NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CONSERVATION COVER

(Ac.)

CODE 327

DEFINITION

Establishing and maintaining permanent vegetative cover

PURPOSE

This practice may be applied to accomplish one or more of the following:

- Reduce soil erosion and sedimentation.
- Improve water quality.
- Improve air quality
- Enhance wildlife habitat and pollinator habitat.
- Improve soil quality
- Manage plant pests

CONDITION WHERE PRACTICE APPLIES

This practice applies on all lands needing permanent vegetative cover. This practice does not apply to plantings for forage production or to critical area plantings.

CRITERA

General Criteria Applicable to All Purposes

Species planted shall be adapted to soil, ecological sites, and climatic conditions.

Species planted shall be suitable for the planned purpose and site conditions.

Plant species, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods will be adequate to accomplish the planned purpose.

Native grass and forb species may be planted during the dormant season to allow for an appropriate stratification period (Nov 15 – March 1); or in the spring (April 15 – June 30). Dormant plantings may require a nurse crop to assist in establishment. Refer to conservation practice (340) Cover Crop for species using the additional criteria for weed suppression.

Planting legumes with native grasses should occur April 15th – May 15th. Legumes alone can also be over seeded during the fall or spring after native grass planting. (Annual legumes may only be seeded during the spring.)

Certified seed shall be used unless otherwise specified.

Planting dates, planting methods and care in handling and planting of the seed or planting stock shall ensure that planted materials have an acceptable rate of survival. Vegetative planting material (e.g. sprigs, rhizomes, bulbs) shall be from a reliable supplier.

Site preparation shall be sufficiently adequate to eliminate weeds for establishment and growth of selected species.

Application of herbicides necessary for establishment and maintenance shall be in accordance with NRCS policy and all label requirements and recommendations.

Timing and use of equipment shall be appropriate for the site and soil conditions.

Application of any soil amendments, if needed, should be based on recommendations from a qualified soil testing laboratory, such as the University of KY Soil Testing Laboratory.

Non-native and/or introduced species may be appropriate for some specified purposes.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide.

Additional Criteria to Reduce Soil Erosion and Sedimentation

The amount of plant biomass and cover needed to reduce erosion to the planned soil loss objective shall be determined using the current approved wind and/or water erosion prediction technology.

Utilize those species and methods identified under (342) Critical Area Treatment.

Additional Criteria for Improving Air Quality

In perennial crop systems such as orchards, vineyards, berries and nursery stock, vegetation established shall provide full ground coverage in the alleyway during mowing and harvest operations.

To sequester carbon, plant cover established will result in a positive CO_2 equivalent value when determined by the current approved carbon prediction technology.

Utilize those species and methods identified under (512) Forage and Biomass Planting for this purpose.

Additional Criteria for Enhancing Pollinator Habitat

Grasses, forbs, and/or legumes shall be planted in a diverse mix to promote bio-diversity and meet the needs of the targeted species of wildlife. Species planted may consist of grasses or forbs.

Where possible, vegetative species utilized under this standard shall be native. Non-native species may be appropriate for certain applications including pollinators to achieve specific purposes.

To establish and manage habitat for pollinating insects, refer to Table 4 of this document; or if available refer to the list of species pollinator mixes and/or methodologies found in the *Kentucky Pollinator Handbook*.

Trees and shrubs should be selected and planted utilizing (612) Tree/Shrub Establishment and (490) as appropriate. For species of trees and shrubs suitable for establishment for pollinator habitat refer to those species identified under (612) Tree/Shrub Establishment.

Herbaceous pollinator plantings under this standard shall be a minimum of one-half acre in size. Larger plantings and blocks of cover (greater than 2 acres) provide exponentially more benefit to pollinators than smaller areas.

A minimum of ten (10) herbaceous species, one of which is a native graminoid species shall be established in pollinator plantings with at least three species occurring in three consecutive bloom periods as follows:

Season	Bloom Time
Very Early	March (or earlier) to April
Early	March through May
Mid	May through July
Late	July through Sept (or later)

If planting only herbaceous plants (forbs and grasses) very early and early may constitute one blooming period.

Pollinator mixes listed in table 4 of this document have blooming requirements already identified.

For small or urban areas, the mixes listed by The Xerces Society under the heading "Garden & Urban Reclamation Seed Mix" are also suitable for establishment.

http:// www.xerces.org

Selection of species for woody plantings for pollinators shall consist of a minimum of nine species (3) in each of the very early, early and mid-season). Plantings should be a minimum of one-half acre in size and be of sufficient density to ensure that pollinator resources are provided in adequate quantities. Refer to (612) Tree/Shrub Establishment for selection of woody species suitable for establishment in pollinator plantings.

Site preparation, seeding rates, establishment methods and management shall follow the guidance outlined in the *Kentucky Pollinator Handbook* if available, (490) Tree/Shrub Site Preparation (612) Tree/Shrub Establishment or

other appropriate conservation practice or guidance.

