NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

RESTORATION AND MANAGEMENT OF DECLINING HABITATS

(acre)

CODE 643

DEFINITION

Restoring and conserving rare or declining native vegetated communities and associated wildlife species.

PURPOSE

- Restore land or aquatic habitats degraded by human activity
- Provide habitat for rare and declining wildlife species by restoring and conserving native plant communities.
- Increase native plant community diversity.
- Management of unique or declining native habitats.

Note: NRCS uses the term “wildlife” to include all animals, terrestrial and aquatic.

CONDITIONS WHERE PRACTICE APPLIES

On any landscape which once supported or currently supports the habitat to be restored or managed. Declining wetland habitat restoration is addressed under other standards in the FOTG. Declining habitats addressed in this standard include the following:

1. Tall Grass Prairie of all types – prairie soils
2. Glades/Barrens – shallow, rocky soils
3. Savanna – various upland and transitional soils
4. Cane Brakes – bottomland and upland soils
5. Ephemeral Ponds – various mesic to hydric soils

CRITERIA

General Criteria Applicable to All Purposes

- Methods used will be designed to protect the soil resource from erosion.
- Vegetative manipulations to restore plant and/or animal diversity can be accomplished by prescribed burning or mechanical, biological or chemical methods, or a combination of the four.
- There will be times when restoration can be best achieved utilizing prescribed fire or herbicides or a combination of these management practices, without planting additional seeds or planting material. Consideration should be given to the existing vegetation onsite and adjacent to the area and the soil seed bank.
- Management measures must be provided to control invasive species and noxious weeds in order to comply with state noxious weed laws and accomplish restoration goals.
- When necessary, spraying or other control of noxious weeds will be done on a “spot” basis to protect forbs and legumes that benefit native pollinators and other wildlife.
- Rotate periodic planned management or other treatments throughout the restored/managed area.

- Where feasible prescribed burning will be utilized instead of mowing.

- Species will be adapted to soil-site conditions and suitable for the planned purpose. Species selected shall be native to physiographic region in which they are planned.

- Seeding rates will be adequate to accomplish the planned purpose. See Tables 1 – 3 for specific grass and forb seeding rates.

- Only high quality ecologically adapted native seed and plant material will be used. Seeds with native local genotype should be used when possible.

- Planting dates and care in handling and planting of the seed or plant material will ensure that established vegetation will have an acceptable rate of survival.

- Site preparation shall be sufficient for establishment and growth of selected species. Timing and use of equipment will be appropriate for the site and soil conditions.

- Any mowing or other disturbance activities must occur before May 15th or after August 1th to avoid the primary nesting season. Exceptions could be granted for periodic burning or mowing when necessary to maintain the health of the plant community. Mowing may be needed during the establishment period to control weeds.

- Additional habitat benefits can be gained by conducting mowing activities during March or August in native grassland habitats.

- Haying and grazing will be managed on a prescribed basis and shall be allowed to achieve and maintain this standards intended purpose.

Criteria Applicable to Native Tall Grass Prairie, Glade, and Barren Restoration

Native tall grass prairies are areas dominated by tall to medium native grass and forb plant communities found on deep soils. Historically these areas were maintained by frequent fire. Trees rapidly invade these areas unless fire, grazing, or mowing, retard plant succession.

Glades or barrens are grassland dominated plant communities found on shallow rocky soils, especially on south and southwest facing slopes. These openings are generally small between 1 and 10 acres typically scattered on the driest outcrops, cliff tops and rocky slopes. Soils are shallow and typically too dry to support a closed forest.

For sites that still have some of the characteristic species of the desired habitat type, it is best to attempt restoration through management techniques such as prescribed burning, herbicide treatments, woody cover removal, and if needed, interseeding with desired species.

Restoration and Maintenance Practices

Brush Management – To restore native prairies, woody species may be removed to prepare for other restoration practices. Woody species removal should be done according to the Additional Criteria For Improving Wildlife Habitat section of the NRCS Brush Management (314) practice standard.

