

# Establishing Vegetative Practices in Kentucky

(A complimentary document to KY eFOTG 340, 386 & 645 standards)\*

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## Introduction

KY NRCS has many vegetative practices (327, 332, 340, 342, 386, 393, 412, 512, 601, 612, 635 & 645) that serve different purposes and apply to different situations. The specificity of each individual practice is described in detail in the respective standard. However, much of the site preparation work for each of these different vegetative practices is quite similar and that similarity is described here in this document so as to avoid repetition in each individual practice standard. Additionally, the seeding recommendations for all vegetative practices and some species information will eventually be found in tables within this document.

## Soil Fertility

In establishing a good stand of vegetation, the soil fertility of the site must be tested and amended to adequate levels for the plants that will be grown. Agricultural lime will be applied to adjust soil pH levels as necessary for the species to be established. If a soil test is not available...get one!

For temporary seedings, fertilizer may be applied at the rate of up to 60 lbs/Ac each of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O as needed, within AGR-1 guidelines. For permanent seedings (greater than 365 days), fertilizer should be applied according to the soil test results and within AGR-1 guidelines, up to 120 lbs/Ac each of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O. For the higher rates of N application it is suggested to split the application to increase plant-use efficiency. No N will be applied on pure stands of

legumes and a reduced rate of N may be applied for seed mixes that have legumes in them. Native grass plantings with forbs or legumes for wildlife purposes do not require fertilization or liming unless specific site conditions identified by the planner indicated a fertility concern, (i.e. mine ground). In these cases, fertilizer and lime should be applied according to soil test recommendation as outlined above.

## Site Preparation and Seeding Methods

Site preparation shall be done to provide a firm, weed-free seedbed that ensures good seed-to-soil contact. The type of site preparation that is required will depend on site conditions such as distance to water ways, soil erodibility, current cover at the site, available equipment, etc. The NRCS planner will recommend the most appropriate site preparation method that will have the least impact offsite and the highest probability of successful stand establishment.

### Conventional Tillage

A seedbed may be prepared by disking two or more times to make a clean, firm seedbed. Roll or culti-pack immediately prior to and after seeding to ensure good soil-to-seed contact. Seeds are usually broadcast.

### Reduced Tillage

A seedbed may be prepared with a chisel, disk or other similar implement that leaves a significant amount of residue on the surface of the soil. Herbicides are normally used to kill existing vegetation prior to tillage. If using a broadcast seeder, roll or culti-pack

\* Later to be adapted to compliment KY eFOTG 327, 332, 342, 393, 412, 512, 601, 612, & 635 standards

immediately prior to and after seeding to ensure good soil-to-seed contact. If using a seed drill, rolling and culti-packing are not necessary. Make sure that the depth of seeding is set correctly for the species being planted.

### No Tillage

Herbicides are normally used to kill existing vegetation prior to planting. Mowing, grazing, prescribed grazing, and/or prescribed burning should be used as needed to control vegetation and prepare the site for the herbicide applications that kill all above-ground growth. More than one herbicide application may be necessary to kill existing vegetation so as to control competing vegetation during the establishment period. In most cases, two herbicide applications are required when converting fescue stands to non-fescue stands.

In no-tillage planting, a seed drill is used to place seed at a prescribed depth (usually between ¼ and ½ inch below the soil surface) with minimal soil disturbance. For native grass/forb plantings, seeding depth shall be a ¼ inch or less.

### Natural Regeneration/Abandonment

In establishing Field Borders for wildlife purposes, a field edge can be allowed to grow back naturally provided that the plant population of festuca aruninacea, cynodon dactylon, bromegrass and old-world bluestems are not in excess of 20% of the total plant composition. When using natural regeneration for field borders which are cropland, a temporary cover crop should be used during the first year of establishment to help prevent erosion.

### **Temporary Cover**

Sometimes, because of certain factors the desired vegetation cannot be planted at the right time (Table 1). In these cases it may

be necessary to protect the planting area temporarily until the desired vegetation can be planted. For these situations, a selection of temporary vegetation can be made from Table 2. The temporary cover should be killed in the appropriate manner (e.g. mowed, sprayed, rolled/crimped, frost killed, etc.) at the appropriate time to allow seeding of the permanent cover at the next available time.

### **Nurse Crops**

Even when timely planting can be accomplished, the planted vegetation may not become well-established in time to achieve the goal of the practice. Such is the case with grassed waterway plantings where concentrated flows can occur prior to seedling establishment and destroy portions of the planted area. In these instances, a fast growing nurse crop can be planted with or prior to the permanent vegetation in order to provide quick, temporary protection of the planted area. If needed, the nurse crop should be killed in the appropriate manner (e.g. mowed, sprayed or frost killed) at the appropriate time to allow the emerging seedling of the permanent cover to become established.

### **Cool-Season or Warm-Season Grasses?**

The terms cool-season and warm-season are generic terms that are used to describe the time the year when a grass experiences the majority of its growth. However, each species has its own specific growth habits, environmental tolerances and management requirements. Although some generalizations can be made about cool-season and warm-season grass stands, be aware that each species is distinct.

Generally, cool-season grasses provide nutrient-uptake benefits in spring and fall

when actively growing but warm season grasses provide this benefit in the warm summer months. So, no one species alone can provide nutrient-uptake benefits all year-round. However, a complementary planting of each type of stand in series would provide year-round benefits.