When possible and feasible utilize woody and herbaceous pollinator plantings. Establishment of woody and herbaceous pollinator plantings may require planting in multiple years and projects to occur in phases.

If pollinator habitat is the primary purpose of establishment this practice the use of pesticide shall be prohibited unless it is required for establishment or to control noxious weeds or invasive organisms; at which the use of pesticides shall be limited to most restrictive application methods and rates.

If a native cover establishes (other than what was planted and is not noxious and/or invasive) and this cover meets the intended purpose and the landowner's objectives and intended bloom periods are satisfied, the cover should be considered adequate.

Additional Criteria for Enhancing General Wildlife Habitat

When an objective is to improve wildlife habitat, the seeding mixture select species that create an open structure that allows increased forb production and wildlife movement.

Table 1 provides a list of native grass species and rates suitable for establishment for most terrestrial wildlife species for a variety of purposes. Native warm season grass species provide exponentially more habitat when combined with native forb species. As a general rule monocultures of native grasses are not recommended. Native perennial forbs are important to many wildlife species. Increasing the number of forb species improves the wildlife habitat by increasing stand diversity. Tables 1, 2, 3, 4 and 7 should be utilized as appropriate to establish upland wildlife habitat as appropriate. Table 7 may also be utilized to establish introduced species for food plots or similar non-permanent plantings for wildlife. Other recommendations or mixes and rates may be utilized as recommended by Kentucky Department of Wildlife Resources (KDFWR) biologists.

To benefit insect food sources for grassland nesting birds, spraying or other control of noxious weeds will be done on a spot basis.

Maintenance practices and activities will not disturb cover during the primary nesting period for grassland species (May15 - August 1).

Supplemental food plots established for various wildlife purposes may be established utilizing species from Table 6. These 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. Certified seed may not be required for these areas.

Additional Criteria to Improve Soil Quality

Plants will be selected based on producing high volumes of organic material to maintain or improve soil organic matter. The amount of biomass needed will be determined using the current soil condition index procedure. Contact the soil health specialists, NRCS forester or other state staff specialist to determine which species are suitable.

Additional Criteria to Manage Plant Pests

In perennial crop systems such as orchards, vineyards, berries and nursery stock, permanent vegetative cover shall be established and managed by incorporating the University of Kentucky's Integrated Pest Management (IPM) recommendations for the target pest species. Refer to: http://www.uky.edu/Ag/IPM/

Additional Criteria to Benefit or Restore Native Communities

Restoration and planting of native ecotypes such as barrens, glades or prairies shall include a minimum of three pounds pure live seed (3 lbs. PLS) of at least three native grass species and at least two pounds of four native forb species.

Table 1 shows suitable native grass species and rates for this purpose. Table 2 provides native forb mixtures and rates based on four

forb species. Table 3 provides mixtures and rates based on seven forb species.

Note that tables 2 and 3 require addition of native warm season grasses from Table 1.

Table 4 shows native forb mixtures based on nine forb species (i.e. pollinator mixes). If a different 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. Other eligible forb species and information regarding their historical ranges are located in Table 5.

Table 5 provides a list of forb species that that may be included or substituted in a forb mixture along with information regarding their historical ranges.

Additional Criteria Applicable to Restoration of Native Cane Breaks

Native cane (*Arundinaria gigantea*) may be established by planting root-balled, potted or dug plants on 8' x 8' spacing.

Plants should be dug to include a root ball at least 1 foot long by 1 foot wide by 1 foot thick. Dug root balls should be planted so the top of the root ball is at or just below the ground surface. These plants will spread rhizomes and send up new shoots to fill in the area over a 3 to 4 year period.

Although not as reliable, cane can be established through planting of stem cuttings containing a node section. Nodal sections of giant cane containing an axillary bud can be used as explants material.

CONSIDERATIONS

Pollinators

For pollinator habitat, it is preferable to install this practice in blocks as opposed to narrow strips of cover. Linear shaped plantings could utilize other practices such as Hedgerow Planting (422), Windbreak (380), Riparian Herbaceous Cover (390) or Riparian Forest Buffer (391).

Consider utilizing The Xerces Society for Invertebrate Conservation's *Pollinator Habitat Assessment Form and Guide* for development of habitat plans for pollinators.

Consider using this practice alone or in combination with other practices to create a minimum pollinator enhancement of at least one-half acre.

Consider utilizing shorter native grasses in mixes as opposed to taller species.

Consider the commercial availability of seed and species selected.

Consider the effect on non-target wildlife species.

Consider utilizing Plant Materials Centers for help in determining suitable plant species.

Consider the effect of deer browse and mortality of planted species with respect to associated costs. Exclusion methods should be considered where feasible.

Consider shade tolerance and placement of plants when establishing woody and herbaceous cover in the same area.

