

## Establishing Vegetative Practices in Kentucky

(A complimentary document to KY FOTG 327, 332, 340, 342, 386, 393, 412, 612, 635, 643 & 645 practice standards)\*

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### Introduction

KY NRCS has many vegetative practices (327, 332, 340, 342, 386, 393, 412, 512, 601, 612, 635, 643 & 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 up to half of the rate recommended by the soil test, within the University of Kentucky's *AGR-1* publication (*Lime and Nutrient Recommendation*) guidelines. For permanent seedings (greater than 365 days), fertilizer should be applied according to the soil test recommendation(s) and within *AGR-1* guidelines. 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.

For mine spoils, follow the University of Kentucky's *AGR-40 Lime and Nutrient Recommendations for Reclamation of Surface-Mined Soils* document.

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.

### Plant Material Adaptability

In making planting material selections, it is critically important to select species and varieties that are best suited for the site conditions that plant materials are to be planted in. Some of the tables in this document will aid in selecting the correct species for your site conditions but variety information should be obtained from the University Cooperative Extension Service or other qualified professionals that are familiar with specific varietal information.

### Seeds

Seeds used for any conservation practice will, at a minimum, meet state seed law requirements. Seeds will be labeled with a germination and purity test completed within the last twelve months. Seed certification basically ensures that "what's on the tag is what's in the bag". The

\* Later to be adapted to compliment KY FOTG 512 standard

certification process essentially ensures the buyer that they are getting what they think they are getting during the purchase of the seed.

For introduced species, certified seed is required for all conservation practices unless there is a documented statewide shortage and the use of uncertified seed is deemed allowable by the State Resource Conservationist. For native grass and forb species certified seed is not required because typically, certified native grass and forb seeds are not found in plentiful supplies in Kentucky so certified seed is more the exception than the rule for native grasses and forbs.

Legume seeds must be treated with a culture of nitrogen-fixing bacteria specific to the legume being planted. The inoculant will be applied to the seed as recommended by the inoculant's manufacturer.

Stratified seeds must be used when seeding Eastern Gama Grass.

### **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 with a plow, disk or other similar implements two or more times to make a clean, firm seedbed. As a general guide, a seedbed is considered firm when footprints leave no more than a

half-inch deep depression. 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 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.

#### Dormant Seeding into Mulch

Prepare a conventional seedbed, as described above, when soils are conducive to tillage. Apply and anchor mulch in accordance to the Mulch practice standard (484). Seed is then broadcast during the dormant seeding period (see Table 1).

#### Dormant Seeding into Live Cover

Seed is broadcast during the dormant seeding period (see Table 1) into live cover (that meets the 340 practice standard requirements or an existing stand of vegetation) that has previously been established.

#### 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.

#### Hydroseeding

It is critical that the hydroseeding slurry have good contact with the soil surface. The soil surface should be cleared of obstacles (e.g. heavy residue, debris, tree limbs, etc.) that could prevent the slurry from contacting the soil surface.

Seed fertilizer, lime and mulch may be applied together. Slurry mixes will have no more than 125 pounds of solids per 100 gallons on water. The pH of the slurry will be no less than 6.0 when inoculated legumes are included in the seed mix. Additionally, the use of hydrated lime in slurries is not allowed.

Legumes to be hydroseeded will be inoculated three times the rate recommended by the manufacturer. When the inoculant is added to the fertilizer and lime mixture, apply slurry within 30 minutes. Re-inoculate slurry if not applied within one hour.

#### 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.

### **Establishment Period**

Some species of plants take longer to establish than others. It is critical to manage weed pressure on the slower-establishing species to ensure their successful establishment. Mowing at the appropriate times is a useful management technique as is the judicious and timely use of selective, post-emergent herbicides. Some plantings may require several mowing events or herbicide applications to ensure successful establishment. Landowners are urged to work with a Certified Crop Advisor, University Extension Specialist, Kentucky Department of Fish and Wildlife Resources Biologist or other qualified individual in the selection and proper application of any agrichemicals to the newly seeded area.

### **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 (Table 3) 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 sooner than warm-season grasses.