### Cool-Season Grasses

Cool-season grasses are plants that grow best in the spring and fall when soil temperatures are cooler relative to summer temperatures. Cool-season grasses either go dormant or cease growth during the warm summer months.

Cool-season grasses can take up to two years to become fully established. During that time, weeds can become significant competitors and must be managed so that the weeds do not suppress or delay the establishment of the cool-season grass stand. Mowing at appropriate times and the judicious use of selective herbicides are the most common methods of reducing weed pressures in establishing stands of cool-season grasses.

Because of the longer growing period during the year, cool-season grasses generally establish quicker than warm-season grasses thus providing erosion and water quality benefits much sooner than warm-season grasses.

### Warm-Season Grasses

Warm-season grasses are plants that grow best in the warmer summer temperatures, mostly June through August. Warm-season grasses usually go dormant in the fall and do not come out of dormancy until the next spring (late spring).

Warm-season grasses can take up to three or four years to become fully established. During that time, weeds can become significant competitors and must be managed so that the weeds do not suppress

or delay the establishment of the warm-season grass stand. Mowing at appropriate times and the judicious use of selective herbicides are the most common methods of reducing weed pressures in establishing stands of warm-season grasses and this will be done more intensively than in a cool-season grass, especially in the springtime.

Once successfully established, the enormous above- and below-ground biomass produced during the summer months by warm-season grasses can uptake large quantities of soil nutrients making warm-season grass stands as effective in providing water quality benefits as the cool-season grass stands. Additionally, native wildlife species prefer stands of native warm-season grass over stands of cool-season grass.

### **Native Wildflower/Forb Establishment**

Native wildflowers (forbs) are established with native grasses to improve wildlife and pollinator habitat, increase plant diversity and improve aesthetics. Increased plant diversity improves habitat by increasing seeds, insects, and nectar food sources within the stand. Addition of forbs also improves stand structure for nesting, brood rearing, foraging, and winter cover.

Forb planting mixtures should be selected from Table 9 and 10. The forbs included in these mixtures were selected based on several factors which include their availability from vendors, herbicide tolerance, competitiveness, structure, habitat qualities, and other traits.

Native forbs may be seeded from December 1<sup>st</sup> through June 30<sup>th</sup>. Planting forbs during winter or very early spring will ensure that seeds go through a cold stratification period improving first year germination. If planting occurs during late spring or early summer, some forb species will germinate the first growing season while those requiring a cold

stratification period will not germinate until the second growing season.

Forbs should be seeded at a rate between 1 and 5 pounds (PLS) per acre. The higher seeding rates provide improved habitat but increased establishment costs.

Seeding and seedbed preparation methods will be in accordance with the conventional tillage or no-tillage sections above. Forbs seeding depths should be consistent with the native grass seeding depth of ¼” or less.

Forbs may also be over seeded after light strip disking or prescribed burning. When possible, over seeding should be completed during the fall, winter, or early spring to ensure seeds make good seed-to-soil contact through freezing and thawing actions.

### **Establishing Trees/Shrubs with Herbaceous Cover**

There will be occasions when it is desirable to establish both herbaceous and woody vegetation in an area as is the case with some field borders or areas where woody vegetation alone would not address erosion issues adequately in the first years of establishment (e.g. on mine spoil soils) or where herbaceous cover will serve as a nurse crop for a tree planting. For these situations there are four alternatives to co-establishment:

- *Alternative 1* is to establish both the herbaceous cover and the trees/shrubs simultaneously and the process is outlined in Table 6.
- *Alternative 2* is to establish the herbaceous cover in a manner that is consistent with the NRCS standard that is being applied in the first season and then come back after successful establishment to plant the trees/shrubs.
- *Alternative 3* is to establish the herbaceous cover in a manner that is

consistent with the NRCS standard that is being applied in the first season and then come back after successful establishment to plant the trees/shrubs in spots that have been sprayed with herbicide to reduce immediate competition around the tree/shrub.

- *Alternative 4* is to establish the herbaceous cover in a manner that is consistent with the NRCS standard that is being applied in the first season and then come back after successful establishment to plant the trees/shrubs in strips that have been sprayed with herbicide to reduce immediate competition around the tree/shrub.

If seeding dates for any of the above establishment methods are missed, then seed the area to temporary vegetation as mentioned in the **Temporary Cover** section above and **Table 2** below. Make sure that the temporary cover is killed prior to establishing permanent vegetation.

### **Selecting the Correct Vegetation and Seeding Rate for the Appropriate Practice**

Information about species characteristics, species management and seeding rates is described in the following tables. Use these tables to make a decision on species type and management required for the practice that will be installed.

[Questions or comments about this document are to be directed towards the KY State Office Ecological Sciences Staff.](#)

**Table 1. Generalized Planting Dates**

TYPE OF SEEDING	COOL-SEASON GRASSES	WARM-SEASON GRASSES	FORBS	LEGUMES
Spring	3/1-5/15	4/15-6/30	4/15-6/30	3/1-5/15
Late Summer/Fall	8/1-10/15 <sup>1</sup>	Not recommended	Not recommended	8/1-10/15
Dormant	12/10-2/28 <sup>2</sup>	Not recommended	12/10-2/28	12/10-2/28

<sup>1</sup> Grassed Waterways: 8/1-9/15

<sup>2</sup> Liming, fertilizing, seedbed preparation and mulching may be completed ahead of the dormant seeding, with seed being broadcast on top of the mulch.