Consider multiple phases of plantings in larger more complex areas to allow for plant establishment prior to initiating other plantings in the same area.

Certified seed and planting stock that is adapted to the site should be used when it is available.

Inoculating legume seed with the proper *Rhizobium* bacteria should be considered on sites where the legumes to be planted have not been previously grown.

Mowing may be needed during the establishment period to reduce competition from broadleaf annual weeds.

On sites where annual grasses are an expected weed problem it may be necessary to postpone nitrogen fertilizer application until the planted species are well established.

Where applicable this practice may be used to conserve and stabilize archeological and historic sites.

Use native species that are appropriate for the identified resource concern and management objective. Consider trying to re-establish the native plant community for the site.

If a native cover (other than what was planted) establishes, and this cover meets the intended purpose and the landowner's objectives, the cover should be considered adequate.

General Wildlife

This practice may be used to promote the conservation of wildlife species in general, including threatened and endangered species.

Inoculating legume seed with the proper Rhizobium bacteria should be considered on sites where the legumes to be planted have not been previously grown.

Where wildlife management is an objective, the food and cover value of the planting can be enhanced by using a habitat evaluation procedure to aid in selecting plant species and providing or managing for other habitat requirements necessary to achieve the objective.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. They shall include, but are not limited to:

- purpose
- species
- seeding rates and dates
- site preparation methods
- establishment methods and procedures
- other management actions needed to ensure an adequate stand
- type of plant material (seedling, plug, containerized, etc)
- any other specifications developed under facilitating practices

OPERATION AND MAINTENANCE

Mowing and harvest operations in perennial crop systems such as orchards, vineyards, berries and nursery stock shall be done in a manner which minimizes the generation of particulate matter.

If wildlife habitat enhancement is a purpose, maintenance practices and activities shall not disturb cover during the reproductive period for the desired species. Exceptions should be considered for periodic burning or mowing when necessary to maintain the health of the plant community.

Maintenance measures must be adequate to control noxious weeds and other invasive species.

To benefit insect food sources for grassland nesting birds, spraying or other control of noxious weeds shall be done on a “spot” basis to protect forbs and legumes that benefit native pollinators and other wildlife.

If wildlife (including pollinators) is a primary purpose and where feasible and appropriate, management and maintenance activities should be rotated (e.g. mow only one-fourth or one-third of the area each year) throughout the managed area to maximize spatial and temporal diversity. Also apply any measures required to achieve appropriate stand density. For woody plantings, follow the operation and maintenance identified in (612) Tree and Shrub Establishment.

Annual mowing of the conservation cover for generic weed control is not recommended since it greatly reduces cover for next year’s nesting period. If needed, conduct mowing and light disking activities outside the nesting season (May 15 Aug 1).

For native warm season grasses and/or mixes which include native forb species:

- Control competition and prevent weed seed formation by clipping, or the application of post-emergent herbicide to

control competition during the establishment period.

- Do not apply nitrogen during the planting year. This encourages weed competition. Lime could be applied at recommended levels if needed.

Prescribed burning may be used to manage native grasses provided that a prescribed burning plan is prepared in advance by the Kentucky Department of Fish and Wildlife Resources (KDFWR), The Nature Conservancy (TNC) or qualified Technical Service Provider. The landowner will be responsible for adhering to the burn plan and all applicable local and state laws.

REFERENCES

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool and D.C. Yoder. 1997. Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), Agricultural Handbook Number 703.

Revised Universal Soil Loss Equation Version 2 (RUSLE2) website (checked September 2010): http://fargo.nserl.purdue.edu/rusle2_dataweb/

University of Kentucky Integrated Pest Management Programs website checked 7/10/2013 http://www.uky.edu/Ag/IPM/

The Xerces Society – *Native Bee Conservation Pollinator Habitat Assessment Form and Guide*. January 2013. www.xerces.org

Table 1. . Native Grass Species Suitable for Wildlife Purposes and Native Prairie Restorations

Species	Wildlife Rating	Multiple Grass Species Seeding Rate (lbs./acre)
Native Grass		
big bluestem	Good	0.5 - 1
Eastern gama grass	Excellent	1
Indiangrass	Good	0.5 - 1
little bluestem	Excellent	0.5
prairie dropseed	Excellent	0.5
side oats grama	Excellent	0.5
switchgrass	Good	0.5 - 1
native wild rye species	Excellent	0.5
Forbs [1]		
multiple species	Excellent	2 - 5

1 - See Table 2 & 3 for recommended native forb species.

Table 2. Four-Mix Species Containing Two Pounds of Native Forbs Suitable for Establishment in Kentucky
NOTE: Add 3 lbs. PLS from Table 1 should be added to any of the mixes below.

