

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS**

UPLAND WILDLIFE HABITAT MANAGEMENT

1. Scope

Upland wildlife habitat management will be carried out on lands where game and non-game wildlife are the primary or secondary objective of the landowner or project purpose. This specification provides details and other information that shall be used in the planning process to improve upland habitat management.

Habitat diversity. Interspersion or intermixing of the various wildlife habitat components is habitat diversity. Numerous habitat types in small units provide diversity or edge and benefit wildlife. Potential negative wildlife population effects should be considered before converting native plant communities to other types of vegetation. Habitat fragmentation can adversely affect some wildlife species.

Habitat linkages. Habitat linkages or cover types with corridors may greatly increase the use of an area by wildlife. Corridors can provide travel access and offer food, cover, and water. Priority habitats for linking with wildlife corridors are riparian areas, wetlands, native prairies, and native woodlands. Fencerows, windbreaks, waterways, and contour and crosswind grass strips are examples of practices used to link habitat. There is no minimum or maximum width as long as the width is adequate to meet the species' needs. Vegetation for corridors can include perennial grass, annual or perennial forbs, trees, shrubs, or a combination of vegetation types.

Home range. Wildlife species occur in a home range or a geographic area. Individual species life requirements must be present in sufficient quantity and quality. Structure and composition of habitat must be available for the daily and seasonal needs of the species. Habitat assessments provided with this specification identify home range for prairie chicken, bobwhite quail, and ring-necked pheasants.

Limiting factor. Habitat assessments are used to identify limiting factors. Some conditions will limit populations within the home range of each species. If that condition is removed or improved, species population numbers may increase to the point where another condition sets the limit. These conditions can be grouped into the following 2 categories:

- (1) Those which can be influenced or changed (such as the vegetative elements of habitat) - These elements impose limits through food supply, protection, and reproduction.
- (2) Those which are difficult or cannot be influenced (such as climate or topography)

Plant communities. Many wildlife species prosper at the early plant successional stage. Others are dependent on climax communities. Knowledge of the local plant communities, the plant species in the successional stages, and the associated animals is essential for providing accurate wildlife management assistance.

Comparison sites. The use of comparison sites is a tool available to assist in habitat development. Areas that provide all of the necessary components (food, cover, and water) for stable wildlife populations provide information such as preferred foods, distance to water, disturbance, plant species, interspersion, den trees, and other habitat information. After sampling the comparison site, plan and implement plantings, seedings, water development, and management to meet the intended objective. Where program or regulatory issues apply, comparison sites will be sampled according to agency policy.

2. Habitat Development

Herbaceous cover establishment.

For requirements on seedbed preparation, seeding methods, seeding dates, seed origin and quality, refer to Conservation Practice 550, Range Planting.

Upland wildlife habitat mix. Seed mixtures shall be developed using Tables 1 and 2 of this specification. Seeding mixtures shall be comprised of as a minimum 4 species with at least 2 native grasses and 1 perennial forb/legume as part of the mixture. No one specie may comprise more than 50 percent of the seed mixture.

Of the mixture, the grass component shall comprise 90 percent of the seed mixture and the forb/legume component shall comprise 10 percent of the seed mixture. The percentages of grasses and forb/legumes in the seed mixture shall equal 100 percent. See example below.

For example: big bluestem	20%
switchgrass	30%
sideoats grama	15%
little bluestem	15%
western wheatgrass	10%
<u>Illinois bundleflower</u>	<u>10%</u>
	100%

Brood cover mix. Where upland bird brood-rearing habitat development is the primary objective, seed mixtures shall be developed using Tables 1 and 2 of this specification. Seeding mixtures shall be comprised of as a minimum 4 species with at least 2 native grasses and 1 perennial forb/legume as part of the mixture. No one specie may comprise more than 50 percent of the seed mixture.

