

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CONSERVATION COVER

(Acre)

CODE 327

DEFINITION

Establishing and maintaining permanent vegetative cover to protect soil and water resources.

PURPOSES

- Reduce soil erosion and sedimentation.
- Improve water quality.
- Enhance wildlife habitat.
- Provide cover in tree plantations.

CONDITIONS WHERE PRACTICE APPLIES

The Conservation Cover practice applies on land to be retired from agricultural production requiring permanent protective cover, and on other lands needing permanent protective cover. The practice does not apply to plantings for forage production or to critical area plantings.

CRITERIA

General Criteria Applicable to All Purposes

Species shall be adapted to soil, range site, and climate conditions.

Species planted shall be suitable for the planned purpose and site conditions. Use of invasive and noxious species shall be avoided.

Seeding rates and methods shall be adequate to accomplish the planned purpose.

Several seed mixtures have been provided. The mixtures are useful for general conservation planning purposes but, may or may not be suitable for specific sites or meet requirements of specific conservation programs. Information in Tables 2 and 3 may be used to customize additional seeding mixtures as needed.

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.

Only viable, high quality and adapted seed or planting stock shall be used.

Legume seed shall be inoculated with the proper Rhizobium bacteria before planting.

Site preparation shall be sufficient for establishment and growth of selected species.

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

Vegetative manipulation will be accomplished by mechanical means, biological methods, chemical methods, prescribed burning, or a combination of the four. If burning is used alone or in combination, Prescribed Burning, practice code 338, must be included as a planned practice.

All nutrients shall be applied according to the included specifications.

Additional Criteria to Reduce Erosion, Sedimentation, and to Improve Water Quality

No-till seeding methods are preferred where erosion could be severe.

Nurse crops are required for seedings in tilled seedbeds where severe erosion would be expected during the establishment period.

Additional Criteria for Enhancing Wildlife Habitat

Grasses, forbs, and legumes shall be planted in mixes to encourage maximum plant diversity.

Where included in a wildlife management plan approved by an Illinois Department of Natural Resources (IDNR) or NRCS wildlife biologist, monoculture seedings are allowed for special purposes such as nesting and escape cover or herbaceous fire breaks. It is suggested that native grass monocultures shall be planted at

a seeding rate of 30 PLS seeds per square foot.

Management/Maintenance

Methods used shall be designed to protect the soil resource from erosion.

Maintenance practices and activities shall not disturb cover during the reproductive period of grassland wildlife species.

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

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

Additional Criteria to Provide Cover in Tree Plantations

Most tree planting sites will not need a protective cover, either permanent or temporary. Broadleaf weeds are not aesthetically pleasing but will often provide adequate cover, conceal tree seedlings from deer, and are not very competitive with tree seedlings.

If soil erosion is a concern due to steep slopes and/or highly erodible soils, a temporary cover may be needed until trees become established. (Refer to Table 4 for suitable annual species and seeding rates.) Do not perform fall tillage prior to springtime tree planting unless a temporary cover can be seeded according to the "Late Summer" seeding deadlines found in Table 1.

If a temporary cover will not provide erosion and/or weed control for a sufficient duration, a perennial grass cover may be necessary. Sod forming grasses are very competitive with tree seedlings and have been known to cause tree plantations to fail. Therefore, only less competitive grasses and legumes listed in Table 5 are recommended. Once the cover is established, a weed free, 4-foot diameter circle will be maintained around individual trees. Alternately, a 4-foot wide weed free band will be maintained centered on the tree row. Herbicides, mulches or light tillage may be used to remove competing cover crops and/or weeds from around tree seedlings. Do not include legumes in seed mixes if deer or rabbit

pressure is expected to be high. Legumes often attract deer and rabbits into tree plantations increasing browse on tree seedlings.

CONSIDERATIONS

Consider the long-term objectives of the land user and the needs of declining wildlife species, including threatened and endangered species in the selection of vegetative cover. The use of native plant species is encouraged for all cover situations.

Consider Conservation Cover to conserve and stabilize archeological and historic sites where applicable.

Additional conservation practices, such as grassed waterways, may be needed for complete erosion control.

Established plant communities usually benefit from periodic burning. Burning can stimulate growth of some species by reducing unwanted competition from weedy plants and excessive plant residue and therefore helps to maintain plant community diversity. (Refer to Prescribed Burning, Practice Code 338).

Individuals using herbicides to control weed competition should be cautioned as follows:

Read and follow all label directions and heed all precautions. If herbicides are handled or applied improperly, or if unused portions are not disposed of safely, they may contaminate water and soil, injure humans, domestic animals, desirable plants, and fish or other wildlife. Herbicides should not be used over or directly adjacent to ponds, lakes or streams. Users should be aware of and adhere to the provisions of local, county, state or federal laws and regulations concerning the use of agricultural chemicals.

The use of certified or source identified seed should be used whenever possible.