Mix #	Common Name	Scientific Name	Seeding Rate
Mix 1	partridge pea	*Cassia fasciculate*	12.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	4.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	8.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	8.0 ounces/acre
Mix 2	partridge pea	*Cassia fasciculate*	14.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	7.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	10.0 ounces/acre
Mix 3	partridge pea	*Cassia fasciculate*	12.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	5.0 ounces /acre
	roundhead lespedeza	*Leasedeza capitata*	6.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	9.0 ounces/acre
Mix 4	partridge pea	*Cassia fasciculate*	16.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	roundhead lespedeza	*Leasedeza capitata*	6.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	9.0 ounces/acre
Mix 5	partridge pea	*Cassia fasciculate*	16.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	3.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	12.0 ounces/acre
Mix 6	spiked blazing star	*Liatris spicata*	10.0 ounce/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	4.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	17.0 ounces/acre
Mix 7*	New England aster	*Aster novae-angliae*	1.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	7.0 ounces/acre
	spiked blazing star	*Liatris spicata*	8.0 ounces/acre
	swamp milkweed	*Asclepias incarnata*	16.0 ounces/acre
Mix 8*	partridge pea	*Cassia fasciculate*	14.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	6.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	11.0 ounces/acre

** This mix is suitable for mesic to wet sites*

Table 3. Seven-Mix Species Containing Two Pounds of Native Forbs Suitable for Establishment in Kentucky

NOTE: Add 3 lbs. PLS from Table 1 should be added to any of the mixes below.

Mix #	Common Name	Scientific Name	Seeding Rate
Mix 1	partridge pea	*Cassia fasciculate*	8.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	4.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	2.0 ounces/acre
	roundheaded lespedeza	*Lespedeza capitata*	4.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	6.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	7.0 ounces/acre
Mix 2	partridge pea	*Cassia fasciculate*	9.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	4.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	2.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	6.0 ounces/acre
	spiked blazing star	*Liatris spicata*	4.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	6.0 ounces/acre
Mix 3	partridge pea	*Cassia fasciculate*	8.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	4.0 ounces /acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	2.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	8.0 ounces/acre
	bergamot	*Monarda fistulosa*	1.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	8.0 ounces/acre
Mix 4	partridge pea	*Cassia fasciculate*	10.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	4.0 ounces /acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	2.0 ounces/acre
	roundhead lespedeza	*Leasedeza capitata*	6.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	8.0 ounces/acre
	rigid goldenrod	*Solidago rigida*	1.0 ounces/acre
Mix 5	partridge pea	*Cassia fasciculate*	10.0 ounces/acre
	Illinois bundleflower	*Desmanthus illinoensis*	4.0 ounces /acre
	greyhead coneflower	*Ratibida pinnata*	2.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	purple coneflower	*Echinacea purpurea*	8.0 ounces/acre
	spiked blazing star	*Liatris spicata*	6.0 ounce/acre
	rigid goldenrod	*Solidago rigida*	1.0 ounces/acre

Table 3. Seven-Mix Species Containing Two Pounds of Native Forbs Suitable for Establishment in Kentucky - Continued

Mix #	Common Name	Scientific Name	Seeding Rate
Mix 6	partridge pea	*Cassia fasciculate*	8.0 ounces/acre
	blackeyed susan	*Rudbeckia hirta*	1.0 ounces/acre
	greyheaded coneflower	*Ratibida pinnata*	2.0 ounces/acre
	false sunflower	*Heliopsis helianthoides*	6.0 ounces/acre
	spiked blazing star	*Liatris spicata*	3.0 ounce/acre
	purple coneflower	*Echinacea purpurea*	8.0 ounces/acre
	tall coreopsis	*Coreopsis tripteris*	4.0 ounces/acre

Table 4. Species and Seeding Rates for Pollinator Planting Mixes – Nine Forb Species Mixes

Common Name	Scientific Name	oz./ac	Common Name	Scientific Name	lbs. PLS/ac
Native Wildflowers			Native Grasses		
Pollinator Mix 1					
blackeyed susan	*Rudbeckia hirta*	2	little bluestem	*Schizachyrium scoparium*	1
bergamot	*Monarda fistulosa*	2	side-oats grama	*Bouteloua curtipendula*	1
purple coneflower	*Echinacea purpurea*	15	Virginia wild rye	*Elymus virginicus*	1
Ohio spiderwort	*Tradescantia ohiensis*	9			
rigid goldenrod	*Solidago ridida*	5			
greyheaded coneflower	*Ratibida pinnata*	7			
New England aster	*Symphyotrichum novae-angliae*	2			
spiked blazing star	*Liatris spicata*	12			
smooth aster	*Aster laevis*	2			
Pollinator Mix 2					
blackeyed susan	*Rudbeckia hirta*	2	little bluestem	*Schizachyrium scoparium*	1
bergamot	*Monarda fistulosa*	2	side-oats grama	*Bouteloua curtipendula*	1
purple coneflower	*Echinacea purpurea*	17	Virginia wild rye	*Elymus virginicus*	1
white beardtounge	*Penstemon digitalis*	5			
rigid goldenrod	*Solidago ridida*	3			
greyheaded coneflower	*Ratibida pinnata*	8			
New England aster	*Symphyotrichum novae-angliae*	2			
false sunflower	*Heliopsis helianthoides*	15			
smooth aster	*Aster laevis*	2			

