimm's Gardens	Hiawatha, KS	888-459-2586	www.grimmsgardens.com/hiawatha/
Happy Apple's Farm	Tonganoxie, KS	816-260-6417	https://happyapplesfarm.com/
Kansas Forest Service	Manhattan, KS	785-532-3300	www.kansasforests.org
Sunflower Farms	Cherryvale, KS	620-336-2066	
Vinland Valley Nursery	Baldwin City, KS	785-594-2966	www.vinlandvalleynursery.com
REGIONAL SEEDS			
Hamilton Native Outpost	Elk Creek, MO	417-967-2190	www.hamiltonnativeoutpost.com
Missouri Wildlflowers Nursery	Jefferson City, MO	573-496-3492	http://mowildflowers.net/
Stock Seed Farm	Mudock, NE	800-759-1520	http://www.stockseed.com/
Heartland Seed of Missouri, LLC	Eolia, MO	866-476-7333	www.heartlandseed.com
REGIONAL PLANTS			
Bluebird Nursery, Inc.	Clarkson, NE	800-356-9164	http://www.bluebirdnursery.com/
Critsite: Prairie and Wetland Center Retail Store	Belton, MO	816-331-9738	http://www.critsite.com/index.cfm/fuseaction/pwc.retail/index.htm
Missouri Wildlflowers Nursery	Jefferson City, MO	573-496-3492	http://mowildflowers.net/
Sow Wild Natives	Kansas City, MO	816-974-6201	http://sowwildnatives.com/
Great Plains Nursery	Weston, NE	402-540-4801	greatplainsnursery.com
Down to Earth Services	Kansas City, MO	816-207-7960	DTEKC.com
Easy Living Native Wildflower Perennials	Willow Springs, MO	417-469-2611	https://easywildflowers.com/

* Listing does not imply endorsement of products or services. Sources listed advertise a large selection of native plants.