Most cool season grasses should be planted between ¼ to ½ inch deep.

#### Warm-Season Grasses

Warm-season grasses are plants that grow best in the warmer summer temperatures, mostly May 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 two or three 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 or top-clipping 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 grass seed, with the notable exception of Eastern Gama Grass, should not be planted deeper than ¼ inch. Eastern Gama Grass should be planted between ¾ to 1 inch deep.

### **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 10<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, prescribed burning, or selective herbicide application. 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 (i.e. Nurse Crop in Forestry terms)**

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 the following alternatives to co-establishment:

- *Alternative 1* is to establish both the herbaceous cover and the trees/shrubs simultaneously or in close succession. This 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. Switchgrass, Indian Grass, or Big Bluestem shall not be used for tree/shrub planting nurse crops.
- *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 or strips that have been sprayed with herbicide to reduce immediate competition around the tree/shrub. Switchgrass, Indian Grass, or Big

Bluestem shall not be used for tree/shrub planting nurse crops.

- *Alternative 4* is to establish a temporary cover of wheat, oats, cereal rye, annual ryegrass as a nurse crop according to the Temporary Cover section above and Table 2 below. Temporary cover does not need to be killed prior to planting trees or shrubs.

If seeding dates for Alternatives 1-3 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 the herbaceous vegetation.

### **Establishing Sod**

Grade area(s) to a slope of 2:1 or flatter if possible. Smooth area to remove rills and gullies. Remove all debris that would prevent contact between the soil and sod roots. Use of ladders on steep slopes will speed sod installation, prevent disruption of the seedbed, and avoid damage to the sod. Sodding must be complete by October 15.

Lime and fertilize according to soil tests and within AGR-1 guidelines for *Lawns and General Turf*. Incorporate required soil amendments 3 inches deep and prepare a conventional seedbed. Moisten soil to at a rate needed to provide a firm soil surface. Use only moist, freshly cut sod that has been cut uniformly 1/2-1 inch in thickness. Start laying sod on the lower end of slopes and perpendicular to the flow of runoff. Stagger joints and fill them with loose soil and compact after sod strips are laid. Tamp or roll installed sod to ensure uniform and complete contact between the soil and sod roots. Irrigate installed sod with sufficient volume to percolate to the soil layer under the sod.

### **Cover Crop**

Species and seeding rate information for Cover Crops is located in Tables 4.

Note, permanent ground cover in perennial crop systems such as orchards and vineyards that was included under the cover crop standard is now encompassed by the conservation cover standard. Species and seeding rate information for Conservation Cover in permanent cropping systems is located in Table 5.

### **Conservation Cover, Field Border & Upland Wildlife Habitat Management**

Species and seeding rate information for Conservation Cover, Field Border and Upland Wildlife Habitat Management is located in Tables 5 through 11.

### **Food Plots**

Species and seeding rate information for Food Plots is located in Table 12.

### **Critical Area Planting**

Species and seeding rate information for Critical Area Planting is located in Table 13.

#### *Special Soil Fertility Considerations*

Critical Area Plantings in areas where subsoil has been exposed and the subsoil was not accessible prior to construction activities poses a difficulty in determining the amounts of fertilizer needed to establish vegetation. It is recommended that every effort be made to sample and analyze the soil/subsoil that will become the exposed seedbed so that appropriate fertilizers and the appropriate rates of fertilizers may be applied. In the rare cases that sampling and analysis cannot be completed prior to

seeding there are two options to soil fertility amendments:

- Option 1 is to amend the seeded area shortly after planting at the recommended rates from soil test results received after planting, with the hopes that precipitation will move the amendments to the seed root-zone.
- Option 2 is to assume that the exposed subsoil is nutrient-poor and to amend the soil with up to, but not exceed, 50 lb/Ac N, 120 lb/Ac P<sub>2</sub>O<sub>5</sub> and 80 lb/Ac K<sub>2</sub>O (based on AGR-1 rates for establishing new seeding of hay or pastures on very low fertility soils).

Additionally, lime will be added according to calculations based on soil survey data of the exposed soil material or past management of an area if soil samples are not obtained.