Where wildlife management is an objective, use Biology Technical Note No IL-18 to determine how the food and cover value of the planting can be enhanced.

Native species (grasses, forbs, and/or legumes), other than the species planted, that encroach the planting that meet the intended purpose of the practice and meet the landowner's objectives will be allowed.

PLANS AND SPECIFICATIONS

Specifications for conservation cover shall be prepared based on specific objectives for each site or planning unit according to the criteria and considerations described in the standard.

A job sheet or similar document shall be used to provide specifications for conservation cover to the land user.

All specifications shall be consistent with Federal, State, and Local regulations.

ESTABLISHMENT OF PERMANENT VEGETATIVE COVER

Seeding Periods

Seeding dates are listed in Table 1. The dates listed in the table are based on long-term averages and may be extended by two weeks by the district conservationist. Extension of these deadlines shall be based on both favorable moisture and temperature for seed germination.

Soil Testing

Soil tests will be taken to the 7-inch depth for newly retired cropland and existing stands of permanent cover greater than five years old if no current soil test is available. Soil tests are considered current if they are 4 years old or less.

Fertilizer and Lime Requirements

The minimum soil test pH for all seedings is 5.5. Where the soil pH level is below 5.5, apply limestone at rates needed to increase soil pH to 6.2 or 3 tons/acre whichever is less. Lime application rates will be calculated according to the procedures described in the Illinois Agronomy Handbook. Application rates greater than 1 ton/acre will be incorporated with tillage.

Note: Depth that the lime will be incorporated must be known in order to calculate appropriate lime rates.

Minimum Levels for Nitrogen, Phosphorus, and Potassium for Native Grasses, Forbs, and Legumes

Fertilizer and lime are not normally recommended for plantings consisting of native grasses, forbs, and legumes. Soil tests should be taken for native plantings in order to select species adaptable to the plant nutrient status of the site.

Minimum Levels for Nitrogen, Phosphorus, and Potassium for Introduced Grasses and Legumes

The minimum soil test Phosphorus (Bray P1 or Mehlich 3) is 15 pounds per acre. For fields with soil test Phosphorus levels below 15 pounds per acre, apply 60 pounds of P_2O_5 per acre. The minimum soil test Potassium is 150 pounds per acre. For fields with soil test Potassium levels below 150 pounds per acre, apply 200 pounds of K_2O per acre.

Nitrogen is not recommended where native species are planned especially during the year of establishment. If weed control is achieved and nitrogen is still needed, apply 50-lbs. actual nitrogen per acre during active growth, after the establishment year.

Nitrogen is not recommended where legumes are included in the seed mixture. For seed mixtures that do not include legumes, apply 30 lbs./ac of actual nitrogen at planting.

Nitrogen may be omitted if either of the following apply:

- Grass seedings follow within nine months of the harvest of a legume crop or,
- Grass seedings are sown into soils with at least 2 percent organic matter.

Seed Quality

All seed shall comply with Illinois Seed and Weed Laws. Seeding rates are expressed in Pure Live Seed (PLS) pounds or ounces/acre.

$PLS = (\% \text{ germination} + \% \text{ dormant seed}) \times \% \text{ purity} / 100.$

Tests for seed quality shall apply to the seed lot being used and must have been performed within 6 months of the approximate date of seeding. Seed shall be tested for percent germination, purity, inert matter, weed seed, noxious weed seed, and dormant or hard seed

if present. The seed label shall state the variety and origin of the species in the mix if known and the seed test date.

Legume Inoculation

Introduced and native legume seed shall be inoculated by the wet method using Rhizobium strains specific to the legumes to be seeded. When more than one legume species is used, each species shall be inoculated separately. Re-inoculate seeds that have been pre-inoculated more than 60 days prior to seeding.

Companion (Nurse) Crop

Introduced Grasses and Legumes

For spring seedings, oats shall be seeded at a rate of one bushel/acre to reduce soil erosion and suppress weed competition. The oats shall be clipped prior to seed head emergence (late boot stage) to prevent further competition with the new permanent cover. For seedings planned for the late summer to early fall period, a companion crop of wheat or cereal rye will be seeded at a rate of 20 lbs./acre. An oat companion crop may be used for late summer if planted no later than 60 days prior to the first expected killing frost date. Expected first frost dates may be found in the FOTG, Section I-Climatic Data, most published soil surveys, and the Illinois Agronomy Handbook. Winter cereal crops will be mowed the following spring no later than just prior to seed head emergence (late boot stage) during the spring following seeding. Cool season, cereal companion crops shall not be allowed to form seeds.

Native Grasses, Forbs, and Legumes

Companion crops are usually not recommended for native warm season seedings. Where erosion or weed pressure is of concern, a broadcast or drilled companion crop of oats seeded at one bushel/acre may be used. Where a companion crop is used, mow by the late boot stage to prevent further competition with the new permanent cover and control weeds.