Prescribed Burning – Prescribed fire may be used to prepare an area for future restoration practices or may be sufficient by itself to restore the prairie. Prescribed burning, when possible, shall be utilized every 3 to 5 years to control woody invasion and maintain a healthy prairie community. Prescribed burning shall be completed according to the NRCS Prescribed Burning (338) practice standard.

Mowing Management – While not as effective as prescribed burning, mowing can be used to control woody species invasion and maintain prairie habitat. Mowing should be done according to the Mowing Maintenance section of the Upland Wildlife Habitat Management (645) practice standard.

Chemical management – Selective herbicides may be used to release native species in areas that contains both native and unsuitable introduced species. Use of selective herbicides may also be used to thin native grass stands to release native forb species. Chemical management shall be done according to the Idle Lands – Native Prairie Restoration/Old Field Regeneration section of the Upland Wildlife Habitat Management (645) practice standard. Herbicides shall be used in accordance with all Federal, State and local laws and regulations and the NRCS Pest Management Standard (595) as applicable.

Tall Grass Prairie, Glade, or Barren Planting – Planting can be used to restore tall grass prairies, glades, or barrens when suitable species are no longer present in the area being restored.

- Native prairie plantings will include three pounds pure live seed per acre total of at least three native grass species and between 2 and 5 pounds per acre of at least 4 native forbs. For the Rare and Declining Habitat (CP-25) practice under the CRP, the planting mixture will include 3 pounds pure live seed per acre of at least 3 native grasses and at least 2 pounds of at least 7 native forms.

- See Table 1 for native grass species and seeding rates. See Table 2 for native forb mixtures and rates based on 4 forb species and Table 3 for mixtures and rates based on 7 forb species. Table 4 provides a list of forb species that could be included in a forb mixture along with information regarding their historical ranges.

- When maintaining the genetic integrity of a site is a priority, several steps need considered during restoration. Natural regeneration should be used when possible in concert with practices that favor the native grasses and forbs such as prescribed burning or selective herbicide application. If the remnant stand of native plants is thin, the stand should only be supplemented by planting local ecotype seed. For this purpose, native grass and forb seed harvested from existing remnant stands within 100 miles of the planting site should be used. Special consideration should be given to how seed harvested from an existing remnant stand should be planned and contracted. The harvest area should be evaluated to ensure that a minimum of 3 species of native grass and at least 4 species of native forbs are in the stand. Native grass species should make up at least 30% of the stand. Native forbs should also make up at least 30% of the stand. The stand should not contain noxious or invasive plants or significant amounts of unwanted plants. At least 5 pounds of the harvested mix should be planted depending on the density of the existing stand.

- Seeding and seedbed preparation should be according to the NRCS Conservation Cover (327) practice standard.

- Native forbs may be seeded from October 1st through June 30th. If possible, seed native forbs the fall or winter prior to native grass seeding, this will ensure that seeds go through a cold stratification period.

- Some forb species will germinate the first growing season while some require a cold stratification period and will not germinate until the second growing season.

- Forb seeding depths should be consistent with the native grass seeding depth of ¼" or less.

- Whenever possible, native prairie, glade, and barren plantings should be managed with prescribed fire.

Criteria Applicable to Savanna Restoration

Savannas are open grassy woodlands having widely scattered trees with a herbaceous understory. Before settlement, such vegetation was typical a transition zone between the native prairies and the forested areas of the state. Fires are thought to have occurred at intervals of between 3 and 10 years.

Restoration Practices

Restoration and maintenance practices for savanna restoration include those covered under the Tall Grass Prairie, Glade, and Barren section above. If herbaceous vegetation will be planted to restore the savanna, utilize the criteria under the prairie, glade, or barren planting section above.

Tree Planting – Tree planting requirements for savanna restoration are as follows:

- A minimum of three tree species will be planted from table 5.