**Table 2. Information for Temporary Cover Establishment.**

PLANTS	DURATION	SEEDING RATE (PLS lbs./Ac.)	REMARKS
Spring Oats	<75 days	64	For short duration seeding, it may not be necessary to fertilize unless the soil test result indicates extremely poor soil conditions.
Winter Oats	45-365 days	90	
Wheat	45-365 days	90	Due to a potential allelopathic effect, avoid using wheat or rye for a temporary cover when planning native grasses as the permanent cover.
Rye grain	45-365 days	90	Due to a potential allelopathic effect, avoid using wheat or rye for a temporary cover when planning native grasses as the permanent cover. Rye is more tolerant than wheat to herbicide carryover
Annual ryegrass	45-365 days	20	
Hairy Vetch	45-120 days	20 - 30	Vetch has a rapid growth rate and will cover the soil surface quickly. Must be tilled-in prior to seed maturation to avoid volunteer vetch growth in the future.
Bell Beans (40%), Magnus Peas (20%) and Vetch (40%)	45-120 days	70 - 120	Primarily for high biomass production and high nitrogen production. Biomass must be tilled into the soil to receive the full benefit of the nitrogen fixing capacity of this mix. Must be tilled-in prior to vetch seed maturation to avoid volunteer vetch growth in the future.
Bell Beans (40%), Triticale (40%) and Vetch (20%)	45-120 days	70 - 120	Primarily for high biomass production and high nitrogen production. Biomass must be tilled into the soil to receive the full benefit of the nitrogen fixing capacity of this mix. Must be tilled-in prior to seed vetch maturation to avoid volunteer vetch growth in the future.

**Table 3. Information for Nurse Crop planting to aid in the establishment of permanent cover.**

PLANTS	SEEDING RATE (PLS lbs./Ac.)	REMARKS
Spring Oats	32	For use with spring seeded vegetative practices.
Winter Oats	45	For use with fall seeded vegetative practices
Wheat	20	Due to a potential allelopathic effect, avoid using wheat or rye for a temporary cover when planning native grasses as the permanent cover.
Annual ryegrass	10	Timely mowing to prevent seeds from maturing will help avoid spreading annual ryegrass to sensitive areas such as waterways and streams. If appropriate management cannot be performed, avoid using this species in sensitive areas.
Perennial ryegrass	10	

**Table 4. Below are species, seeding dates, and seeding rates for Cover Crops in rotations of annual crops. Use the heavier seeding rates when seedbed or seeding conditions are not ideal or when outside the preferred seeding dates.**

PLANTS	PREFERRED SEEDING DATES (Month/Day)	SEEDING RATE (PLS lbs./Ac.)	REMARKS
Rye	9/15 – 10/30	90	Rye is more tolerant than wheat to herbicide carryover. Due to a potential allelopathic effect, avoid using wheat or rye for a temporary cover when planning native grasses as the permanent cover.
Wheat	9/15 – 10/30	90	
Oats	9/15 – 10/15 3/1 – 4/1	64 - 90	
Aroostook Rye	10/15 – 11/15	112	Will germinate at colder temperature. Use for late seeded cover crops. Faster germination and more canopy at cooler temperatures than wheat, rye, or oats. Can be hayed or grazed in winter/spring.
Annual Ryegrass	8/15 – 10/1	18 - 25	Due to a potential allelopathic effect, avoid using annual ryegrass for a temporary cover when planning native grasses as the permanent cover.
Hairy Vetch	8/1 – 9/10	20 - 30	Use only in a continuous corn operation because hard seeds may germinate later and pose a problem in wheat or soybeans. May also be used with tobacco.
Tall fescue or Orchardgrass	2/1 – 4/15 & 8/20 – 10/1	10 - 15 10 - 15	These grasses may be seeded with red clover, alsike clover, or ladino clover as indicated below. Use orchardgrass over fescue when wildlife is a concern.
Red Clover or Alsike Clover or Ladino Clover	2/1 – 4/15 & 8/1 – 9/10	8 - 12 4 - 6 1 - 3	These legumes should be included in a mix with fescue or orchardgrass. Inoculate the legume seeds with proper inoculant.
Crimson Clover	8/1 – 10/15	20 - 30	Winter annual legume. Good canopy. Not suited to poorly drained soils. Will produce more forage at low temps. than other clovers. Can be hayed or grazed.
Wheat or rye and ladino clover	9/15 – 10/30	90  1	Lime and fertilize according to soil test. Prepare seedbed and incorporate lime and fertilizer. Mulch around trees or cultivate during growing season to suppress growth of clover and conserve moisture.