#### Special Seeding Method Consideration

Seeds are broadcast and mulch is applied over the seeds. Then, the earthmoving equipment will press the seed and mulch into the soil with its tracks. This ensures good seed/soil contact and aids in crimping the straw in place.

### **Grassed Waterway**

The constructed channel and adjacent areas disturbed during construction where vegetation is needed for proper functioning of the waterway will be vegetated. When shaping and grading is complete, remove roots, limbs, rocks, or other debris that would interfere with seeding and maintenance activities.

Prior to or during seedbed preparation, apply nutrients and lime according to the **Soil Fertility** section of this document (see also the *Special Soil Fertility Considerations* in the **Critical Area Planting** section if

applicable). Prepare the seedbed as specified in the Site **Preparation and Seeding Methods** section of this document.

Species and seeding rate information for Grassed Waterways is located in Table 14.

Seeding will be completed within the seeding period specified in Table 1 (specifically, the footnote associated with Late Summer/Fall dates for Cool-Season Grasses). Late Summer/Fall dates can be extended to September 30<sup>th</sup> if soil moisture and temperatures favor the establishment of the seeding.

If seeding cannot be completed for the Grassed Waterway within the dates specified in Table 1 (specifically, the footnote associated with Late Summer/Fall dates for Cool-Season Grasses) then a temporary vegetation must be established until a the permanent vegetation can be seeded or become established. There are two options for the establishment of permanent vegetation in conjunction with temporary vegetation after the last seeding date for Late Summer/Fall according to Table 1:

- A) Establish any grass species in Table 2 within their corresponding seeding dates listed in Table 4 and then seed the permanent vegetation into the temporary cover within the Spring seeding dates for Cool-Season Grasses in Table 1. In this case, the practice cannot be certified as completed until the permanent vegetation has become well established.
- B) Establish any grass species in Table 3 within their corresponding seeding dates listed in Table 4 along with the permanent vegetation seed. In this case, the practice cannot be certified as completed until the permanent vegetation has become well established.

Where temporary vegetative cover is necessary to stabilize a waterway during the midsummer period, establish one of the following warm season covers followed by seeding of the permanent vegetation within periods specified in Table 1 (specifically, the footnote associated with Late Summer/Fall dates for Cool-Season Grasses);

- Sudangrass or grain sorghum 30 lbs./ac
- Wheat, Cereal Rye, or Oats up to 90 lbs./ac

### **Filter Strip**

Species and seeding rate information for Filter Strips is located in Table 15.

### **Contour Buffer Strip**

Species and seeding rate information for Contour Buffer Strips is located in Table 15. If the purpose of installing a Contour Buffer Strip is to increase water infiltration or to reduce transport of sediment and other water-borne contaminants down slope then, use the seeding rates in Table 15 as stated. If the purpose of installing a Contour Buffer Strip is solely to reduce sheet and rill erosion then the seeding rates in Table 15 can be reduced by up to 20% of the stated rates.

### **Vegetated Treatment Area**

Species and seeding rate information for Vegetated Treatment Areas is the same as for Grassed Waterways due to the increased runoff rates from the upslope heavy use areas or the flow of dairy water coming into them. The species and seeding rate information is thus located in Table 14. Planting dates for the vegetation are to be consistent with those located in Table 1.

### **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. Seeding rates are the minimum amounts and may be increased by 25% as appropriate to address erosion concerns at the site.

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

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**Table 1. Generalized Planting Dates.**

TYPE OF SEEDING	COOL-SEASON GRASSES	WARM-SEASON GRASSES (May Include Native Cool-Season Grasses in Mix)	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.**

PLANT SPECIES	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. Oats should be used for native grasses due to the possible allelopathic effects from other species used for temporary cover.
Winter Oats	45-365 days	90	Oats should be used for native grasses due to the possible allelopathic effects from other species used for temporary cover.
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.**

PLANT SPECIES	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.
Aroostook Rye	25	Will germinate at colder temperature. Use for later seeding dates. Faster germination and more canopy at cooler temperatures than wheat, rye, or oats.
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	Suitable for well drained sites but will not tolerate poorly drained sites.