- Typically, Bur Oak, Chinquapin Oak and Blue Ash should dominate the plantings in central Kentucky. In the western portions of Kentucky, plantings should be dominated by Post Oak and Blackjack Oak. In eastern Kentucky, savanna habitats were historically dominated by Short leaf pine and Pitch Pine and Chestnut Oak.

- Trees shall be planted at a rate of 25 trees per acre with a spacing that shall not be closer than 30 feet with some trees planted in clusters or blocks rather than evenly spaced across a field. This will allow some parts of the savanna to be more open than other parts.

- Tree planting stock will be at least 3 feet tall with at least 1/2 inch caliper. The large initial size is required to facilitate their protection from fire and reduce competition from grass. Use container grown or ball-n-burlap stock and when possible use air root pruned stock since these seedlings have thick fibrous roots as opposed to a large taproot, which may be difficult to plant.

- Tree planting materials, plant care, and planting methods shall be according to the NRCS Tree/Shrub Establishment (612) practice standard with the above stated exceptions.

Criteria Applicable to Cane Brake Restoration

Cane brakes occur in forest and savanna type habitats on deep soils, especially in floodplains or on rich upland soils. Optimal conditions are on relatively well drained sites in open woodland.

Restoration and Maintenance Practices

Management/Maintenance Practices – If cane is present in an area, restoration may be achieved through the following management practices.

Use Exclusion – When cane is present in an area but is stunted, isolated, or sparse, limiting disturbance activities like grazing, cropping or mowing can help restore cane brakes. In some cases the use of the NRCS Brush Management (314) standard may be beneficial to remove competing shrub species.

- Mowing shall only occur to help during establishment or help maintain the stand and shall not occur more than once every 5 years.

- Grazing should be limited to one rotation every 3 years and should only be allowed after the cane is established.

- **Chemical management** – Selective herbicides may be used to release cane in an area where both cane and unsuitable introduced species exist if a herbicide labeled for this purpose can be found. Chemical management shall be done according to the Idle Lands – Native Prairie Restoration/Old Field Regeneration section of the Upland Wildlife Habitat Management (645) practice standard.

Cane Plantings – Cane brakes may be restored by planting root-balled, potted or dug plants on a 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.

Criteria Applicable to Ephemeral Pool Restoration and Creation

Ephemeral pools are small, shallow pools of water that occur naturally throughout the landscape in Kentucky. When possible, locate ephemeral pools in or at the edge of woodland to provide the best habitat benefits. However, these pools provide important water sources and breeding locations for a variety of wildlife regardless of location. Wild turkeys, bats, and deer may use them for drinking, and salamanders, toads and frogs may lay their eggs in them. Unfortunately, modern landuse practices have eliminated many of our naturally occurring ephemeral pools.

Ephemeral pools shall be installed according to the Additional Criteria to Provide Ephemeral Pool Habitat section in the NRCS Wildlife Watering Facility (648) practice standard.

PLANNING CONSIDERATIONS

Work with a biologist from NRCS, Kentucky Department of Fish and Wildlife Resources, Kentucky State Nature Preserves Commission, and/or the Kentucky Chapter of The Nature Conservancy to identify restoration techniques, species and maintenance requirements for this practice.

The site should first be evaluated to determine if the habitat can be restored through management practices (prescribed fire, brush management, herbicide treatment, etc.) or if it must be restored by planting, seeding and/or a combination.

In many cases threatened and endangered species or species of concern will benefit from conservation of declining habitats. Follow-up habitat assessments shall be performed as needed.

Haying and grazing will be planned and managed as necessary to achieve and maintain the intended purpose.

All habitat manipulations will be planned and managed according to soil capabilities and recommendations for management will avoid excessive soil loss.