Of the mixture, the grass component shall comprise between 50 and 80 percent of the seed mixture and the forb/legume component shall comprise between 20 and 50 percent of the seed mixture. The percentages of grasses and forbs/legumes in the seed mixture shall equal 100 percent. See example below. For cropland or solid grass fields, it is recommended 8 acres of this type of cover be present for every 40 acres of cropland, hayland, or pasture. Minimum strip width is 30 feet. Minimum patch size is one acre.

For example: big bluestem	15%
switchgrass	30%
sideoats grama	20%
western wheatgrass	15%
Illinois bundleflower	10%
<u>showy partridgepea</u>	<u>10%</u>
	100%

Pollinator habitat. These areas include nectar-producing plants in areas such as field borders, vegetative buffers, contour buffer strips, waterways, shelterbelts, windbreaks, riparian forest, and herbaceous plantings. For information concerning pollinator biology and habitat technology, refer to NRCS Pollinator Biology and Habitat Technology, Biology Technical Note KS-37.

Inter-seeding. Inter-seeding of legumes and forbs into existing grass stands can provide a needed food source and add plant diversity to attract beneficial insects necessary for brood habitat. Existing stands of native or introduced grasses may be inter-seeded with 1 or more forbs/legumes to increase plant diversity. Drilling is the required method of seeding native forb/legume species. The forb/legume component drill seeding rate will be 1 pls/lb/ac. Introduced species may be broadcast seeded at the rate of 2 pls/lbs/ac.

The following methods are acceptable for inter-seeding:

- Drilling following a prescribed burn. The area proposed for inter-seeding would be burned by March 31, followed by drilling or broadcast seeding of the forb/legume component and/or grass species. Burning is not approved for soils in Wind Erosion Groups (WEG) greater than 86, unless specifically approved by the state resource conservationist.
- Mechanical tillage followed by drilling. The area proposed for inter-seeding would receive mechanical tillage sufficient to prepare the seedbed and also to suppress the existing vegetation. The amount of tillage and degree of disturbance will depend on the planned seeding method. Tillage should be used with caution in any known areas of noxious weeds or erodible soils.
- Mowing, haying, or grazing followed by drilling. The existing cover is reduced by such methods as mowing, haying, or grazing, followed by drilling directly into the residue. The drill must be properly equipped to allow proper seed placement through the existing cover.
- Frost seeding. Frost seeding is an option when using introduced legumes. This method is limited to the eastern seeding zone. The area proposed for inter-seeding would be broadcast seeded at the rate of 2 pls/lbs/ac. This would be done between November 1 and December 31 to allow natural processes of freezing, thawing, and precipitation to incorporate the seed.
- No-till seeding into existing cover. The area proposed for inter-seeding is seeded by drilling directly into existing cover with no seedbed preparation. This is the least preferred method. Seeding should be completed with a no-till drill. Management actions that include burning, mowing, or grazing may be required after the seeding.

3. Herbaceous Cover Management

The following techniques may be used to manipulate successional stages of grassland habitat. If the field size is greater than 80 acres, it is usually best to treat only half of a field to allow residual cover. Disturbance frequency interval, distribution, and technique should be tailored to individual wildlife species to ensure that distribution, recruitment, and retention are not jeopardized.

Prescribed burning. Use Conservation Practice 338, Prescribed Burning, to remove excess litter. Burning can open the stand to allow for bird movement, encourage forb growth to increase diversity and attract insects, and control unwanted woody encroachment. Allowable dates are August 15 to April 15. Generally, burning between February 1 and March 15 is preferred for opening the stand and encouraging forb growth. Other dates can be used for specific management purposes.

Rotational burning. Rotational burned pastures should be burned once every 3 to 4 years (or as designed) to reduce litter and improve plant health. Burning for wildlife purposes should be done as early as possible (February 1 through April 15) to encourage broadleaf plant growth and to avoid negative wildlife impacts. When possible, burning should be done on a rotational basis to preserve critical nesting cover for target species. Food plots can be used on field perimeters to serve a dual purpose of wildlife food and fire control.