Temporary Cover

Temporary cover may be required to reduce potential weed and erosion problems where one of the following conditions exists.

- Fields with herbicide carry over.
- The planting is delayed due to unavailability of seed.
- The normal seeding period has passed.

The temporary cover shall be seeded as specified in Table 4. Seed during the normal spring or late summer seeding period or as close to these dates as practical. Temporary cover crops will be mowed as many times as necessary in order to prevent seed formation.

Seeding equipment

Drills, rotary spreaders, or airflow spreaders may be used. Drills will be equipped with metering devices designed for the seeds being sown. Chaffy seed will be seeded with drills equipped to sow bearded seed. Mix seed with a bulking material such as cracked corn or pelletized lime where rotary or airflow spreaders are used. Chaffy seed must be debearded where rotary or airflow equipment is used.

Seedbed preparation and seeding

Tilled Seedbeds

Seedbeds will be tilled to a depth of at least 3 inches. The seedbed shall be reasonably smooth, friable, and firm prior to seeding. Firm tilled seedbeds with a corrugated metal roller, cultipacker, or a cultimulcher with the tines disengaged. Perform all tillage operations across the general slope of the land where possible. Grass and legume seed shall be drilled to a maximum 1/4-1/2 inch depth. Broadcast and airflow seedings are to be rolled with a corrugated metal roller, cultipacker, or a cultimulcher with the tines disengaged after planting.

No-till Seedings

Approved herbicides shall be applied to kill or suppress existing weed competition, where necessary. A drill designed for no-till planting shall be used to plant the seed to a maximum depth of 1/4-1/2 inch.

Frost Seedings

Broadcast seed only species approved for frost seeding as shown in Table 2 and Table 3. Broadcast seedings are not recommended where residue cover on the soil surface exceeds 50 percent ground cover.

Modification of Existing Stands

The following recommendations can be applied to existing stands where a shift in species composition is desired while retaining components of the original stand.

Tilled Seedbeds

Weaken existing vegetation in late summer or early fall with chemicals, mowing, grazing, and/or burning. Disturb the existing ground cover with a disc or power rotary tiller sufficiently to expose 50 percent bare soil. Drill seed to a depth greater than 1/4-1/2 inch. Surface seeding methods may be used as long as the seedbed is rolled after seeding. Suppress early spring growth of existing species to allow for the establishment of the newly introduced species.

No-till Seedings

Weaken the existing vegetation in the late summer or early fall with herbicides, mowing, burning, and/or grazing. Drill grasses and legumes at a depth not to exceed 1/4-1/2 inch with a drill equipped for sod conditions. The seeding should be done within the appropriate seeding periods. Suppress early spring growth of existing species to allow for the establishment of the new seedlings.

Weed and Companion Crop Control During the Establishment Year

To ensure survival of new seedings, weeds and companion crops shall be controlled during the establishment year. Native warm season species shall be mowed no shorter than 8 inches. Introduced cool season species shall be mowed no closer than 4 inches.

Seed Mixtures

General Seed Mixtures

Several general seeding mixtures have been provided in the attached table. The mixtures are suitable for general conservation planning purposes. The mixtures may or may not be suitable for specific sites, targeted wildlife species, or meet requirements of specific conservation programs. General-purpose

native seed mixtures are designed to provide approximately 20-30 PLS seeds/square foot. Information in Tables 2 and 3 are to be used to customize additional seeding mixtures as needed.

Seed Mixtures for Erosion Concerns Introduced cool season grass and legume seed mixtures:

Seed mixtures shall consist of grass and legume components. The grass component of the seed mixture shall consist of at least 3 Lbs. PLS per acre. The legume component shall consist of at least 50% by weight of the total seed mixture. In no case, shall the legumes in mixtures be sown at rates less than the minimums found in Table 2.

Native grass and forb seed mixtures:

Seed rates shall provide at total of 30-40 PLS seeds per square foot. A minimum of 20 PLS seeds per square foot shall be comprised of grasses and 2 PLS seeds per square foot of nitrogen fixing legume species. Seed mixtures may be developed from Table 3.

Seed Mixtures for Wildlife Concerns Introduced Grass and Legume Seed Mixtures:

Seed mixtures shall contain at least two grass and one legume species. The grass component of seed mixtures shall be at least 2 lbs. PLS per acre. Seed mixtures may be designed using Table 2.

Native Grass and Forb Seed Mixtures:

For seed mixtures consisting of native grasses and forbs/legumes, the grass component generally should provide at least 10-20 PLS seeds per square foot. A minimum of 5 PLS seeds per square foot for the legume/forb with at least 1 PLS seed per square foot shall be nitrogen fixing legume species. Seed mixtures may be designed using Table 3.

Monoculture plantings are allowed for special purposes such as nesting or escape cover if included in a wildlife management plan approved by an IDNR or NRCS wildlife biologist.