**Table 4. Species, seeding dates, and seeding rates for Cover Crops (340) 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.**

PLANT SPECIES	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.
Bell Beans (~40%) Magnus Peas (~20%) Vetch (~30%) Oats or Rye(~10%)	3/1 – 5/15	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. When grown during the normal growing season (i.e. planted according to the dates recommended) the biomass should be worked into

PLANT SPECIES	PREFERRED SEEDING DATES (Month/Day)	SEEDING RATE (PLS lbs./Ac.)	REMARKS
			the soil and the field planted to a cereal crop for the winter to receive maximum benefits from this cover crop.
Cereal Rye (~50%) Winter Peas (~30%) Vetch (~10%) Clover (~10%)	3/1 – 5/15	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. When grown during the normal growing season (i.e. planted according to the dates recommended) the biomass should be worked into the soil and the field planted to a cereal crop for the winter to receive maximum benefits from this cover crop.
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. Species, seeding dates, and seeding rates for **Cover Crops (340)/Conservation Cover (327)** 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.**

PLANT SPECIES	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. Species, seeding dates, and seeding rates for Establishing a Herbaceous Nurse Crop for [Tree/Shrub Establishment \(612\)](#). This information is associated with the [Tree/Shrub Establishment \(612\)](#) and [Field Borders \(386\)](#) practices where shrubs are being established. Seeding mixtures from the table below must include at least one grass species. 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 the higher grass seeding rates.**

<b>PLANT SPECIES</b>	<b>PREFERRED SEEDING DATES (Month/Day)</b>	<b>SEEDING RATE (PLS lbs./Ac.)</b>
Orchard Grass	3/1 – 5/15 8/1 – 10/15	10 - 15*
Red Top	3/1 – 5/15 8/1 – 10/15	3 - 5*
Virginia wildrye	3/1 – 5/15 8/1 – 10/15	6 - 8*
Kobe or Korean lespedeza	3/1 – 5/15	3
Red clover	3/1 – 5/15 8/1 – 10/ 15	2
Ladino clover	3/1 – 5/15 8/ 1 – 10/15	2

\* If legumes are excluded from the planting, use the higher grass seeding rates.

**Table 7. Species and seeding rate information for Conservation Cover (327), Field Borders (386), and Upland Wildlife Habitat Management (645) practices. Conservation Cover must be established with at least one grass species. Plantings for wildlife habitat shall be established with at least three species including at least one grass and one legume or forb. See Table 8. for seeding mixtures and rates for optimizing the wildlife benefits of these practices AND for plantings completed under the Restoration and Management of Rare and Declining Habitat (643) practice standard. Introduced grass mixtures must include at least 10 pounds of grass PLS/acre. Native grass mixtures planned with this table must include a minimum of 5 pounds grass Pure Live Seed (PLS) per acre. Grass seeding rates may be increased by 25% when site conditions warrant, however, species maximums still apply.**

PLANT SPECIES	EROSION CONTROL RATING <sup>1/</sup>	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	F	G	15	5
Red Top	F	G	5	0.5
Timothy	G	G	10	5
<b><u>Native Grasses</u></b>				
Big Bluestem	G	E	5	Minimum & Maximum 0.5
Composite Dropseed	F	E	5	0.5
Eastern Gama Grass	P	E	5	3
Indiangrass	G	E	5	Minimum & Maximum 0.5
Little Bluestem	G	E	5	0.5
Prairie Dropseed	P	E	5	0.5
Purpletop Tridens	F	G	5	0.5
Splitbeard Bluestem	F	E	5	0.5
Side Oats Grama	P	E	NA	0.5
Switchgrass	G	G	5	Minimum 0.5 to 1.0 Maximum
Native Wild Rye Species	F	E	NA	0.5
<b><u>Legumes</u></b>				
Alsike Clover	F	G	2	1
Ladino Clover	F	F	1	0.5
Kobe Lespedeza	F	G	3	1.5
Korean Lespedeza	F	G	3	1.5
Partridge Pea	P	G	1.0 – 2.0	1.5
Red Clover	F	F	3	2.5
White Clover	F	F	1	0.5
<b><u>Native Forbs</u></b>				
Single Species	P	E	1 to 5 lbs.	
Multiple Species	P	E	1 to 5 lbs. <sup>2/</sup>	