Plant materials centers and commercial growers should be encouraged to develop plant materials for habitat restorations.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each habitat type. Specifications shall be recorded using specifications sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

Specifications shall include:

- Management practices needed to restore existing vegetation.
- Site preparation needed to establish and grow selected species.
- Species selection and seeding rates to accomplish the planned purpose.
- Planting dates, care and handling of the seed or other plant materials to ensure an acceptable rate of survival.
- Statement that only viable, high quality, and regionally adapted seed and plant materials will be used.

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance).

Any use of fertilizers, pesticides and other chemicals shall not compromise the intended purpose of this practice.

Declining habitat restoration may take many years to approximate the biological diversity found in a similar undisturbed native habitat. Proper management of the restored area is

essential for the restoration to achieve and maintain the full potential of the site. As the vegetation matures, and goes through successional stages, changes in management practices including the possible introduction of new species may be required to maintain and enhance the desired habitat type.

Prescribed burning, brush management, mowing, and/or selective herbicides should be used as needed according to the appropriate NRCS practice standard to maintain the habitat at the desired state.

Table 1. Native prairie plantings shall include 3 pounds pure live seed of at least 3 native grass species and at least 2 pounds of 4 native forb species. For the Rare and Declining Habitat (CP-25) practice under the CRP, the planting mixture will include 3 pounds pure live seed per acre of at least 3 native grasses and at least 2 pounds per acre of at least 7 native forbs.

Species	**Wildlife Rating**	**Multiple Grass Species Seeding Rate (Minimum Pounds/Acre)**
Native Grass		
Big Bluestem	Good	Minimum 0.5 lb. to 1.0 lb. Maximum
Eastern Gama Grass	Excellent	1
Indiangrass	Good	Minimum 0.5 lb. to 1.0 lb. Maximum
Little Bluestem	Excellent	0.5
Prairie Dropseed	Excellent	0.5
Side Oats Grama	Excellent	0.5
Switchgrass	Good	Minimum 0.5 lb. to 1.0 lb. Maximum
Native Wild Rye Species	Excellent	0.5
Forbs		
Multiple Species	Excellent	2 to 5 pounds

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

Table 2. Native prairie mix shall include 3 pounds pure live seed of at least 3 native grass species and between 2 and 5 pounds of 4 native forb species. The following forb mixes were developed based on 4 native forb species at 2 pounds/acre total rate. These mixes are suitable for dry to moist settings except mix 7 and 8 which are also suitable for wet sites. If a higher forb seeding rate is desired or if other species are desired, work with a biologist to develop the seeding mixture based on a similar number of seeds per pound for each species in the mix. Other eligible forb species and information regarding their historical ranges are located in Table 4.

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 #	Common Name	Scientific Name	Seeding Rate
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
	Greyhead 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

*** - mix suitable for mesic to wet sites**

Table 3. Native prairie mix for the CP-25 practice under CRP shall include 3 pounds pure live seed of at least 3 native grass species and between 2 and 5 pounds of 7 native forb species. The following forb mixes were developed based on 7 native forb species at 2 pounds/acre total rate. These mixes are suitable for dry to moist settings, if a seven forb mix is need for a wet site contact a biologist for assistance. If a higher forb seeding rate is desired or if other species are desired, develop the mixture based on a similar number of seeds per pound for each species in the mix. Other eligible species and their historical ranges are located in Table 4.

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

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.

Common Name	Scientific Name	Ecological Group*	Moisture	Sun	Bloom Color	Height
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'*
New England Aster	*Aster novae-angliae*	1	M,D	Full	*Purple*	*3' – 6'*
Aromatic Aster	*Aster sagittifolius*	1	D,M	Full	*Blue*	*1' – 3'*
Downy Pagoda-plant	*Blephilia ciliata*	1	D	Full/Part.	*Blue*	*1'-- 3'*
Maryland Senna	*Cassia marilandica*	1	M,D	Full	*Yellow*	*4'-8'*
Common Boneset	*Eupatorium perfoliatum*	1	W	Full	*White*	*3' – 5'*
White Snakeroot	*Eupatorium rugosum*	1	M	Full/Part.	*White*	*2'-- 5'*