OPERATION AND MAINTENANCE

After the establishment period, spot mowing or spot herbicide treatment shall be used, where possible, to control noxious weeds and other undesirable plant growth.

Any mowing after the establishment period (except for noxious weed control) should be done prior to April 15 or after August 1 to protect nesting wildlife. Exceptions can be made to allow mowing, burning, and/or chemical treatments when necessary to maintain the health and diversity of the plant community.

Maintenance levels of plant nutrients may be necessary where plant vigor declines.

Burning native plant stands may be appropriate when plant vigor declines, diversity diminishes, or where invader species encroach. See Prescribed Burning, Practice Code 338 for additional information and criteria.

Where the conservation cover is grazed or hayed, refer to Prescribed Grazing, Practice Code 528 and Forest Harvest Management, Practice Code 511.

Strip disking can be used to control stand succession and maintain wildlife benefits. See Upland Wildlife Habitat Management (Practice Code 645) standards and specifications for specific guidelines.

The procedure in Illinois Agronomy Technical Note (IL-2) shall be used for stand evaluation.

REFERENCES:

Heath, M.E., D.S. Metcalfe, R.F. Barnes. 1973. Forages-The Science of Grassland Agriculture, 3rd ed., Iowa State University Press, Ames.

McClain, W.E. 1997. Prairie Establishment and Landscaping, Technical Publication No. 2. Division of Natural Heritage, Illinois Department of Natural Resources, Springfield, Illinois.

National Range and Pasture Handbook, USDA, Natural Resources Conservation Service, Grazing Lands Technology Institute, 1997.

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Vegetating with Native Grasses in Northeastern North America. USDA-Natural Resources Conservation Service and Duck Unlimited Canada.

Table 1. Seeding Dates

Type of Seeding	Plant Suitability Zone ¹	Cool Season Species	Warm Season Species ²
Spring	I	Early spring - June 1	Early spring - June 15
	II	Early Spring - May 15	Early spring - June 5
	III	Early Spring - May 15	Early spring - June 1
Late Summer	I	August 1 - September 1	Not Recommended
	II	August 1 - September 10	Not Recommended
	III	August 1 - September 20	Not Recommended
Dormant	I	November 1 - Freeze-up	November 1 - Freeze-up
	II	November 15 - Freeze up	November 15 - Freeze up
	III	November 15 - Freeze up	November 15 - Freeze up
Frost ³	I	February 1 - March 15	February 1- March 15
	II	February 1 - March 1	February 1 -March 1
	III	February 1 - March 1	February 1 -March 1
1 - Refer to the "Plant Suitability Zones" map locate in Section I, IL-FOTG-Climatic Data 2 - Dates to be used when warm and cool season natives are planted in mixture. 3 - Refer to table 2 and 3 for applicable plant species.			

Table 2. Introduced grasses and legumes

Species S=Sod Forming B= Bunch Forming	Wildlife	Seeds per pound	Seeds per square foot at 1 Lb. PLS/Acre	Recommended seeding rate when included in mixtures Lbs. PLS/Acre	Wildlife Suitability ³	Site Suitability ⁴	pH Range
	% of mixture by weight						
Smooth Bromegrass(S)	0-60	136,000	3	1-3	P	D,WD	5.6-8.4
Kentucky Bluegrass(S)	0-60	2,177,000	50	¾ - 1 ¼	Q	WD,PD	5.6-7.3
Orchardgrass(B)	0-50	654,000	15	½ - 1 ½	P-Q	D,WD	5.6-8.4
Timothy(B)	0-50	1,230,000	28	½ - 1 ½	P-Q	WD,PD	5.1-8.4
Red top(S)	0-50	4,990,000	114	¼ - ¾	P-Q	WD,PD	4.5-9.0
Perennial Ryegrass(B)	0-25	227,000	5	1-3	P	WD,PD	5.1-8.4
Alfalfa ¹	0-50	200,000	5	4-6	P	D,WD	6.1-8.4
Red Clover ¹	0-50	275,000	6	4-6	P-Q	D,WD	5.1-8.4
Birdsfoot Trefoil ¹	0-50	375,000	9	3-4	P-Q	D,WD,PD	5.1-8.4
Ladino Clover ¹	0-50	800,000	37	½ - 1	P-Q	WD,PD	5.1-8.4
Alsike Clover	0-50	700,000	18	2-3	P-Q	WD,PD	5.1-7.3
Annual Lespedeza ^{1,2}	0-50	225,000	5	5-6	Q	D,WD	5.1-7.3 (Common) 5.6-7.3 (Korean)

1. Species suitable for frost seeding. Increase seeding rate by a factor of 1.5.
2. Annual lespedezas are adapted to Plant Suitability Zones 2 and 3 only. Common Korean and Summit are recommended varieties of Korean lespedeza. Kobe and Marion are recommended varieties of striate lespedeza.
3. P=Beneficial for Pheasants Q=Beneficial for Bobwhite Quail (See Figure 1)
4. D=Droughty, WD=Well Drained, PD=Poorly Drained

Wildlife Seed Mixture Criteria: Seed mixtures shall contain at least two grass species and one legume species. The grass component of the seed mixture shall consist of at least 2 Lbs. PLS per acre. Monoculture seedings are allowed on acreage designated for special purposes such as nesting and escape cover, or herbaceous firebreaks and are included in a wildlife management plan.