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

<sup>2/</sup> - See Table 9 or 10 for recommended forb mixtures

**Table 8. Species and seeding rate information for optimizing wildlife habitat with native grass/forb plantings. Plantings will include three pounds pure live seed of at least three native grass species when the mixture contains Big Bluestem, Indiangrass, or Switchgrass. Five pounds PLS is required in the seeding mix when it does not contain Big Bluestem, Indiangrass, or Switchgrass. Between 2 and 5 pounds of 4 native forb species are required according to table 9. For the [Restoration and Management of Rare and Declining Habitat \(643\)](#) practice under the Conservation Reserve Program (CP-25), use the 7 species forb mixtures in Table 10.**

PLANT SPECIES	WILDLIFE RATING <sup>1/</sup>	MULTIPLE GRASS SPECIES SEEDING RATE (Minimum PLS lbs./Ac.)
<b>Native Grasses</b>		
Big Bluestem	E	Minimum & Maximum 0.5
Composite Dropseed	E	0.5
Eastern Gama Grass	E	1
Indiangrass	E	Minimum & Maximum 0.5
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>Native Forbs</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. Forb four-species mixes and seeding rate information. 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, 8 and 9 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.**

<b>MIX #</b>	<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>SEEDING RATE (PLS ounces/Ac.)</b>
<b>Mix 1</b>	Partridge Pea	<i>Cassia fasciculata</i>	12
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4
	False Sunflower	<i>Heliopsis helianthoides</i>	8
	Purple Coneflower	<i>Echinacea purpurea</i>	8
<b>Mix 2</b>	Partridge Pea	<i>Cassia fasciculata</i>	14
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	7
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Purple Coneflower	<i>Echinacea purpurea</i>	10
<b>Mix 3</b>	Partridge Pea	<i>Cassia fasciculata</i>	12
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	5
	Roundhead Lespedeza	<i>Leasedeza capitata</i>	6
	False Sunflower	<i>Heliopsis helianthoides</i>	9
<b>Mix 4</b>	Partridge Pea	<i>Cassia fasciculata</i>	16
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Roundhead Lespedeza	<i>Leasedeza capitata</i>	6
	False Sunflower	<i>Heliopsis helianthoides</i>	9
<b>Mix 5</b>	Partridge Pea	<i>Cassia fasciculata</i>	16
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	3
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Purple Coneflower	<i>Echinacea purpurea</i>	12
<b>Mix 6</b>	Spiked Blazing Star	<i>Liatris spicata</i>	10
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	4
	Purple Coneflower	<i>Echinacea purpurea</i>	17
<b>Mix 7*</b>	New England Aster	<i>Aster novae-angliae</i>	1
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	7
	Spiked Blazing Star	<i>Liatris spicata</i>	8
	Swamp Milkweed	<i>Asclepias incarnata</i>	16
<b>Mix 8*</b>	Partridge Pea	<i>Cassia fasciculata</i>	14
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	6
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	False Sunflower	<i>Heliopsis helianthoides</i>	11
<b>Mix 9*</b>	Partridge Pea	<i>Cassia fasciculata</i>	12
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	5
	False Sunflower	<i>Heliopsis helianthoides</i>	8
	Showy Tickseed	<i>Bidens aristosa</i>	7
<b>Mix 10</b>	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	False Sunflower	<i>Heliopsis helianthoides</i>	14
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	4
	Purple Coneflower	<i>Echinacea purpurea</i>	13