Patch burning. Patch burn grazing (PBG) is defined as an application of prescribed fire to focus livestock grazing on a portion of a grazing unit where the objective is to increase the diversity and structure of vegetation to benefit wildlife and maintain livestock production. By burning different parts of a pasture on a rotational basis, livestock grazing pressure and hoof action can be shifted.

The prescribed burning plan will be prepared by certified individuals. All patch burns will follow Conservation Practice 338, Prescribed Burning. Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets ([Form KS-ECS-338, Prescribed Burn - 338](#)), technical notes, and narrative statements in the conservation plan. All necessary permits must be obtained before implementation of the practice.

Light disking. Disking of established grass stands (generally more than 4 years old) may be necessary to open the stand, create bare ground, and encourage forb growth. Bobwhite quail require 25 to 70 percent bare ground for brood rearing. Disk 3 to 4 inches deep between October 1 and April 15. The best forb response is usually created if disked prior to February 28. In high residue, multiple passes may be needed. This practice is not recommended in unbroken, native prairie.

Prescribed grazing. Use Conservation Practice 528, Prescribed Grazing, to manipulate plant succession and encourage desirable forb growth. Livestock can be beneficial to maintaining the quality of herbaceous cover and controlling undesirable plants when managed in accordance with a grazing plan with wildlife management as a primary objective.

Controlling tree invasion. Tree invasion is a serious threat to native rangeland and established grassland. Use Conservation Practice 314, Brush Management, when applying tree and brush control methods. Aerial spraying is least preferred for woody species control. Ground broadcast application is preferred over aerial spraying.

Depending on species requirements, 10 to 30 percent of the area may remain in shrubs. The list of plant species having negative impacts on native habitat can include honeylocust, eastern redcedar, Siberian elm, Russian olive, osage orange, black locust, mulberry, and cottonwood.

4. Woody Cover Establishment

Species recommendations will be based on landowner objectives and site potential. Planting trees and shrubs can adversely affect non-target species. Where wildlife is a primary objective, trees should generally not be planted in or adjacent to native prairie or other large grassland blocks. Shrub plantings may be acceptable in some circumstances.

Woody plantings will follow the criteria and guidelines in Conservation Practices 612, Tree/Shrub Establishment, and 380, Windbreak/Shelterbelt Establishment. These practices provide guidelines for planting design and establishment. Native species are preferred.

Shrub plantings are particularly valuable for edge-associated upland birds like pheasants and quail. Where quail covey headquarters are desired, shrub plantings from 0.1 to 0.25 acre should be planted for each 5- to 40-acre tract. A companion component to reinforce covey headquarters is the downed tree structure. A few trees with their crowns dropped together will create excellent woody cover at ground level similar to a shrub thicket. This practice maintains live growth in the downed tree branches.

For woody plantings, refer to [Kansas Forestry Technical Note KS-10](#) for plant species selection and use [Form KS-ECS-5](#) to design the plan. For species-specific information, see leaflets on [Wild Turkey](#) and [Managing Forest for Fish and Wildlife](#).

5. Woody Cover Management

Manipulation of woody tree and shrub stands to achieve early successional plant composition encourages regrowth and regeneration of palatable and nutritious vegetation beneficial to deer. Browse management also increases plant diversity, which supports a variety of other species. Browse management can be accomplished by shearing, hand cutting, mowing, etc., or by prescribed burning.

Where covey headquarters is a limiting factor for bobwhite quail, 1 covey headquarters for every 15 acres is recommended. Covey headquarters include woody shrubs, vines, downed tree structures, and feathered edges where woody stems and shoots are managed between 3 and 8 feet in height. Minimum recommended size on this habitat is 30 feet wide by 50 feet long or a minimum of 1500 square feet. This habitat can be established through shrub planting or through tree cutting (coppicing or cutting of trees with the ability to re-sprout). Trees can be cut, treated, monitored, and managed to achieve the structure and height desired. Trees will need re-cutting to achieve the height requirements. Shrubs will provide covey

headquarters with lower maintenance costs. Priority areas for covey headquarters habitat development include tree rows, windbreaks, and wildlife areas that are in need of renovation.