Erosion Seed Mixture Criteria: Seed mixtures shall consist of grass and legume components. The grass component of the seed mixture shall consist of at least 3 Lbs. PLS per acre. The legume component shall consist of at least 50% by weight of the total seed mixture. In no cases, shall the legumes seed rates be less than the minimums found in the table above.

FIGURE 1. STATEWIDE DISTRIBUTION OF RINGNECK PHEASANT AND BOBWHITE QUAIL

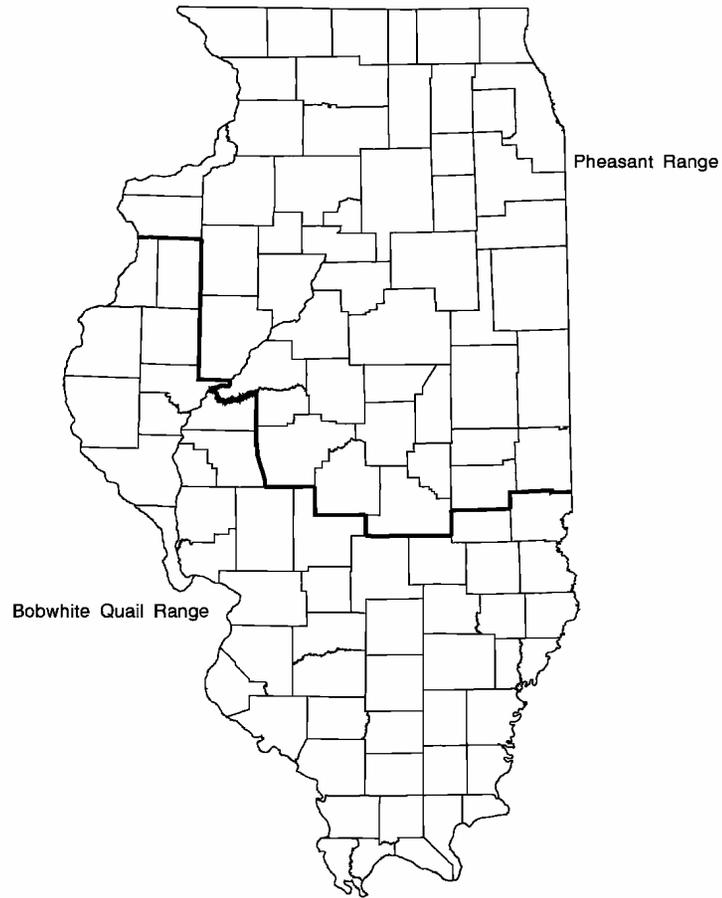


Table 3. Native grasses, sedges, and rushes

Grass, Sedge, and Rush Species	Native Ecosystem ¹	Moisture Regime ²	Seeds per square foot at 1 pound or (<i>1 ounce</i>) PLS/Acre	PLS seeds per pound	pH Range	Remarks
Big Bluestem, <i>Andropogon gerardii</i>	P,S	D,DM,M,WM	3	130,000	5.1-8.4	Warm Season
Blue Grama, <i>Bouteloua gracilis</i>	P	D	16	710,000	6.6-8.4	Warm Season, Sandy soils
Bull sedge, <i>Carex lanuginosa</i>	P,W,S	W	(9)	6,486,000		
Canada wildrye, <i>Elymus canadensis</i>	P,S	DM,M,WM	3	115,000	5-8	Cool season
Dark green bullrush, <i>Scirpus atrovirens</i>	P	W	(11)	7,360,000	4-8	
Eastern gamagrass ⁴ , <i>Tripsacum dactyloides</i>	P	M,WM,W	0.2 ⁴	7,500	4.5-9.0	Warm Season
Fox Sedge, <i>Carex vulpinoidea</i>	P,W,S	W	30	1,297,000	6.8-8.9	
Hard-stemmed bullrush, <i>Scirpus acutus</i>	P	W	5	206,400	5.2-8.5	
Hop sedge, <i>Carex lupulina</i>	P	W	12	528,000	6.1-7.0	
Indiangrass, <i>Sorghastrum nutans</i>	P	D,DM,M,WM	4	170,000	5.6-7.3	Warm Season
June grass, <i>Koeleria macrantha</i>	P	D,DM,M	34	1,465,000	6-8	Cool season, Sandy soils
Little bluestem, <i>Schizachyrium scoparium</i>	P,S	D,DM,M	5	225,000	5.1-8.4	Warm Season
Prairie dropseed, <i>Sporobolus heterolepis</i> ³	P	D,DM,M	28	1,200,000	6-7.2	Warm Season
Rough dropseed, <i>Sporobolus asper</i> ³	P	D,DM,M,WM	34	1,500,000		Warm Season
Sand dropseed, <i>Sporobolus cryptandrus</i> ³	P	D,DM	114	5,000,000	6.6-8.0	Warm Season
Sand Lovegrass, <i>Eragrostis trichodes</i>	P,S	D, DM	35.6	1,550,000	6.0-8.5	Warm Season, Sandy soils
Sideoats grama, <i>Bouteloua curtipendula</i>	P,S	D,DM	4.3	190,000	5.5-7.8	Warm Season
Soft stemmed bullrush, <i>Scirpus validus</i>	P	W	11	496,000	5.4-7.5	
Switchgrass, <i>Panicum virgatum</i> ³	P,S	D,DM,M,WM	9	400,000	5.1-8.4	Warm Season
Virginia wildrye, <i>Elymus virginicus</i>	P,S,W	WM,W	2	75,000	5-7	Cool season
Prairie cordgrass, <i>Spartina pectinata</i>	P	M,WM,W	Plugs or rhizomes on 3 foot centers		6.0-8.5	Warm Season, Seedings are unreliable
Bluejoint reedgrass, <i>Calamagrostis canadensis</i>	P	WM,W	Plugs or rhizomes on 0.5-1.5 foot centers	3,750,000	4.5-8.0	Cool season, Seedings are unreliable

1. Native Ecosystem: P=Prairie, S=Savanna, W= Woodland
2. Moisture Regime: D=Dry, DM=Dry Mesic, M=Mesic, WM=Wet Mesic, W=Wet
3. Suitable for frost seeding.
4. For purposes of designing seeding mixtures, consider 1 lb./acre to provide the equivalent of 2 seeds/ft²

Table 3a. Native Forbs

Forbs and Legumes	Native Ecosystem	Moisture Regime	Flowering Period	Seeds per ft ² at 1 PLS ounce/acre	Seeds per Ounce ¹	pH Range	Remarks