Table 4. Species and Seeding Rates for Pollinator Planting Mixes (continued)

Common Name	Scientific Name	oz./ac	Common Name	Scientific Name	lbs. PLS/ac
Native Wildflowers			Native Grasses		
Pollinator Mix 3					
blackeyed susan	*Rudbeckia hirta*	2	little bluestem	*Schizachyrium scoparium*	1
bergamot	*Monarda fistulosa*	2	side-oats grama	*Bouteloua curtipendula*	1
purple coneflower	*Echinacea purpurea*	10	Virginia wild rye	*Elymus virginicus*	1
illinois bundleflower	*Desmanthus illinoensis*	10			
rigid goldenrod	*Solidago ridida*	3			
greyheaded coneflower	*Ratibida pinnata*	5			
new england aster	*Symphyotrichum novae-angliae*	2			
partridge pea	*Cassia fasciculata*	10			
false sunflower	*Heliopsis helianthoides*	12			
Pollinator Mix 4					
blackeyed susan	*Rudbeckia hirta*	2	little bluestem	*Schizachyrium scoparium*	1
white beardtounge	*Penstemon digitalis*	4	side-oats grama	*Bouteloua curtipendula*	1
purple coneflower	*Echinacea purpurea*	8	Virginia wild rye	*Elymus virginicus*	1
illinois bundleflower	*Desmanthus illinoensis*	10			
rigid goldenrod	*Solidago ridida*	3			
greyheaded coneflower	*Ratibida pinnata*	5			
new england aster	*Symphyotrichum novae-angliae*	2			
partridge pea	*Cassia fasciculata*	10			
false sunflower	*Heliopsis helianthoides*	12			

Table 5. Supplemental Species of Native Forbs that are Suitable for Establishment in Kentucky

Below is a list of native perennial species that may be used for forb plantings in Kentucky. These species are suitable for field plantings and are readily 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.

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 use 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 5. – Supplemental Species of Native Forbs that are Suitable for Establishment in Kentucky

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
White Colicroot	*Aletris farinosa*	4	D,M	Full	White	2’-- 3’
Hairy Angelica	*Angelica venenosa*	4	D,M	Full/Part.	White	2’-- 4’
Clasping Milkweed	*Asclepias amplexicaulis*	4	D	Full	Purple	3’-- 5’
Swamp Milkweed	*Asclepias incarnata*	1	W,M	Full	Pink	3’-- 5’
Purple Milkweed	*Asclepias purpurascens*	1	M,D	Full/Part.	Purple	2’ – 3’
Common Milkweed	*Asclepias syriaca*	1	M,D	Full	Pink	3’-- 5’
Butterfly Milkweed	*Asclepias tuberosa*	1	D,M	Full	Orange	2’ – 3’
Redring Milkweed	*Asclepias variegata*	2	D,M	Full/Part.	White Red	2’-- 4’
Drummond’s Aster	*Aster drummondii*	3 (W) local	D,M	Full	Blue	2’-- 5’
Smooth Aster	*Aster laevis*	3	D	Full	Blue	2’ – 4’
New England Aster	*Aster novae-angliae*	1	M,D	Full	Purple	3’ – 6’
Toothed Whitetop Aster	*Aster paternus*	2	M,D	Full/Part.	White	2’-- 3’
Aromatic Aster	*Aster sagittifolius*	1	D,M	Full	Blue	1’ – 3’
Narrowleaf Whitetop Ast	*Aster solidagineus*	4	D	Full	White	1’-- 3’
Largeleaf Wild Indigo	*Baptisia alba* var. *macrophylla*	4 (local)	D,M	Full	White	2’-- 5’
False Blue Indigo	*Baptisia australis*	3	M	Full/Part.	Blue	2’ – 5’