\* - mix suitable for mesic to wet sites

**Table 10. Forb seven-species mixes and seeding rate information. The CP-25 practice under CRP shall include 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 (PLS ounces/Ac.)</b>
<b>Mix 1</b>	Partridge Pea	<i>Cassia fasciculata</i>	8
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2
	Roundheaded Lespedeza	<i>Lespedeza capitata</i>	4
	False Sunflower	<i>Heliopsis helianthoides</i>	6
	Purple Coneflower	<i>Echinacea purpurea</i>	7
<b>Mix 2</b>	Partridge Pea	<i>Cassia fasciculata</i>	9
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2
	False Sunflower	<i>Heliopsis helianthoides</i>	6
	Spiked Blazing Star	<i>Liatris spicata</i>	4
	Purple Coneflower	<i>Echinacea purpurea</i>	6
<b>Mix 3</b>	Partridge Pea	<i>Cassia fasciculata</i>	8
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2
	False Sunflower	<i>Heliopsis helianthoides</i>	8
	Bergamot	<i>Monarda fistulosa</i>	1
	Purple Coneflower	<i>Echinacea purpurea</i>	8
<b>Mix 4</b>	Partridge Pea	<i>Cassia fasciculata</i>	10
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2
	Roundhead Lespedeza	<i>Leasedeza capitata</i>	6
	Purple Coneflower	<i>Echinacea purpurea</i>	8
	Rigid Goldenrod	<i>Solidago rigida</i>	1
<b>Mix 5</b>	Partridge Pea	<i>Cassia fasciculata</i>	10
	Illinois Bundleflower	<i>Desmanthus illinoensis</i>	4
	Greyhead Coneflower	<i>Ratibida pinnata</i>	2
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Purple Coneflower	<i>Echinacea purpurea</i>	8
	Spiked Blazing Star	<i>Liatris spicata</i>	6
	Rigid Goldenrod	<i>Solidago rigida</i>	1
<b>Mix 6</b>	Partridge Pea	<i>Cassia fasciculata</i>	8
	Blackeyed Susan	<i>Rudbeckia hirta</i>	1
	Greyheaded Coneflower	<i>Ratibida pinnata</i>	2
	False Sunflower	<i>Heliopsis helianthoides</i>	6
	Spiked Blazing Star	<i>Liatris spicata</i>	3
	Purple Coneflower	<i>Echinacea purpurea</i>	8
	Tall Coreopsis	<i>Coreopsis tripteris</i>	4

**Table 11. Native perennial species that may be used for forb plantings in Kentucky. The table below contains species suitable for field plantings that are available from wildflower vendors, however, the mixes in Table 10 are preferred. Work with the NRCS State 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</i>	1	M,D	Full	5'-- 8'
Jerusalem Artichoke	<i>Helianthus tuberosus</i>	1	M,W	Full/Part.	5'-- 7'
Oxeye 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 vars.</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'
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 Beeblossom	<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'

COMMON NAME	SCIENTIFIC NAME	ECOLOGICAL GROUP*	MOISTURE	SUN	HEIGHT
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</i>	2	M	Full/Part.	2'-- 4'
Narrowleaf Mint	<i>Pycnanthemum</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'-- 2.5'
Fire Pink	<i>Silene virginica</i>	3	D,M	Full/Part.	9"– 16"
Tansy Rosinweed	<i>Silphium pinnatifidum</i>	3 (local)	D,M	Full	5'--10'
Prairie Dock	<i>Silphium</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</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 Star	<i>Liatris squarrulosa</i>	4	D	Full/Part.	3'-- 5'
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. Species, seeding dates, and seeding rates for Food Plots. 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.**

PLANT 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

**Table 13. Species and seeding rates for Critical Area Plantings (342).**

PLANT SPECIES	Ditch, Channel, Spoil, Streambank	Levee, Dike, Embankment, Spillway, Borrow Areas, Diversions	Steep Bank, Cut/Fill Areas, Severely Gullied Areas	Acid Mine Refuse, Slurry Pit Areas, Acid Overburden Material	SEEDING RATE (PLS lbs./Ac)	pH SUITABILITY
Tall Fescue	✓	✓	✓		50	5.5 – 8.3
Tall Fescue Birdsfoot trefoil			✓	✓	50 10	5.8 – 7.5
Tall Fescue 'Lathco' Flatpea		✓	✓	✓	50 30	5.5 – 7.5
KY Bluegrass			✓		35	5.5 – 7.0
Tall Fescue Redtop or Timothy Alsike or Red Clover			✓	✓	50 3 8	6.0 – 7.0
Orchardgrass Redtop Alsike or Red Clover	✓	✓	✓	✓	50 5 8	6.0 – 7.0
Tall Fescue Crownvetch			✓	✓	25 10	5.5 – 8.3
Tall Fescue Perennial Ryegrass Alfalfa			✓		20 10 10	6.0 – 7.5
Tall Fescue 'Lathco' Flatpea Deertongue 'Tioga'			✓	✓	20 20 10	4.5 – 8.0
Switchgrass	✓	✓	✓		10	5.5 – 7.0
Switchgrass Big Bluestem Indiangrass	✓	✓	✓		2 4 4	5.5 – 7.0