Alumroot, <i>Heuchera richardsonii</i>	P	D, DM, M	April-June	16	687,500		Expensive
American germander, <i>Teucrium canadense</i>	P, S, W	M, WM	Summer	0.5	21,875	4.5-8.0	Aggressive
Aromatic aster, <i>Aster oblongifolius</i>	P	D, DM, M	Late Summer	1.1	51,000	7.0-8.0	Expensive
Ashy sunflower, <i>Helianthus mollis</i>	P	D, DM, M	Aug.-Sept.	0.16	7,000		Aggressive seed no more than 5-10 ounces/acre
Bird's foot violet, <i>Viola pedata</i>	P	D, DM	April-June	0.6	26,000		Expensive
Black-eyed susan, <i>Rudbeckia hirta</i>	P, S	D, DM, M, WM	July-Sept	2.0	93,750	6.0-7.0	Biennial, Seed no more than 1 oz./ac., easily established
Blue-eyed grass, <i>Sisyrinchium campestre</i>	P, S	D, DM, M	Mid Spring-Early Summer	1.0	45,000		Expensive
Blue flag, <i>Iris shrevei</i>	P, S	W	May - July	0.02	1,000		Fall plant
Blue vervain, <i>Verbena hastata</i>	P	W	Summer-Fall	2.0	93,000		
Boneset, <i>Eupatorium perfoliatum</i>	P	W, WM	Mid Summer - Fall	3.6	160,000		
Bottle Gentian, <i>Gentiana andrewsii</i>	P, S	M	Late Summer-Fall	13.0	562,500	5.8-7.2	Expensive
Brown-eyed susan, <i>Rudbeckia triloba</i>	P, S	DM, M, WM	Jul.-Sept.	0.8	35,000		
Butterfly milkweed, <i>Asclepias tuberosa</i>	P, S	DM, M	June-Aug	0.1	4,375	4.8-6.8	
Calico aster, <i>Aster lateriflorus</i>	S, W	W, WM	Late Summer	5.7	250,000		Expensive
Canada anemone, <i>Anemone canadensis</i>	P, S	W	Late May-June	0.18	8,000		
Cardinal flower, <i>Lobelia cardinalis</i>	P, S	WM, W	August	6.8	300,000	5.8-7.8	Expensive
Compass plant, <i>Silphium laciniatum</i>	P	DM, M	June-Sept	0.01	663		
Cream wild indigo, <i>Baptisia leucophaea</i>	P, S	DM, M	May	.03	1,400		
Culver's root, <i>Veronicastrum virginicum</i>	P, S	M, WM, W	Summer	17.2	750,000		Expensive
Cup plant, <i>Silphium perfoliatum</i>	P, S	M, WM, W	Jul-Sept	0.03	1,400		
Dotted blazing star, <i>Liatris punctata</i>	P	D, DM, M	Aug.-Sept	0.09	3940	6.0-7.8	
Downy gentian, <i>Gentiana puberulenta</i>	P, S	M, WM	Sept-Oct	10.0	435,000		Expensive
Evening primrose, <i>Oenothera biennis</i>	P, S	D, DM, M	Aug-Sept	2.0	86,000	5.0-7.0	Biennial
Feverfew-Wild quinine, <i>Parthenium integrifolium</i>	P	DM, M, WM	June-August	0.16	7,000		Easily established
Flat-topped aster, <i>Aster umbellatus</i>	P, S	W	Late Sum-Fall	1.15	50,250		Expensive
Flowering spurge, <i>Euphorbia corollata</i>	P	D, DM, M	June-September	0.18	8,000		Expensive
Foxglove beardedtongue, <i>Penstemon digitalis</i>	P, S	M	Late Spring-Mid Summer	2.8	125,000	5.5-7	
Fringed gentian, <i>Gentianopsis crinita</i>	P	WM, W	Sept-Oct	5.3	231,250		Biennial
Fringed Loosestrife, <i>Lysimachia ciliata</i>	P, W	WM, W	Late Spr-Sum	2.0	90,000		
Golden alexanders, <i>Zizia aurea</i>	P, S, W	M, MW	Mid Spring-Early Summer	0.28	12,000		Easily established
Gray-headed coneflower, <i>Ratibida pinnata</i>	P, S	D, DM, M, WM	July-Sept	0.9	39,063	5.5-6.8	Easily established
Great blue lobelia, <i>Lobelia siphilitica</i>	P, S	W, WM	Mid Sum-Fall	10.5	457,500		