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
Longbract Wild Indigo	*Baptisia bracteata* var. *leucophaea*	4 (local)	D	Full	White	1'-- 4'
Downy Pagoda-plant	*Blephilia ciliata*	1	D	Full/Part.	Blue	1'-- 3'
Pale Indian Plantain	*Cacalia plantaginea*	2	W	Full/Part.	White	4' – 6' 10'
Partridge Pea	*Cassia fasciculata*	2	D,M	Full	Yellow	2' –3'
Maryland Senna	*Cassia marilandica*	1	M,D	Full	Yellow	4'-8'
New Jersey Tea	*Ceanothus americanus*	4	D,M	Full/Part.	White	2' – 3'
Narrowleaf Silkgrass	*Chrysopsis graminifolia*	4	D	Full	Yellow	1'-- 3'
Maryland Goldenaster	*Chrysopsis mariana*	2	D,M	Full	Yellow	1'-- 3'
Tall Tickseed	*Coreopsis tripteris*	2	D,M	Full	Yellow	4'-- 7'
White Praire Clover	*Dalea candidum*	3 (local)	D,M	Full	White	1' – 2'
Purple Prairie Clover	*Dalea purpurpeum*	3 (local)	D,M	Full	Purple	1' – 2'
Illinois Bundleflower	*Desmanthus illinoensis*	3 (W) local	D,M	Full	White	1' – 2'
Pale Purple Coneflower	*Echinacea pallida*	3 (local)	D	Full	Purple	3' – 5'
Purple Coneflower	*Echinacea purpurea*	3	M,D	Full/Part.	Purple	3' – 4'
Rattlesnake Master	*Eryngium yuccifolium*	3	D,M	Full	White	3' – 5'
White Thoroughwort	*Eupatorium album* var. *glandulosum*	4	D	Full	White	2'-- 3'
Blue Mistflower	*Eupatorium coelestinum*	2	M,W	Full/Part.	Blue	1' – 3'
Joe-Pye Weed	*Eupatorium fistulosum*	2	M,W	Full/Part.	Pink	5' – 8'

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
Hyssopleaf Thoroughwort	*Eupatorium hyssopifolium*	4	D,M	Full	White	3'-- 5'
Common Boneset	*Eupatorium perfoliatum*	1	W	Full	White	3' – 5'
Sweet Joe-Pye	*Eupatorium purpureum*	2	M,W	Full/Part.	Purple	4' – 6'
Roundleaf Thoroughwort	*Eupatorium rotundifolium* var. *ovatum*	4	D,M	Full	White	2'-- 4'
White Snakeroot	*Eupatorium rugosum*	1	M	Full/Part.	White	2'-- 5'
Biennial Beeblossom	*Gaura biennis*	1	M,W	Full	Pink	4'-- 7'
Slenderstalk Beeblossom	*Gaura filipes*	3 (W) local	D	Full	Pink	2'-- 3'
Swamp Sunflower	*Helianthus angustifolius*	4 (W) local	M,W	Full	Yellow	3'-- 6'
Purpledisk Sunflower	*Helianthus atrorubens*	4 (E) local	D,M	Full/Part.	Yellow	4'-- 7'
Giant Sunflower	*Helianthus giganteus*	2	M,W	Full	Yellow	5'-- 8'
Sawtooth Sunflower	*Helianthus grosseserratus*	1	M,D	Full	Yellow	5'-- 8'
Hairy Sunflower	*Helianthus hirsutus*	3	D	Full	Yellow	2'-- 5'
Ashy Sunflower	*Helianthus mollis*	3 (W) local	D,M	Full	Yellow	2' – 3'
Western Sunflower	*Helianthus occidentalis*	3 (W) local	D,M	Full	Yellow	3' – 4'
Paleleaf Woodland Sunfl.	*Helianthus strumosus*	4 (local)	M,W	Full/Part.	Yellow	3'-- 6'
Jerusalem Artichoke	*Helianthus tuberosus*	1	M,W	Full/Part.	Yellow	5'-- 7'
Smooth Oxeye	*Heliopsis helianthoides*	1	M,W	Full	Yellow	2' – 3'
Roundhead Lespedeza	*Lespedeza capitata*	4	D,M	Full	White	3' – 5'

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
Hairy Lespedeza	*Lespedeza hirta*	2	D,M	Full/Part.	Yellow	3'-- 5'
Slender Lespedeza	*Lespedeza virginica*	3	D,M	Full	Pink	2' – 3'
Tall Blazing Star	*Liatris aspera*	3	D,M	Full	Purple	2' – 5'
Dense Blazing Star	*Liatris spicata*	4	D,M	Full	Purple	3'-- 5'
Scaly Blazing Star	*Liatris squarrosa*	3	D	Full	Purple	1'-- 2'
Appalachian Blazing Star	*Liatris squarrulosa*	4	D	Full/Part.	Purple	3'-- 5'
Cardinal Flower	*Lobelia cardinalis*	2	W	Full/Part.	Red	2' – 5'
Great Blue Lobelia	*Lobelia siphilitica*	1	M,W	Full/Part.	Blue	1' – 4'
Wild Bergamot	*Monarda fistulosa*	1	D,M	Full/Part.	Pink	2' – 5'
Common Evening Primrose	*Oenothera biennis*	1	M,W	Full	Yellow	4'-- 7'
Narrowleaf Evening Primrose	*Oenothera fruticosa*	4 (local)	D,M	Full	Yellow	1'-- 2'
Broadleaf Evening Primrose	*Oenothera tetragona*	2	M	Full/Part.	Yellow	1'-- 3'
Broadleaf Scurfpea	*Orbexilum onobrychis*	3 (local)	D,M	Full/Part.	Blue	2'-- 4'
Sampson's Snakeroot	*Orbexilum pedunculatum*	4	D,M	Full	Blue	2'-- 3'
Wild Quinine	*Parthenium integrifolium*	4	D,M	Full/Part.	White	2' – 4' 3.5'
Long sepal Beardtongue	*Penstemon calycosus*	1	M,D	Full/Part.	White	2'-- 3'
Eastern Gray Beardtongue	*Penstemon canescens /brevisepalus*	2	M,D	Full/Part.	White Blue	2'-- 3'
Foxglove Beard-tongue	*Penstemon digitalis*	1	M,W	Full/Part.	White	3' – 4'