Forest openings are beneficial habitat for some species. Conservation Practice 666, Forest Stand Improvement, will be used for recommendations on thinning extent and techniques.

Conservation Practice 382, Fencing, can be used to protect desirable woody vegetation from livestock.

6. Crop Field Management

Crop fields can provide food, cover, and water for wildlife.

Buffers. Adding strips of permanent cover adjacent to or in critical areas of crop fields greatly improves habitat for edge species. Buffers increase diversity and cover for nesting, brood-rearing, and escape cover when the crop field is harvested, tilled, or chemically treated. For buffers, use Conservation Practices 393, Filter Strip; 391, Riparian Forest Buffer; 589C, Cross Wind Trap Strips; 412, Grassed Waterway; 332, Contour Buffer Strips; 386, Field Border; 380, Windbreak/Shelterbelt Establishment; etc. Seeding will follow appropriate specifications. In center-pivot irrigation areas, there is often little undisturbed cover available during critical times of the year. Planting permanent cover (native grass and forbs) on dry land corners adjacent to a center-pivot irrigation system greatly enhances upland bird habitat.

Wet areas. Wet areas including playa lakes should be managed for optimum wetland functions and values. Grass buffers can enhance the habitat values of a wetland. These areas are valuable to a variety of migratory species and provide other environmental benefits to include water quality and aquifer recharge.

Brood strips. Brood strips are narrow bands (20 to 60 feet) of crops where annual weeds are permitted to grow within the crop or crop stubble. Refer to Kansas Biology Technical Note No. KS-35, Crop Field Management – Habitat Strips for Wildlife.

Wheat. Brood strips in green wheat and other similar crops should not be sprayed using herbicides with residual activity for control of cool season weeds. Broadleaf herbicides that have no long-term residual activity are acceptable. After harvest, brood strips cannot be sprayed or tilled until March 31 of the following year.

Row crop. No herbicides (including pre-emergent herbicides) should be applied to brood strips prior or during the growing season. Brood strips must remain intact from harvest until March 31.

Residue management/tillage. Farming methods that leave maximum residue on the surface usually provide better wildlife potential than conventional tillage, especially when done in conjunction with buffers or other practices that provide adjacent permanent habitat. Crop stubble should be left as tall as possible to provide upland birds with overhead protection from avian predators. Upland bird use and survival increases when stubble is left taller than 15 inches. The wheat/fallow cropping sequence termed “delayed minimum till” provides both wildlife and crop production benefits. Under this scenario, wheat is cut no lower than 12 inches, no weed control is done after harvest, and the first, and sometimes second, treatment in the spring is done with herbicides. Information on this practice is available from a Kansas Department of Wildlife and Parks (KDWP) publication “[New Life for Wheat Fallow.](#)”

Crop rotations/field size. Edge species require habitat diversity. Reducing field size or breaking crop rotations at convenient places within a field (along contours or terraces) can accomplish this. Additional diversity and edge can be provided by practices like buffers and brood strips.

Harvest/haying patterns. Wildlife losses can occur when cutting hay during the nesting or brood-rearing season. This damage can be reduced by using a harvesting pattern that starts through the middle of the field and proceeds outward, thereby forcing wildlife to the edge of the field where they may find adjacent

cover. Other helpful practices include harvesting half of a field at a time or leaving a strip of unharvested hay around the perimeter of the field. Leaving a strip of corn, grain sorghum, wheat, or other crops unharvested along the perimeter or other field break will provide a food source with overhead cover especially valuable in winter. Refer to Kansas Biology Technical Note No. KS-35, Crop Field Management – Habitat Strips for Wildlife.