**Table 5. Below are species, seeding dates, and seeding rates for Cover Crops in vineyards, orchards and other permanent crop situations. Use the heavier seeding rates when seedbed or seeding conditions are not ideal or when outside the preferred seeding dates.**

PLANTS	PREFERRED SEEDING DATES (Month/Day)	SEEDING RATE (PLS lbs./Ac.)	REMARKS
<b>Annuals – No-tilled orchards and vineyards</b>			
Rye Wheat Oats Triticale	9/15 – 10/30	90 90 64 - 90	Allow seeds to mature before mowing so as to create a new seed source for the next year or reestablish by seeding with a no-till drill.
Aroostook Rye	10/15 – 11/15	112	Allow seeds to mature before mowing so as to create a new seed source for the next year or reestablish by seeding with a no-till drill. Will germinate at colder temperature. Use for late seeded cover crops. Faster germination and more canopy cover at cooler temperatures than wheat, rye, or oats.
Annual Ryegrass	8/15 – 10/1	18 - 25	Allow seeds to mature before mowing so as to create a new seed source for the next year or reestablish by seeding with a no-till drill.
<b>Perennials – No-tilled orchards and vineyards</b>			
Tall fescue or Orchardgrass	2/1 – 4/15 & 8/20 – 10/1	45 - 55	May be seeded with red clover, alsike clover, or ladino clover as indicated below. High mowing frequency. Moderate cut height: 3”- 4”
Perennial ryegrass	2/1 – 4/15 & 8/20 – 10/1	10	Quick to establish.
Red Clover or Alsike Clover or Ladino Clover	2/1 – 4/15 & 8/1 – 9/10	5 - 10 3 - 10 1	<b>These legumes should be included in a mix</b> with fescue or orchardgrass. Inoculate the legume seeds with proper inoculants.
Kentucky bluegrass	2/1 – 4/15 & 8/20 – 10/1	30 - 40	Moderate mowing frequency. Low cut height: 2”- 3”
Creeping red fescue	2/1 – 4/15 & 8/20 – 10/1	25 - 35	Creeping fescue that does well in shaded or partially shaded areas and also does well in wetter soils. May work best in areas where tree/vine crop shades the ground for the majority of the day. Relatively slow to establish and spread by short rhizomes.
Mix of Creeping red fescue, Chewings fescue Sheep fescue and Hard fescue	2/1 – 4/15 & 8/20 – 10/1	20 - 30	The mix allows for several types of “fine fescues” to be present, making the mix more adaptable to the site. Somewhat slow to establish but competitive once it has established.
Virginia wildrye	8/1 – 10/15	10 - 12	Native cool-season grass. Moderate mowing frequency. High cut height: 5”- 7”
Buffalo grass <sup>1</sup>	4/1 – 6/15	60 - 90	Native (Western U.S.) warm-season grass. A low maintenance grass that if left unmowed will only grow to 6 inches tall. Can be mowed to very short lengths (1.5”) if necessary for weed control.

<sup>1</sup> Information on buffalo grass establishment can be found at [www.stockseed.com](http://www.stockseed.com), [www.nativegrasses.com](http://www.nativegrasses.com), [www.outsidepride.com](http://www.outsidepride.com) and [www.ext.colostate.edu](http://www.ext.colostate.edu) among other places.

**Table 6. Below are species, seeding dates, and seeding rates for *Establishing Tree/Shrub and Herbaceous Cover Simultaneously* associated with the Tree/Shrub Establishment (612) and Field Borders (386) practices where shrubs are being established. Mix 10 lbs./Ac (PLS) of orchardgrass, 6 – 8 lbs.Ac (PLS) of Virginia Wildrye, or 3 - 5 lbs./Ac (PLS) Redtop with one of the species below and seed the same area that the trees and/or shrubs are being transplanted. Legumes may be excluded from the planting when determined that they may cause increased tree herbivory by deer. If legumes are excluded from the planting, use 15 lbs./Ac (PLS) orchardgrass, 8 lbs./Ac. (PLS) Virginia Wildrye, or 5 lbs./Ac (PLS) Redtop. Other grass/legume/forb species can be used if planting trees/shrubs as part of a Field Border or other compatible NRCS practice as long as the species are consistent with practice standard.**

<b>PLANTS</b>	<b>PREFERRED SEEDING DATES (Month/Day)</b>	<b>SEEDING RATE (PLS lbs./Ac.)</b>
Birdsfoot trefoil	3/1 – 4/15 8/1 – 9/10	3
Kobe or Korean lespedeza	2/15 – 5/15	3
Red clover	2/1 – 4/15 8/1 – 9/10	2
Ladino clover	2/1 – 4/15 8/1 – 9/15	2
Appalow lespedeza	2/15 – 4/15	7

**Table 7. Below are species and seeding rate information for Conservation Cover (327), Field Borders (386), and Upland Wildlife Habitat Management (645) practices. Plantings for wildlife habitat shall be established with at least three species including at least one grass and one legume or forb. Native grass mixtures must include a minimum of 5 pounds grass Pure Live Seed (PLS) per acre. See Table 8. below for seeding mixtures and rates for optimizing the wildlife benefits of these practices and for plantings completed under the Restoration and Management of Declining Habitat (643) practice standard.**

PLANTS	WILDLIFE RATING <sup>1/</sup>	SINGLE SPECIES SEEDING RATE (Minimum PLS lbs./Ac.)	MULTIPLE SPECIES SEEDING RATE (Minimum PLS lbs./Ac.)
<b><u>Introduced Grasses</u></b>			
Orchardgrass	G	15	10
Red Top	G	5	1
Timothy	G	10	5
<b><u>Native Grasses</u></b>			
Big Bluestem	E	5	Minimum 0.5 to 1.0 Maximum
Composite Dropseed	E	5	1
Eastern Gama Grass	E	5	3
Indiangrass	E	5	Minimum 0.5 to 1.0 Maximum
Little Bluestem	E	5	1
Prairie Dropseed	E	5	1
Purpletop Tridens	G	5	1
Splitbeard Bluestem	E	5	1
Side Oats Grama	E	NA	1
Switchgrass	G	5	Minimum 0.5 to 1.0 Maximum
Native Wild Rye Species	E	NA	1
<b><u>Legumes</u></b>			
Alsike Clover	G	2	1
Ladino Clover	F	1	0.5
Kobe Lespedeza	G	3	1.5
Korean Lespedeza	G	3	1.5
Partridge Pea	G	1.0 – 2.0	1.5
Red Clover	F	3	2.5
White Clover	F	1	0.5
<b><u>Native Forbs</u> <sup>2/</sup></b>			
Single Species	E	1 to 5 pounds	
Multiple Species	E	1 to 5 lbs.; See Table 9 or 10 for recommended forb mixtures	