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Forbs and Legumes	Native Ecosystem	Moisture Regime	Flowering Period	Seeds per ft ² at 1 PLS ounce/acre	Seeds per Ounce ¹	pH Range	Remarks
Gray-headed coneflower, <i>Ratibida pinnata</i>	P, S	D, DM, M, WM	July-Sept	0.9	39,063	5.5-6.8	Easily established
Heartleaf golden alexanders, <i>Zizia aptera</i>	P, S	M	Mid Spring- Early Summer	0.02	750		
Heath aster, <i>Aster ericoides</i>	P, S	D, DM, M	Aug-Oct	4.6	200,000		Seed no more than 0.1 ounce/acre, expensive
Hoary puccoon, <i>Lithospermum canescens</i>	P	D, DM	May	0.57	25,000		
Hoary vervain, <i>Verbena stricta</i>	P	D, DM	Late Spr-Early Fall	0.77	33,375		Easily established
Illinois bundle flower, <i>Desmanthus illinoensis</i>	P, S, W	DM, M	Early Summer	0.09	3,750	5.0-8.0	Legume, easily established
Illinois tick trefoil, <i>Desmodium illinoense</i>	P, S, W	D, DM	June-July	0.09	4,000		
Ironweed, <i>Vernonia fasciculata</i>	P, S	W	Late July-Early Oct	0.55	24,000		Easily established
Joe-pye weed, <i>Eupatorium maculatum</i>	P	W	Late Spr-Early Fall	2.1	95,000		
Lance leaf coreopsis, <i>Coreopsis lanceolata</i>	P, S	D, DM	May-June	0.46	20,000		
Lousewort, <i>Pedicularis canadensis</i> (Wood betony)	P, S	DM	May-June	0.75	3,250	4.0-7.0	Expensive
Milk vetch, <i>Astragalus canadensis</i>	P	M	Summer	0.36	15,625	6.0-8.0	Legume, easily established
Mountain mint, <i>Pycnanthemum virginianum</i>	P, S	DM, M, WM	Mid Sum-Early Fall	5.0	220,000		Expensive
New England aster, <i>Aster novae-angliae</i>	P, S	M, WM	Aug-Oct	1.5	66,000		Expensive
Old field (Gray) goldenrod, <i>Solidago nemoralis</i>	P, S	D, DM, M	Late Sum-Fall	6.9	300,000	6.5-7.5	Expensive
Ox-eye or False sunflower, <i>Heliopsis helianthoides</i>	P, S	M	June-Sept	0.15	6494		Easily established
Pale beardtongue, <i>Penstemon pallidus</i>	P, S	D	May	4.1	180,000		
Pale gentian, <i>Gentiana alba</i>	P	M, WM	Sept-Oct	5.2	227,000		Expensive
Pale purple coneflower, <i>Echinacea pallida</i>	P	M	Mid-Late Spring	0.15	6,625	6.5-7.2	Easily established
Partridge pea, <i>Chamaecrista fasciculata</i>	P, S	DM, M	July-Sept	0.07	3,125	6.5-7.5	Annual legume
Pasque flower, <i>Pulsatilla patens</i>	P	D, DM	Early-Mid Spring	0.41	18,000		Northern IL, expensive
Prairie blazing star, <i>Liatrix pycnostachya</i>	P	DM, M, WM	Mid Sum-Early Fall	0.17	7,500	6-8.5	Easily established
Prairie cinquefoil (potentilla), <i>Potentilla arguta</i>	P, S	D, DM, M	Spr-Sum	5.3	230,000	6-8	Easily established
Prairie coreopsis, <i>Coreopsis palmata</i>	P, S	D, DM, M	June	0.23	10,000		
Prairie dock, <i>Silphium terebinthinaceum</i>	P	M, WM	Summer	0.02	1,000		
Prairie phlox, <i>Phlox pilosa</i>	P, S	DM, M	Mid Spr-Mid Summer	.44	19,000		Expensive
Prairie ragwort, <i>Senecio plattensis</i>	P	D, DM, M	May-June	2.3	100,000		Supplies limited
Prairie smoke, <i>Geum triflorum</i>	P, S	D, DM	Mid-Late Summer	1.0	43,500		Northern IL, expensive
Prairie violet, <i>Viola pedatifida</i>	P	D, DM, M	Spring- Fall	0.7	28,000		Expensive
Purple coneflower, <i>Echinacea purpurea</i>	P, W	M	June-July	0.14	6,000	6.5-7.2	Easily established
Purple meadow rue, <i>Thalictrum dasycarpum</i>	P	M, WM	May-June	0.25	11,000		