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
Pale Beardtongue	*Penstemon pallidus*	3	M,D	Full/Part.	White	2'-- 3'
Hairy Phlox	*Phlox amoena*	4 (E) local	D,M	Full/Part.	Purple	-- 1'
Eastern Smooth Phlox	*Phlox carolina* var. *triflora*	2 (E) local	M	Full/Part.	Purple	1'-- 3'
Western Smooth Phlox	*Phlox glaberrima* ssp. *interior*	2 (W) local	M,W	Full	Purple	1'-- 3'
Wild Sweet William	*Phlox maculata*	2	M,W	Full/Part.	Purple	2' – 4'
Fall Phlox	*Phlox paniculata*	1	M,W	Full/Part.	Purple	3'-- 5'
Prairie Phlox	*Phlox pilosa*	3 (local)	D,M	Full/Part.	Pink	-- 1'
Obedient Plant	*Physostegia virginiana* ssp. *praemorsa*	3 (local)	D	Full	Pink	1' – 2'
Hoary/Southern Mountain Mint	*Pycnanthemum incanum/ pycnanthemoides*	2	M	Full/Part.	White	2'-- 4'
Whorled Mountain Mint	*Pycnanthemum pilosum*	3	D,M	Full	White	2'-- 4'
Narrowleaf Mountainmint	*Pycnanthemum tenuifolium*	2	D,M	Full	White Pink	2' – 3'
Grayheaded Coneflower	*Ratibida pinnata*	3	D,M	Full	Yellow	3' – 6'
Orange Coneflower	*Rudbeckia fulgida* vars. *fulgida and spathulata*	1	D,M	Full	Yellow	2' – 4'
Black-eyed Susan	*Rudbeckia hirta* var. *pulcherrima*	1	D,M	Full	Yellow	1' – 3'
Sweet Black-eyed Susan	*Rudbeckia submentosia*	3 (local)	M,W	Full/Part.	Yellow	4' – 6'
Brown-eyed Susan	*Rudbeckia triloba*	1	M	Full/Part.	Yellow	3'-- 5'
Pitcher Sage	*Salvia azurea* var. *grandiflora*	3 (W) local	D,M	Full/Part.	Blue	3' – 5'

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
Littleleaf Sensitive Brier	*Schrankia microphylla*	4 (E) local	D,M	Full	Pink	2’ – 3’
Hoary Skullcap	*Scutellaria incana*	2	M,D	Full/Part.	Blue	2’-- 4’
Royal Catchfly	*Silene regia*	3 (local)	D,M	Full	Red	2’- 2.5’
Fire Pink	*Silene virginica*	3	D,M	Full/Part.	Red	9”- 16”
Wholeleaf Rosinweed	*Silphium integrifolium*	4 (W) local	M,W	Full/Part.	Yellow	2’ – 6’
Compass plant	*Silphium laciniatum*	4 (local)	D,M	Full	Yellow	5’ –8’ 10’
Cup Plant	*Silphium perfoliatum*	1	M,W	Full/Part.	Yellow	5’ – 10
Tansy Rosinweed	*Silphium pinnatifidum*	3 (local)	D,M	Full	Yellow	5’--10’
Prairie Dock	*Silphium terebinthinaceum*	3 (local)	D,M	Full	Yellow	3’ –10’
Whorled Rosinweed	*Silphium trifoliatum*	3 (local)	D,M	Full/Part.	Yellow	4’-- 7’
Tall Goldenrod	*Solidago altissima*	1	M,D	Full	Yellow	3’-- 6’
Erect Goldenrod	*Solidago erecta*	4	D,M	Full	Yellow	3’-- 5’
Giant Goldenrod	*Solidago gigantea*	1	W,M	Full	Yellow	3’-- 5’
Early Goldenrod	*Solidago juncea*	2	M,W	Full	Yellow	2’-- 4’
Gray Goldenrod	*Solidago nemoralis*	3	D	Full	Yellow	1’ – 2’
Anise-scented Goldenrod	*Solidago odora*	4	D	Full	Yellow	3’ -- 5’
Stiff Goldenrod	*Solidago rigida*	3	D,M	Full	Yellow	3’ – 5’
Showy Goldenrod	*Solidago speciosa*	3 (local)	D,M	Full	Yellow	1’ – 3’