Common Name	Scientific Name	Ecological Group*	Mois-ture	Sun	Bloom Color	Height
Biennial Beeblossom	*Gaura biennis*	1	M,W	Full	*Pink*	*4'-- 7'*
Sawtooth Sunflower	*Helianthus grosseserratus*	1	M,D	Full	*Yellow*	*5'-- 8'*
Jerusalem Artichoke	*Helianthus tuberosus*	1	M,W	Full/Part.	*Yellow*	*5'-- 7'*
Smooth Oxeye	*Heliopsis helianthoides*	1	M,W	Full	*Yellow*	*2' – 3'*
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'*
Longsepal Beardtongue	*Penstemon calycosus*	1	M,D	Full/Part.	*White*	*2'-- 3'*
Foxglove Beard-tongue	*Penstemon digitalis*	1	M,W	Full/Part.	*White*	*3' – 4'*
Fall Phlox	*Phlox paniculata*	1	M,W	Full/Part.	*Purple*	3'-- 5'
Orange Coneflower	*Rudbeckia fulgida vars.*	1	D,M	Full	*Yellow*	*2' – 4'*
Black-eyed Susan	*Rudbeckia hirta var.*	1	D,M	Full	*Yellow*	*1' – 3'*
Brown-eyed Susan	*Rudbeckia triloba*	1	M	Full/Part.	*Yellow*	*3'-- 5'*
Cup Plant	*Silphium perfoliatum*	1	M,W	Full/Part.	*Yellow*	*5' – 10*
"Tall" Goldenrod	*Solidago altissima*	1	M,D	Full	*Yellow*	*3'-- 6'*
Giant Goldenrod	*Solidago gigantea*	1	W,M	Full	*Yellow*	*3'-- 5'*
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'*
Purple Meadowparsnip	*Thaspium trifoliatum*	1/2 (local)	M	Full/Part.	*Pur/Yell*	*3'-- 4'*
Alternateleaf Wingstem	*Verbesina alternifolia*	1	M,W	Full/Part.	*Yellow*	*5' -- 7'*
Giant Ironweed	*Vernonia gigantea*	1	M,W	Full/Part.	*Purple*	*4' -- 7'*
Golden Alexanders	*Ziza aurea*	1	M,W	Full/Part.	*Yellow*	*2' – 4'*
Redring Milkweed	*Asclepias variegata*	2	D,M	Full/Part.	*Whi/red*	*2'-- 4'*
Toothed Whitetop Aster	*Aster paternus*	2	M,D	Full/Part.	*White*	*2'-- 3'*
Pale Indian Plantain	*Cacalia plantaginea*	2	W	Full/Part.	*White*	*4' – 6'*
Partridge Pea	*Cassia fasciculata*	2	D,M	Full	*Yellow*	*2' –3'*
Maryland Goldenaster	*Chrysopsis mariana*	2	D,M	Full	*Yellow*	*1'-- 3'*
Tall Tickseed	*Coreopsis tripteris*	2	D,M	Full	*Yellow*	*4'-- 7'*
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'*
Sweet Joe-Pye	*Eupatorium purpureum*	2	M,W	Full/Part.	*Purple*	*4' – 6'*
Giant Sunflower	*Helianthus giganteus*	2	M,W	Full	*Yellow*	*5'-- 8'*
Hairy Lespedeza	*Lespedeza hirta*	2	D,M	Full/Part.	*Yellow*	*3'-- 5'*
Cardinal Flower	*Lobelia cardinalis*	2	W	Full/Part.	*Red*	*2' – 5'*
"Broadleaf Evening Primrose"	*Oenothera tetragona*	2	M	Full/Part.	*Yellow*	*1'-- 3'*
Eastern Gray Beardtongue	*Penstemon canescens*	2	M,D	Full/Part.	*White/*	*2'-- 3'*
Eastern Smooth Phlox	*Phlox carolina var.*	2 (E) local	M	Full/Part.	*Purple*	*1'-- 3'*
Western Smooth Phlox	*Phlox glaberrima ssp.*	2 (W) local	M,W	Full	*Purple*	*1'-- 3'*
Wild Sweetwilliam	*Phlox maculata*	2	M,W	Full/Part.	*Purple*	*2' – 4'*
Hoary/Southern Mountain	*Pycnanthemum incanum/*	2	M	Full/Part.	*White*	*2'-- 4'*
Narrowleaf Mountainmint	*Pycnanthemum tenuifolium*	2	D,M	Full	*Whi/pin*	*2' – 3'*
Hoary Skullcap	*Scutellaria incana*	2	M,D	Full/Part.	*Blue*	*2'-- 4'*
Early Goldenrod	*Solidago juncea*	2	M,W	Full	*Yellow*	*2'-- 4'*
Yellow Crownbeard	*Verbesina occidentalis*	2	M	Full/Part.	*Yellow*	*4' -- 6'*
Swamp Verbena	*Verbena hastata*	2	M,W	Full	*Blue*	*4'-- 6'*
Drummond's Aster	*Aster drummondii*	3 (W) local	D,M	Full	*Blue*	*2'-- 5'*
Smooth Aster	*Aster laevis*	3	D	Full	*Blue*	*2' – 4'*
False Blue Indigo	*Baptisia australis*	3	M	Full/Part.	*Blue*	*2' – 5'*
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'*