<sup>1/</sup> - Wildlife ratings are: E – Excellent, G – Good, and F – Fair.

**Table 8. For optimizing wildlife habitat and/or for native grass/forb plantings completed under the Restoration and Management of Declining Habitat (643) practice standard, plantings shall include three pounds pure live seed of at least three native grass species and between 2 and 5 pounds of 4 native forb species. For the Rare and Declining Habitat (CP-25) practice under the CRP, use the 7 species forb mixtures in Table 10.**

Species	Wildlife Rating <sup>1/</sup>	Multiple Grass Species Seeding Rate (Minimum Pounds/Acre)
<b><u>Native Grasses</u></b>		
Big Bluestem	E	Minimum 0.5 lb. to 1.0 lb. Maximum
Composite Dropseed	E	0.5
Eastern Gama Grass	E	1
Indiangrass	E	Minimum 0.5 lb. to 1.0 lb. Maximum
Little Bluestem	E	0.5
Prairie Dropseed	E	0.5
Purpletop Tridens	G	0.5
Side Oats Grama	E	0.5
Splitbeard Bluestem	E	0.5
Switchgrass	G	Minimum 0.5 lb. to 1.0 lb. Maximum
Native Wild Rye Species	E	0.5
<b><u>Native Forbs</u></b>		
Multiple Species	E	2 to 5 lbs; See table 9 or 10 for recommended forb mixtures

<sup>1/</sup> - Wildlife ratings are: E – Excellent, G – Good, and F – Fair.

**Table 9. The following forb mixes were developed based on 4 native forb species at 2 pounds/acre total rate. If only a pound of forbs per acre is desired, decrease the seeding rate for each species in the mix by half. These mixes are suitable for dry to moist settings except mix 7 and 8 which are also suitable for wet sites. If a higher forb seeding rate is desired or if other species are desired, work with a biologist to develop the seeding mixture based on a similar number of seeds per pound for each species in the mix. See Table 10 for mixes that include 7 forb species. Other eligible forb species and information regarding their historical ranges are located in Table 11.**

MIX #	COMMON NAME	SCIENTIFIC NAME	SEEDING RATE (PLS lbs./Ac.)
Mix 1	Partridge Pea	<i>Cassia fasciculate</i>	12.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4.0 ounces/acre
	False Sunflower	<i>Heliopsis helianthoides</i>	8.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	8.0 ounces/acre

<b>MIX #</b>	<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>SEEDING RATE (PLS lbs./Ac.)</b>
<b>Mix 2</b>	Partridge Pea	<i>Cassia fasciculata</i>	14.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	7.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	10.0 ounces/acre
<b>Mix 3</b>	Partridge Pea	<i>Cassia fasciculata</i>	12.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	5.0 ounces /acre
	Roundhead Lespedeza	<i>Leasedeza capitata</i>	6.0 ounces/acre
	False Sunflower	<i>Heliopsis helianthoides</i>	9.0 ounces/acre
<b>Mix 4</b>	Partridge Pea	<i>Cassia fasciculata</i>	16.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Roundhead Lespedeza	<i>Leasedeza capitata</i>	6.0 ounces/acre
	False Sunflower	<i>Heliopsis helianthoides</i>	9.0 ounces/acre
<b>Mix 5</b>	Partridge Pea	<i>Cassia fasciculata</i>	16.0 ounces/acre
	Greyhead Coneflower	<i>Ratibida pinnata</i>	3.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	12.0 ounces/acre
<b>Mix 6</b>	Spiked Blazing Star	<i>Liatris spicata</i>	10.0 ounce/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	4.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	17.0 ounces/acre
<b>Mix 7*</b>	New England Aster	<i>Aster novae-angliae</i>	1.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	7.0 ounces/acre
	Spiked Blazing Star	<i>Liatris spicata</i>	8.0 ounces/acre
	Swamp Milkweed	<i>Asclepias incarnata</i>	16.0 ounces/acre
<b>Mix 8*</b>	Partridge Pea	<i>Cassia fasciculata</i>	14.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	6.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	False Sunflower	<i>Heliopsis helianthoides</i>	11.0 ounces/acre
<b>Mix 9*</b>	Partridge Pea	<i>Cassia fasciculata</i>	12.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	5.0 ounces/acre
	False Sunflower	<i>Heliopsis helianthoides</i>	8.0 ounces/acre
	Devil's Beggartick	<i>Bidens frondosa</i>	7.0 ounces/acre