7. Edge Habitat Management

Most upland bird activity takes place within 100 feet of the field edge. High quality edge habitat consists of multiple cover types with a gradual change from one to the other (for example, shrubs to grass to crops). Edge habitat should be a minimum of 30 feet in width. In addition to the edge habitat practices discussed in the above [Section 6, Crop Field Management](#), the following should be considered:

- Root plowing can be used to prevent encroachment of woody plants into the farm field. Root pruning on a 3 to 5 year basis reduces crop loss.
- A cutback border can be used to create a woodland edge. Tall trees are removed in favor of shrubs and herbaceous vegetation. The regrowth will provide benefits for 5 to 10 years before treatment is needed again. A modification of this practice includes half-cutting trees on the outer edge, creating canopy on the ground for a more shrub-like effect.
- To create an edge-feathering effect, shrubs may be planted along a woodland edge, and herbaceous vegetation may be planted along the shrub edge. If quail are the target species, bare ground should also be provided.
- Where no trees or shrubs are present, shrubs should be planted on field edges to provide covey headquarters areas where bobwhite quail are desired.
- Conservation Practice 650, Windbreak/Shelterbelt Renovation, may be done to improve habitat on windbreaks that no longer provide desired habitat due to age, damage, or management objective.

8. Food Plots

Many wildlife species depend on and prefer native weed seeds and wild fruits for winter food. However, additional high quality food can be provided in the form of green browse or standing grain crops. Typically, crop fields have an abundance of waste grain, but it may become less accessible due to insufficient overhead cover for protection or during times of snow cover. Locate food plots next to other cover such as grass or low-growing woody cover. Planting should be done in a manner to control erosion. Large areas of re-established grassland often benefit from food plots. Food plots are not recommended in unbroken native rangeland.

Most grain crops and forages are adequate for food plots (corn, grain sorghum, wheat, alfalfa, brassicas, peas, beans, etc.) A combination of grain sorghum and forage sorghum can provide food and cover through selective lodging. Use standard agronomic practices to produce a moderate yield. A lower yielding food plot with some weed presence is acceptable if wildlife habitat objectives are met for target species. Planting should be timed to achieve crop maturity before frost. In addition to annual crops, plantings can include biennial and perennial forbs which produce green browse such as alfalfa and clover. Management can include the development of paired plot design with half planted each year and the other half allowed to grow naturally occurring forbs. Provide adequate size and production to meet the food needs of the target species. Placed around a portion of or the entire perimeter of a field, food plots can serve as a firebreak. Alfalfa can be seeded at a rate of 4.0 pls/lbs/acre. See Table 2 for adapted species and for seeding rate recommendations for native and introduced forbs.

For bobwhite quail habitat, winter food items include grain, forb seeds, legumes, nuts, mast, and berries. Where food is a limiting factor, plots of 1 acre for every 15 acres of bobwhite quail home range can be beneficial.

9. References

Private Lands Wildlife Management (PLWM) publication from Kansas State Research and Extension NRCS Fish & Wildlife Habitat Management Leaflets at <http://www.whmi.nrcs.usda.gov/technical/leaflet.htm>

10. Seed Mix Development

Follow the following 4 steps for seed mix development:

Step 1 - Identify the target habitat from the above [Section 2, Habitat Development, "Herbaceous cover establishment"](#), and the following from the above [Section 8, Food Plots](#):

- Upland wildlife habitat seed mix with 10 percent forb/legume and 90 percent native grass
- Brood cover seed mix with 50 to 80 percent native grasses and 20 to 50 percent forb/legume
- Pollinator habitat with 100 percent forbs/legumes
- Food plots, grain crops/forages, native/introduced forbs/legumes

Step 2 - Identify the location of the seeded area on the map ([Figure 1](#)).

Step 3 - Choose native grasses from [Table 1](#) and forbs/legumes from [Table 2](#).

Step 4 - Document seed mixes on [Form KS-ECS-4](#).