Common Name	Scientific Name	Ecological Group*	Moisture	Sun	Bloom Color	Height
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'*
Slenderstalk Beeblossom	*Gaura filipes*	3 (W) local	D	Full	*Pink*	*2'-- 3'*
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'*
Slender Lespedeza	*Lespedeza virginica*	3	D,M	Full	*Pink*	*2' – 3'*
Tall Blazing Star	*Liatris aspera*	3	D,M	Full	*Purple*	*2' – 5'*
Scaly Blazing Star	*Liatris squarrosa*	3	D	Full	*Purple*	*1'-- 2'*
Broadleaf Scurfpea	*Orbexilum onobrychis*	3 (local)	D,M	Full/Part.	*Blue*	*2'-- 4'*
Pale Beardtongue	*Penstemon pallidus*	3	M,D	Full/Part.	*White*	*2'-- 3'*
Prairie Phlox	*Phlox pilosa*	3 (local)	D,M	Full/Part.	*Pink*	*-- 1'*
Obedient Plant	*Physostegia virginiana ssp.*	3 (local)	D	Full	*Pink*	*1' – 2'*
Whorled Mountain Mint	*"Pycnanthemum pilosum"*	3	D,M	Full	*White*	*2'-- 4'*
Grayheaded Coneflower	*Ratibida pinnata*	3	D,M	Full	*Yellow*	*3' – 6'*
Sweet Black-eyed Susan	*Rudbeckia submentosia*	3 (local)	M,W	Full/Part.	*Yellow*	*4' – 6'*
Pitcher Sage	*Salvia azurea var.*	3 (W) local	D,M	Full/Part.	*Blue*	*3' – 5'*
Fire Pink	*Silene virginica*	3	D,M	Full/Part.	*Red*	*9"- 16"*
Royal Catchfly	*Silene regia*	3 (local)	D,M	Full	*Red*	*2'- 2.5'*
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'*
Gray Goldenrod	*Solidago nemoralis*	3	D	Full	*Yellow*	*1' – 2'*
Stiff Goldenrod	*Solidago rigida*	3	D,M	Full	*Yellow*	*3' – 5'*
Showy Goldenrod	*Solidago speciosa*	3 (local)	D,M	Full	*Yellow*	*1' – 3'*
Gravelweed	*Verbesina helianthoides*	3	M,D	Full/Part.	*Yellow*	*3' -- 5'*
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'*
Meadow Zizia	*Zizia aptera*	3	D	Full/Part.	*Yellow*	*1' -- 3'*
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'*
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'*
Longbract Wild Indigo	*Baptisia bracteata var. leucophaea*	4 (local)	D	Full	*White*	*1'-- 4'*
New Jersey Tea	*Ceanothus americanus*	4	D,M	Full/Part.	*White*	*2' – 3'*
Narrowleaf Silkgrass	*Chrysopsis graminifolia*	4	D	Full	*Yellow*	*1'-- 3'*
White Thoroughwort	*Eupatorium album var. glandulosum*	4	D	Full	*White*	*2'-- 3'*
Hyssopleaf Thoroughwort	*Eupatorium hyssopifolium*	4	D,M	Full	*White*	*3'-- 5'*
Roundleaf Thoroughwort	*Eupatorium rotundifolium var. ovatum*	4	D,M	Full	*White*	*2'-- 4'*
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'*
Paleleaf Woodland Sunfl.	*Helianthus strumosus*	4 (local)	M,W	Full/Part.	*Yellow*	*3'-- 6'*
Roundhead Lespedeza	*Lespedeza capitata*	4	D,M	Full	*White*	*3' – 5'*