\* - mix suitable for mesic to wet sites

**Table 10. Native prairie mix for the CP-25 practice under CRP shall include 3 pounds pure live seed of at least 3 native grass species and between 2 and 5 pounds of 7 native forb species. The following forb mixes were developed based on 7 native forb species at 2 pounds/acre total rate. These mixes are suitable for dry to moist settings, if a seven forb mix is need for a wet site contact a biologist for assistance. If a higher forb seeding rate is desired or if other species are desired, develop the mixture based on a similar number of seeds per pound for each species in the mix. Other eligible species and their historical ranges are located in Table 11.**

<b>Mix #</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Seeding Rate</b>
<b>Mix 1</b>	Partridge Pea	<i>Cassia fasciculata</i>	8.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus</i>	4.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2.0 ounces/acre
	Roundheaded Lespedeza	<i>Lespedeza capitata</i>	4.0 ounces/acre
	False Sunflower	<i>Heliopsis</i>	6.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	7.0 ounces/acre
<b>Mix 2</b>	Partridge Pea	<i>Cassia fasciculata</i>	9.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus</i>	4.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2.0 ounces/acre
	False Sunflower	<i>Heliopsis</i>	6.0 ounces/acre
	Spiked Blazing Star	<i>Liatris spicata</i>	4.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	6.0 ounces/acre
<b>Mix 3</b>	Partridge Pea	<i>Cassia fasciculata</i>	8.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus</i>	4.0 ounces /acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2.0 ounces/acre
	False Sunflower	<i>Heliopsis</i>	8.0 ounces/acre
	Bergamot	<i>Monarda fistulosa</i>	1.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	8.0 ounces/acre
<b>Mix 4</b>	Partridge Pea	<i>Cassia fasciculata</i>	10.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus</i>	4.0 ounces /acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2.0 ounces/acre
	Roundhead Lespedeza	<i>Leasedeza capitata</i>	6.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	8.0 ounces/acre
	Rigid Goldenrod	<i>Solidago rigida</i>	1.0 ounces/acre
<b>Mix 5</b>	Partridge Pea	<i>Cassia fasciculata</i>	10.0 ounces/acre
	Illinois Bundleflower	<i>Desmanthus</i>	4.0 ounces /acre
	Greyhead Coneflower	<i>Ratibida pinnata</i>	2.0 ounces/acre

Mix #	Common Name	Scientific Name	Seeding Rate
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	8.0 ounces/acre
	Spiked Blazing Star	<i>Liatris spicata</i>	6.0 ounce/acre
	Rigid Goldenrod	<i>Solidago rigida</i>	1.0 ounces/acre
<b>Mix 6</b>	Partridge Pea	<i>Cassia fasciculate</i>	8.0 ounces/acre
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1.0 ounces/acre
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2.0 ounces/acre
	False Sunflower	<i>Heliopsis</i>	6.0 ounces/acre
	Spiked Blazing Star	<i>Liatris spicata</i>	3.0 ounce/acre
	Purple Coneflower	<i>Echinacea purpurea</i>	8.0 ounces/acre
	Tall Coreopsis	<i>Coreopsis tripteris</i>	4.0 ounces/acre

**Table 11. Use of the above mixes is preferred however, below is a list of native perennial species that may be used for forb plantings in Kentucky. The listed below contains species suitable for field plantings that are available from wildflower vendors. Work with a biologist to develop a suitable mixture that contains a similar number of seed for each species in the mix. Review herbicide labels to determine which species are compatible with planned rates and application timing.**

Common Name	Scientific Name	Ecological Group*	Moisture	Sun	Height
Swamp Milkweed	<i>Asclepias incarnata</i>	1	W.M	Full	3'-- 5'
Purple Milkweed	<i>Asclepias purpurascens</i>	1	M.D	Full/Part	2' - 3'
Common Milkweed	<i>Asclepias syriaca</i>	1	M.D	Full	3'-- 5'
Butterfly Milkweed	<i>Asclepias tuberosa</i>	1	D.M	Full	2' - 3'
New England Aster	<i>Aster novae-angliae</i>	1	M.D	Full	3' - 6'
Aromatic Aster	<i>Aster sagittifolius</i>	1	D.M	Full	1' - 3'
Maryland Senna	<i>Cassia marilandica</i>	1	M.D	Full	4'-8'
Common Boneset	<i>Eupatorium perfoliatum</i>	1	W	Full	3' - 5'
Biennial Beeblossom	<i>Gaura biennis</i>	1	M.W	Full	4'-- 7'
Sawtooth Sunflower	<i>Helianthus grosseserratus</i>	1	M.D	Full	5'-- 8'
Jerusalem Artichoke	<i>Helianthus tuberosus</i>	1	M.W	Full/Part	5'-- 7'
Oxeve Sunflower	<i>Heliopsis helianthoides</i>	1	M.W	Full	2' - 3'
Great Blue Lobelia	<i>Lobelia siphilitica</i>	1	M.W	Full/Part	1' - 4'
Wild Bergamot	<i>Monarda fistulosa</i>	1	D.M	Full/Part	2' - 5'
Foxglove Beard-tongue	<i>Penstemon digitalis</i>	1	M.W	Full/Part	3' - 4'
Fall Phlox	<i>Phlox paniculata</i>	1	M.W	Full/Part	3'-- 5'
Orange Coneflower	<i>Rudbeckia fulgida</i>	1	D.M	Full	2' - 4'
Black-eyed Susan	<i>Rudbeckia hirta var.</i>	1	D.M	Full	1' - 3'
Brown-eyed Susan	<i>Rudbeckia triloba</i>	1	M	Full/Part	3'-- 5'
Cup Plant	<i>Silphium perfoliatum</i>	1	M.W	Full/Part	5' - 10'
Purple Meadowparsnip	<i>Thaspium trifoliatum</i>	1/2 (local)	M	Full/Part	3'-- 4'
Giant Ironweed	<i>Vernonia gigantea</i>	1	M.W	Full/Part	4' -- 7'
Golden Alexanders	<i>Ziza aurea</i>	1	M.W	Full/Part	2' - 4'
Smooth Aster	<i>Aster laevis</i>	3	D	Full	2' - 4'
False Blue Indigo	<i>Baptisia australis</i>	3	M	Full/Part	2' - 5'