Figure 1 - Kansas seeding zone delineation

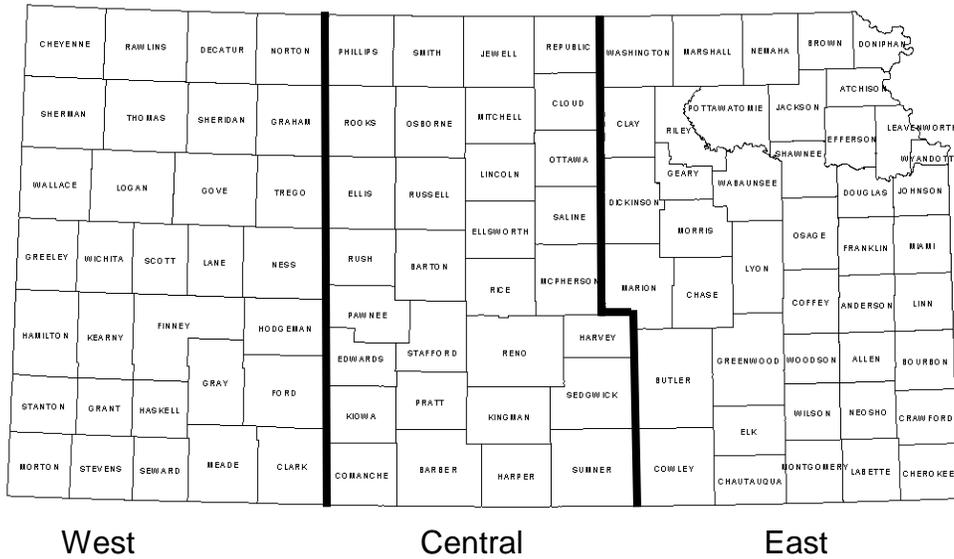


Table 1 - Recommended native grass species

Native Grasses/Perennial	Full Seeding (pls/lb/ac)	Adapted West	Adapted Central	Adapted East	Growth Characteristic	Season
Little Bluestem	4	Yes	Yes	Yes	Tall grass	Warm
Switchgrass	3	Yes	Yes	Yes	Tall grass	Cool/Warm
Blue Grama	2	Yes	Yes	No	Shortgrass	Warm
Indiangrass	6	Yes	Yes	Yes	Tall grass	Warm
Big Bluestem*	6	Yes	Yes	Yes	Tall grass	Warm
Sideoats Grama	6	Yes	Yes	Yes	Intermediate	Warm
Western Wheatgrass	10	Yes	Yes	Yes	Intermediate	Cool
Sand Lovegrass	2	Sandy Soils	Sandy Soils	Sandy Soils	Tall grass	Warm
Prairie Cordgrass	6	Wet Soils	Wet Soils	Wet Soils	Intermediate	Warm
Eastern Gramagrass	8	Wet Soils	Wet Soils	Wet Soils	Tall grass	Warm
Virginia Wildrye	12	Riparian	Riparian	Riparian	Shade tolerant	Cool
Canada Wildrye	8	Riparian	Riparian	Riparian	Shade tolerant	Cool