Common Name	Scientific Name	Ecological Group*	Moisture	Sun	Bloom Color	Height
Dense Blazing Star	*Liatris spicata*	4	D,M	Full	*Purple*	*3'-- 5'*
Appalachian Blazing Star	*Liatris squarrulosa*	4	D	Full/Part.	*Purple*	*3'-- 5'*
Narrowleaf Evening Primrose	*Oenothera fruticosa ssp. f.*	4 (local)	D,M	Full	*Yellow*	*1'-- 2'*
Sampson's Snakeroot	*Orbexilum pedunculatum*	4	D,M	Full	*Blue*	*2'-- 3'*
Wild Quinine	*Parthenium integrifolium*	4	D,M	Full/Part.	*White*	*2' – 4'*
Hairy Phlox	*Phlox amoena*	4 (E) local	D,M	Full/Part.	*Purple*	*-- 1'*
Littleleaf Sensitive Brier	*Schrankia microphylla*	4 (E) local	D,M	Full	*Pink*	*2' – 3'*
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'*
"Erect" Goldenrod	*Solidago erecta*	4	D,M	Full	*Yellow*	*3'-- 5'*
Anise-scented Goldenrod	*Solidago odora*	4	D	Full	*Yellow*	*3' -- 5'*
Goat's Rue	*Tephrosia virginiana*	4	D	Full	*Yell/Red*	*1' – 2'*
Hairyjoint Meadowparsnip	*Thaspium barbinode*	1/3 (local)	M,D	Full/Part	*Yellow*	*3' -- 6'*
Purple Meadowparsnip	*Thaspium trifoliatum*	1/2 (local)	M	Full/Part.	*Pur/Yell*	*3'-- 4'*

Table 5. Tree species for establishing savannas.

Common Name	Scientific Name	Region
Shagbark Hickory	*Carya ovata*	Statewide
Mockernut hickory	*Carya tomentosa*	Statewide
Persimmon	*Diospyros virginiana*	Statewide
Blue Ash	*Fraxinus quadrangulata*	Bluegrass and Central Pennyrile
Short-leaf Pine	*Pinus echinata*	East Kentucky Only
Pitch Pine	*Pinus rigida*	East Kentucky Only
White Oak	*Quercus alba*	Statewide
Swamp White Oak	*Quercus bicolor*	Statewide
Shingle Oak	*Quercus imbricaria*	Statewide
Bur Oak	*Quercus macrocarpa*	Bluegrass Region and Shawnee Hills
Blackjack Oak	*Quercus marilandica*	Statewide except not in Bluegrass
Chestnut Oak	*Quercus montana*	Statewide
Chinquapin Oak	*Quercus muhlenbergii*	Statewide
Post Oak	*Quercus stellata*	Statewide except not in Bluegrass
Black Oak	*Quercus velutina*	Statewide