Common Name	Scientific Name	Ecological Group*	Moisture	Sun	Height
Pale Indian Plantain	<i>Cacalia plantaginea</i>	2	W	Full/Part	4' – 6'
Partridge Pea	<i>Cassia fasciculata</i>	2	D.M	Full	2' – 3'
Maryland Goldenaster	<i>Chrysopsis mariana</i>	2	D.M	Full	1' -- 3'
Tall Tickseed	<i>Coreopsis tripteris</i>	2	D.M	Full	4' -- 7'
White Prairie Clover	<i>Dalea candidum</i>	3 (local)	D.M	Full	1' – 2'
Purple Prairie Clover	<i>Dalea purpureum</i>	3 (local)	D.M	Full	1' – 2'
Illinois Bundleflower	<i>Desmanthus illinoensis</i>	3 (W) local	D.M	Full	1' – 2'
Pale Purple Coneflower	<i>Echinacea pallida</i>	3 (local)	D	Full	3' – 5'
Purple Coneflower	<i>Echinacea purpurea</i>	3	M.D	Full/Part	3' – 4'
Rattlesnake Master	<i>Eryngium yuccifolium</i>	3	D.M	Full	3' – 5'
Blue Mistflower	<i>Eupatorium coelestinum</i>	2	M.W	Full/Part	1' – 3'
Joe-Pye Weed	<i>Eupatorium fistulosum</i>	2	M.W	Full/Part	5' – 8'
Sweet Joe-Pye	<i>Eupatorium purpureum</i>	2	M.W	Full/Part	4' – 6'
Slenderstalk	<i>Gaura filipes</i>	3 (W) local	D	Full	2' -- 3'
Giant Sunflower	<i>Helianthus giganteus</i>	2	M.W	Full	5' -- 8'
Hairy Sunflower	<i>Helianthus hirsutus</i>	3	D	Full	2' -- 5'
Ashy Sunflower	<i>Helianthus mollis</i>	3 (W) local	D.M	Full	2' – 3'
Western Sunflower	<i>Helianthus occidentalis</i>	3 (W) local	D.M	Full	3' – 4'
Hairy Lespedeza	<i>Lespedeza hirta</i>	2	D.M	Full/Part	3' -- 5'
Slender Lespedeza	<i>Lespedeza virginica</i>	3	D.M	Full	2' – 3'
Tall Blazing Star	<i>Liatris aspera</i>	3	D.M	Full	2' – 5'
Scaly Blazing Star	<i>Liatris squarrosa</i>	3	D	Full	1' -- 2'
Cardinal Flower	<i>Lobelia cardinalis</i>	2	W	Full/Part	2' – 5'
Broadleaf Scurfpea	<i>Orbexilum onobrychis</i>	3 (local)	D.M	Full/Part	2' -- 4'
Pale Beardtongue	<i>Penstemon pallidus</i>	3	M.D	Full/Part	2' -- 3'
Wild Sweetwilliam	<i>Phlox maculata</i>	2	M.W	Full/Part	2' – 4'
Prairie Phlox	<i>Phlox pilosa</i>	3 (local)	D.M	Full/Part	-- 1'
Obedient Plant	<i>Physostegia virginiana</i>	3 (local)	D	Full	1' – 2'
Hoary/Southern Mint	<i>Pycnanthemum incanum/</i>	2	M	Full/Part	2' -- 4'
Narrowleaf Mint	<i>Pycnanthemum tenuifolium</i>	2	D.M	Full	2' – 3'
Grayheaded Coneflower	<i>Ratibida pinnata</i>	3	D.M	Full	3' – 6'
Sweet Black-eyed Susan	<i>Rudbeckia submentosia</i>	3 (local)	M,W	Full/Part.	4' – 6'
Royal Catchfly	<i>Silene regia</i>	3 (local)	D.M	Full	2' –
Fire Pink	<i>Silene virginica</i>	3	D.M	Full/Part	9'' –
Tansy Rosinweed	<i>Silphium pinnatifidum</i>	3 (local)	D.M	Full	5' -- 10'
Prairie Dock	<i>Silphium terebinthinaceum</i>	3 (local)	D.M	Full	3' – 10'
Whorled Rosinweed	<i>Silphium trifoliatum</i>	3 (local)	D.M	Full/Part	4' -- 7'
Early Goldenrod	<i>Solidago juncea</i>	2	M.W	Full	2' -- 4'
Gray Goldenrod	<i>Solidago nemoralis</i>	3	D	Full	1' – 2'
Stiff Goldenrod	<i>Solidago rigida</i>	3	D.M	Full	3' – 5'
Showy Goldenrod	<i>Solidago speciosa</i>	3 (local)	D.M	Full	1' – 3'
Swamp Verbena	<i>Verbena hastata</i>	2	M.W	Full	4' -- 6'
Missouri Ironweed	<i>Vernonia missurica</i>	3 (W) local	M.W	Full/Part	4' -- 6'
Culver's Root	<i>Veronicastrum virginicum</i>	3	M.W	Full/Part	3' – 6'
Largeleaf Wild Indigo	<i>Baptisia alba var. macrophylla</i>	4 (local)	D,M	Full	2' -- 5'
New Jersey Tea	<i>Ceanothus americanus</i>	4	D.M	Full/Part	2' – 3'
Swamp Sunflower	<i>Helianthus angustifolius</i>	4 (W) local	M.W	Full	3' -- 6'
Roundhead Lespedeza	<i>Lespedeza capitata</i>	4	D.M	Full	3' – 5'
Dense Blazing Star	<i>Liatris spicata</i>	4	D.M	Full	3' -- 5'
Appalachian Blazing	<i>Liatris squarrulosa</i>	4	D	Full/Part	3' -- 5'