* Substitute Sand Bluestem on sandy areas

Table 2: Native and introduced forbs/legumes

Common Name	Scientific Name	Full Seeding pls/lb/ac	Bloom Period			Mature Height (Feet)	Soils: Fine Medium Course	Annual Perennial Biennial	Zones: West Central East	Notes:
			Early	Mid	Late					
Blacksampson	<i>Echinacea angustifolia</i>	7.0		M		2	M-C	Perennial	W-C-E	Purple coneflower
Black-eyed Susan	<i>Rudbeckia hirta</i>	0.5	E-M-L			3	F-M	Perennial	W-C-E	
Blanketflower	<i>Gaillardia pulchella</i>	4.0	E-M-L			2	F-M-C	Perennial	W-C-E	
Butterfly milkweed	<i>Asclepias tuberosa</i>	13.0		M		3	M-C	Perennial	C-E	
Canada goldenrod	<i>Solidago canadensis</i>	0.2	M-L			3.5	F-M-C	Perennial	W-C-E	
Canada milkvetch	<i>Astragalus canadensis</i>	3.0	E-M			4	M	Perennial	E	
Catsclaw sensitivebriar	<i>Mimosa nuttallii</i>	23.0		M		2	M-C	Perennial	W-C-E	
Clasping coneflower	<i>Dracopis amplexicaulis</i>	0.5	E-M			2	F-M-C	Annual	C-E	
Compass plant	<i>Silphium laciniatum</i>	35	M-L			10	M-C	Perennial	C-E	
Dotted gayfeather	<i>Liatris punctata</i>	7	M-L			2.5	F-M-C	Perennial	W-C-E	Blazing star
Engelmann's daisy	<i>Engelmannia peristenia</i>	15.0	E-M-L			1.5	F-M	Perennial	W-C-E	
False boneset	<i>Brickellia eupatorioides</i>	0.3	M-L			3	M-C	Perennial	W-C-E	
False sunflower	<i>Heliopsis helianthoides</i>	6.0	M-L			1.5	M-C	Perennial	C-E	Smooth oxeye
Grayhead coneflower	<i>Ratibida pinnata</i>	2.0		M		5	M-C	Perennial	C-E	Pinnate prairie coneflower
Hairy golden aster	<i>Heterotheca canescens</i>	3.0	M-L			1	C	Perennial	C-E	Hoary false golden aster
Illinois bundleflower	<i>Desmanthus illinoensis</i>	10.0	E-M			3	F-M-C	Perennial	W-C-E	
Indian blanket flower	<i>Gaillardia pulchella</i>	4.0	E-M-L			2	F-M-C	Perennial	W-C-E	Firewheel
Lance-leaf coreopsis	<i>Coreopsis lanceolata</i>	4.0	E-M			2	F-M	Perennial	E	Lance-leaf tickseed
Lead plant	<i>Amorpha canescens</i>	5.0		M		3	M-C	Perennial	W-C-E	

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Common Name	Scientific Name	Full Seeding pls/lb/ac	Bloom Period Early Mid Late	Flower Color	Mature Height (Feet)	Soils: Fine Medium Course	Annual Perennial Biennial	Zones: West Central East	Notes:
Many-flower scurfpea	Psoralidium tenuiflorum	1	M	purple	3	M-C	Perennial	W-C-E	Slim-flower scurfpea
Maximilian sunflower*	Helianthus maximiliani	5.0	M-L	yellow	9	F-M-C	Perennial	W-C-E	
Missouri goldenrod	Solidago missouriensis	0.5	M-L	yellow	3	M-C	Perennial	W-C-E	
Missouri evening primrose	Oenothera macrocarpa	10.0	E-M	yellow	1.5	C	Perennial	E	
New England aster	Symphotrichum novae-angliae	0.7	L	purple	6	F-M	Perennial	E	
Pale purple coneflower	Echinacea pallida	8.0	E-M	purple	3	F-M-C	Perennial	E	
Pitcher sage	Salvia azurea	3.0	M-L	blue	5	F-M	Perennial	W-C-E	
Plains coreopsis	Coreopsis tinctoria	0.3	M-L	yellow	4	F-M	Annual	W-C-E	Golden tickseed
Plains sunflower	Helianthus petiolaris	10.0	M-L	yellow	5	F-M-C	Annual	W-C-E	Prairie sunflower
Prairie sagewort	Artemisia frigida	0.2	M-L	white	2	F-M-C	Perennial	C-E	
Slender lespedeza	Lespedeza virginica	6.0	E-M-L	pink-purple	2.5	M-C	Perennial	W-C-E	Slender bush-clover
Purple prairie clover	Dalea purpurea	3.0	M	purple	3	F-M-C	Perennial	W-C-E	Violet prairie clover
Roundhead lespedeza	Lespedeza capitata	5.0	M-L	white	2.6	M-C	Perennial	W-C-E	
Prairie wild rose	Rosa arkansana	22.0	E-M	pink	3	M-C	Perennial	C-E	
Scarlet globemallow	Sphaeralcea coccinea	2.0	M-L	orange	1	M-C	Perennial	C-E	
Shell leaf penstemon	Penstemon grandiflorus	3.0	E-M	purple	4	M-C	Perennial	C-E	Large beardtongue
Showy partridge pea	Chamaecrista fasciculata	14.0	M-L	yellow	4	M-C	Annual	W-C-E	
Slender lespedeza	Lespedeza virginica	6.0	E-M-L	pink-purple	2.5	M-C	Perennial	E	Slender bush-clover
Stiff goldenrod	Oligoneuron rigidum	0.9	M-L	yellow	3.5	M-C	Perennial	C-E	Solidago rigida
Stiff sunflower	Helianthus pauciflorus	1	M-L	yellow	5	M-C	Perennial	C-E	
Swamp milkweed	Asclepias incarnata	6.0	M	purple	5	F-M	Perennial	C-E	
Tansyaster	Machaeranthera pinnatifida	2	M-L	purple	2	M	Perennial	E	Tanseyleaf
Thickspike gayfeather	Liatris pycnostachya	7.0	M-L	purple	3.5	F-M-C	Perennial	E	Prairie Blazing Star