Common Name	Scientific Name	Ecological Group	Moisture	Sun	Bloom Color	Height
Goat's Rue	*Tephrosia virginiana*	4	D	Full	Yellow Red	1’ – 2’
Canada Germander	*Teucrium canadense*	1	M	Full/Part.	Pink	2’ -- 3’
Hairyjoint Meadowparsnip	*Thaspium barbinode*	1/3 (local)	M,D	Full/Part	Yellow	3’ -- 6’
Hairyjoint Meadowparsnip	*Thaspium barbinode*	1/3 (local)	M,D	Full/Part	Yellow	3’ -- 6’
Purple Meadowparsnip	*Thaspium trifoliatum*	1/2 (local)	M	Full/Part.	Purple Yellow	3’-- 4’
Purple Meadowparsnip	*Thaspium trifoliatum*	1/2 (local)	M	Full/Part.	Purple Yellow	3’-- 4’
Swamp Verbena	*Verbena hastata*	2	M,W	Full	Blue	4’-- 6’
Alternateleaf Wingstem	*Verbesina alternifolia*	1	M,W	Full/Part.	Yellow	5’ -- 7’
Gravelweed	*Verbesina helianthoides*	3	M,D	Full/Part.	Yellow	3’ -- 5’
Yellow Crownbeard	*Verbesina occidentalis*	2	M	Full/Part.	Yellow	4’ -- 6’
Giant Ironweed	*Vernonia gigantea*	1	M,W	Full/Part.	Purple	4’ -- 7’
Missouri Ironweed	*Vernonia missurica*	3 (W) local	M,W	Full/Part.	Purple	4’ -- 6’
Culver's Root	*Veronicastrum virginicum*	3	M,W	Full/Part.	White	3’ – 6’
Golden Alexanders	*Ziza aurea*	1	M,W	Full/Part. Shade	Yellow	2’ – 4’
Meadow Zizia	*Zizia aptera*	3	D	Full/Part.	Yellow	1’ -- 3’

Table 6. Food Plot Species, Seeding Dates, and Seeding Rates Suitable for Establishment in Kentucky

PLANT SPECIES	PLANTING DATES		SEEDING RATE (lbs. /ac.)
	Spring	Fall	
Legumes			
alfalfa	3/1 – 4/15	8/1 – 9/15	12 – 20
alsike clover	2/1 – 4/15	8/1 – 9/10	4 – 6
austrian winter pea	3/1 -4/ 15	8/1 – 10/1	25 – 35
birdsfoot trefoil	3/1 – 4/15	8/1 – 9/10	6 – 12
cow peas	5/15 – 7/1	N/A	60
korean or kobe lespedeza	2/15 – 4/1	N/A	15 – 25
ladino clover	2/1– 4/15	8/1 – 9/10	1 - 3
partridge pea	2/15 – 4/15	N/A	10 – 15
red clover	2/1 – 4/15	8/1 – 9/10	8 – 12
white dutch clover	2/1 – 4/15	8/1 – 9/10	4
Annual Grains			
browntop millet	5/1 – 8/1	N/A	20 – 25
buck wheat	4/1 – 7/20	N/A	30 – 60
corn	4/1 – 5/30	N/A	10 – 18
foxtail millet	5/1 – 8/1	N/A	20 – 25
grain sorghum	5/1 – 6/10	N/A	6 – 9
Japanese millet	5/1 – 8/1	N/A	20 –25
oats	3/1 – 4/1	9/1 – 10/15	64 – 96
pearl millet	5/1 – 8/1	N/A	20 – 25
proso millet	5/1 – 8/1	N/A	20 – 25
soybeans	5/1 – 7/1	N/A	12 – 15
sunflower	4/1 – 5/10	N/A	10 – 15
wheat*	N/A	*10/4 – 11/1	60 – 120

*Consult Hessian fly-free dates
Note: Nurse crops may be required to aid with establishment of these plantings.

Table 7. Plantings for wildlife habitat shall be established with at least two species including at least one grass and one legume. Introduced grass mixtures must include at least 10 pounds of grass PLS/acre.

PLANT SPECIES	EROSION CONTROL RATING 1/	WILDLIFE RATING 1/	SINGLE SPECIES SEEDING RATE (Min lbs./Ac.)	MULTIPLE SPECIES SEEDING RATE (Min lbs. /Ac.)
INTRODUCED GRASSES				
orchardgrass	F	G	15	5
red top	F	G	5	0.5
timothy	G	G	10	5
LEGUMES				
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

1/ - Erosion Control and Wildlife ratings are: **G** – Good, **F** – Fair and **P** – Poor.