Common Name	Scientific Name	Ecological Group*	Moisture	Sun	Height
Wild Quinine	<i>Parthenium integrifolium</i>	4	D.M	Full/Part	2' – 4'
Wholeleaf Rosinweed	<i>Silphium integrifolium</i>	4 (W) local	M.W	Full/Part	2' – 6'
Compass plant	<i>Silphium laciniatum</i>	4 (local)	D.M	Full	5' – 8'
Goat's Rue	<i>Tephrosia virginiana</i>	4	D	Full	1' – 2'

\* Ecological Groups are designed to guide selection for particular sites. Most species do best in one of these habitat classes, but some have wide ranges and can perform adequately in other habitats. In nature, there is much intermixing between these groups, and botanical advice should be sought for more detailed plans.

Group 1. Typical of moist base-rich soils across Kentucky. The following species are generally appropriate for the Bluegrass Region and other moist fertile base-rich areas in the state, especially bottomlands and upland swales. They are generally NOT suitable for infertile soils of Appalachian regions or Shawnee Hills and other sandy, cherty or deeply weathered acidic uplands.

Group 2. Typical of moist acidic soils across Kentucky. These species are generally appropriate for the Appalachian regions and Shawnee Hills, but also in sections of other regions (e.g., cherty, deeply weathered soils of Pennyrile, many sections of Knobs and its transitions).

Group 3. Typical of seasonally dry base-rich soils with native grassland remnants. These species are particularly appropriate on karst plains of the Mississippian Plateaus and loess plains of the Coastal Plain; also some sections of the Knobs Region, western fringes of the Appalachian Plateaus, and broader uplands/terraces of the Shawnee Hills; only a few of these species occur in the Bluegrass Region.

Group 4. Typical of seasonally dry acidic soils with native grassland remnants. These are appropriate species for former grassy areas on the southern Appalachian Plateaus and for former sandy or cherty grassland areas further west. These species could be used to supplement Group 2 on sites that have some historical association with native grasslands.

Other notes under Ecological Groups

Local: these species are relatively rare or restricted to small sections of the state; only local genotypes should be used since there are often significant differences between separate plant populations.

E: mostly restricted in nature to southeastern regions of the state; not appropriate elsewhere.

W: mostly restricted in nature to southwestern regions of the state; not appropriate elsewhere.

**Table 12. Food plot plantings include pure stand legume plantings, annual grain plantings, or mixtures. When planning a mixture, seeding rates may be reduced by dividing the individual species seeding rate by the number of species in the mixture.**

SPECIES	PLANTING DATES		SEEDING RATE (PLS lbs./Ac.)
	Spring	Fall	
<b><u>Legumes</u></b>			
Alfalfa	3/01 – 4/15	8/01 – 9/15	12 – 20
Alsike Clover	2/01 – 4/15	8/01 – 9/10	4 – 6
Austrian Winter Pea		8/01 – 10/01	25 – 35
Birdsfoot Trefoil	3/01 – 4/15	8/01 – 9/10	6 – 12
Cow Peas	5/15 – 7/01		60
Korean or Kobe Lespedeza	2/15 – 4/1		15 – 25
Ladino Clover	2/01 – 4/15	8/01 – 9/10	1 - 3
Partridge Pea	2/15 – 4/15		10 – 15
Red Clover	2/01 – 4/15	8/01 – 9/10	8 – 12
White Dutch Clover	2/01 – 4/15	8/01 – 9/10	4
<b><u>Annual Grains</u></b>			
Browntop Millet	5/01 – 8/1		20 – 25
Buck Wheat	4/01 – 7/20		30 – 60
Corn	4/01 – 5/30		10 – 18
Foxtail Millet	5/01 – 8/01		20 – 25
Grain Sorghum	5/01 – 6/10		6 – 9
Japanese Millet	5/01 – 8/01		20 – 25
Oats	3/01 – 4/01	9/01 – 10/15	64 – 96
Pearl Millet	5/01 – 8/01		20 – 25
Proso Millet	5/01 – 8/01		20 – 25
Soybeans	5/01 – 7/01		12 – 15
Sunflower	4/01 – 5/10		10 – 15
Wheat		9/15 – 10/15	60 – 120