Common Name	Scientific Name	Full Seeding pls/lb/ac	Bloom Period Early Mid Late	Flower Color	Mature Height (Feet)	Soils: Fine Medium Course	Annual Perennial Biennial	Zones: West Central East	Notes:
Upright prairie coneflower	Ratibida columnifera	1.0	M-L	yellow	3	F-M-C	Perennial	W-C-E	Mexican hat Prairie coneflower
Virginia tephrosia	Tephrosia virginiana	22	M	pink	2	M-C	Perennial	C-E	Goat's rue
Western yarrow	Achillea millefolium	0.3	M-L	white	3	M	Perennial	W-C-E	
White heath aster	Chaetopappa ericoides	.4	E-M	white	1	M-C	Perennial	W-C-E	
White prairie clover	Dalea candida	3.0	M	white	3	M-C	Perennial	C-E	
White sage	Artemisia ludoviciana	0.2	M-L	white	3	M-C	Perennial	W-C-E	
Wild bergamot	Monarda fistulosa	0.7	M	purple	4	F-M	Perennial	E	Beebalm
Introduced Legumes									
Alfafa	Medicago sativa	4.0	E-M-L	yellow	2	F-M	Perennial	W-C-E	Grazing alfalfa Yellow alfalfa
Black medick	Medicago lupulina	3.0	E-M-L	yellow	2	F-M	Perennial	W-C-E	
Bird's-foot trefoil	Lotus corniculatus	2.0	E-M-L	yellow	2	F-M-C	Perennial	E	
Ladino clover	Trifolium repens	1.0	E-M-L	white	0.5	F-M	Perennial	C-E	White clover, Dutch clover
Red clover	Trifolium pratense	3.0	E-M-L	red	2	F-M-C	Perennial	C-E	
Yellow sweet clover	Melilotus officinalis	3.0	E-M-L	yellow	7	FMC	Bi-Annual	W-C-E	
White sweet clover	Melilotus alba	3.0	E-M-L	white	7	F-M-C	Bi-Annual	W-C-E	
Korean lespedeza	Kummerowia stipulacea	4.0	M-L	purple	1.5	F-M-C	Annual	E	Korean clover

Limit introduced legumes individually to 10 percent of the mix. Limit collectively introduced legumes to 20 percent of the mix. To increase diversity it is recommended no one native forb/legume exceed 10 percent of the mix.

*Limited to 5 percent of the seed mixture.