**Table 14. Species and seeding rates for [Grassed Waterways \(412\)](#) and [Vegetated Treatment Area \(635\)](#).**

PLANT SPECIES	SEEDING RATES (PLS lbs./Ac)	COMMENTS
KY Bluegrass	35	Requires well drained sites.
Tall Fescue	50	Prefers well drained sites but will tolerate poorly drained sites.
Tall Fescue Red Top	50 4	Prefers well drained sites but will tolerate poorly drained sites.
Tall Fescue Timothy	50 5	Prefers well drained sites but will tolerate poorly drained sites.

**Table 15. Species and seeding rates for Filter Strips (393) and Contour Buffer Strips (332). (Not to be considered a complete list). Use the middle column for establishing single species stands and the column on the right for establishing multiple species stands. Mixtures of introduced species grasses must include a minimum of ten pounds PLS (pure live seed)/acre. Mixtures of native species grasses must include a minimum of eight pounds PLS/acre. The minimum seeding rates on this table may be exceeded by 25 % as needed to accommodate site specific situations. The seeding rates in this table are high for filtering purposes. If the selected purpose of the Contour Buffer Strip is solely to reduce sheet and rill erosion then, the seeding rates can be reduced by up to 20%.**

PLANT SPECIES		SINGLE SPECIES SEEDING RATE (Minimum lbs/Ac)	MULTIPLE SPECIES SEEDING RATE (Minimum lbs/Ac)
COMMON NAME	SCIENTIFIC NAME		
<b>GRASSES – Native Species</b>			
Big Bluestem	<i>Andropogon gerardii</i>	8	2
Indiangrass	<i>Sorghastrum nutans</i>	8	2
Little Bluestem	<i>Schizachyrium scoparium</i>	8	2
Side Oats Gama	<i>Bouteloua curtipendula</i>	NA	1
Switchgrass	<i>Panicum virgatum</i>	8	1
Virginia Wild Rye	<i>Elymus virginicus</i>	NA	2
<b>GRASSES – Introduced Species</b>			
Bermudagrass*	<i>Cynodon dactylon</i>	40 (bu/ac)	N/A
Kentucky Bluegrass	<i>Poa pratensis</i>	15	10
Orchardgrass	<i>Dactylis glomerata</i>	15	10
Red Top	<i>Agrostis alba</i>	8	4
Ryegrass	<i>Lolium perenne</i>	20	10
Smooth Brome**	<i>Bromus inermis</i>	20	10
Tall Fescue	<i>Festuca arundinacea</i>	25	10
Timothy	<i>Phleum pratense</i>	10	5
<b>LEGUMES</b>			
Birdsfoot Trefoil	<i>Lotus corniculatus</i>		3
Clover, Alsike	<i>Trifolium hybridum</i>		2
Clover, Ladino	<i>Trifolium repens</i>		1
Clover, New Zealand	<i>Trifolium repens</i>		5
Clover, Red	<i>Trifolium pratense</i>		5
Clover, Sweet	<i>Melilotus spp.</i>		5
Clover White	<i>Trifolium repens</i>		1
Lathco Flat Pea	<i>Lathyrus sylvestris</i>		5
Lespedeza, Kobe	<i>Kummerowia striata</i>		5
Lespedeza, Korean	<i>Kummerowia stipulacea</i>		5
Partridge Pea	<i>Cassia fasciculata</i>		3

\* Applicable to MLRA 131, 134, 120 and 122 only.

\*\* Applicable to MLRA 121 and 125 only.