Forbs and Legumes	Native Ecosystem	Moisture Regime	Flowering Period	Seeds per ft ² at 1 PLS ounce/acre	Seeds per Ounce ¹	pH Range	Remarks
Purple prairie clover, <i>Dalea purpureum</i>	P	D, DM, M	July-Aug	0.40	17,188		Legume
Rattlesnake master, <i>Eryngium yuccifolium</i>	P	DM, M, WM	June-August	0.16	7,000		
Riddell's goldenrod, <i>Solidago riddellii</i>	P	W	Late Summer	2.1	93,000		Wet/Calcareous Soils
Rigid or Stiff goldenrod, <i>Solidago rigida</i>	P	D, DM, M, WM	Aug-Oct	1.0	41,000		Easily established
Rosin weed, <i>Silphium integrifolium</i>	P	DM, M	July-Sept	0.03	1,400		Easily established
Rough blazing star, <i>Liatris asper</i>	P, S	D, DM, M	Aug-Sept	0.34	16,000		Easily established
Roundhead lespedeza, <i>Lespedeza capitata</i>	P, S	D, DM, M	July-Sept	0.18	8,000	5.7-8.2	Legume, easily established
Saw-tooth sunflower, <i>Helianthus grosseserratus</i>	P, S	M, WM, W	July-Aug	0.90	12,500		Aggressive, Seed no more than 5-10 ounces/acre
Seedbox, <i>Ludwigia alternifolia</i>	P	M, MW, W		29.8	1,300,000	4-6	Sandy soils
Shooting star, <i>Dodecatheon meadia</i>	P, S	D, DM, M	April-May	1.38	60,000	4-6	
Showy goldenrod, <i>Solidago speciosa</i>	P, S	DM, M	July-Oct	2.18	95,000		
Showy tick trefoil, <i>Desmodium canadense</i>	P, S	M, WM	July-Aug	0.13	5,500		Legume, easily established
Silky Aster, <i>Aster sericeus</i>	P, S	D, DM	Late Sum-Fall	1.29	55,625		
Sky blue aster, <i>Aster azureus</i>	P, S	D, DM, M	Late Sum-Fall	1.45	63,125		Expensive, easily established
Smooth blue aster, <i>Aster laevis</i>	P, S	DM, M, WM	Aug-Oct	1.15	50,000		Expensive, easily established
Sneezeweed, <i>Helenium autumnale</i>	P	WM, W	Aug-Sept	3.26	14,188		
Spiderwort, <i>Tradescantia ohioensis</i>	P, S	D, DM, M	May-June	0.18	8,000		Expensive
Spiked lobelia, <i>Lobelia spicata</i>	P	DM, M	Mid Spring-Mid Summer	20.7	90,000		Expensive
Spotted St. John's wort, <i>Hypericum punctatum</i>	P, S	WM	June-Aug	13.3	580,000		
Swamp aster, <i>Aster puniceus (Purplestem aster)</i>	P, S	W	Late Sum-Fall	1.0	43,750		Limited supply
Swamp Buttercup, <i>Ranunculus hispidus</i>	S, W	W, WM	April-July	0.04	1,594		Expensive
Swamp milkweed, <i>Asclepias incarnata</i>	P	W	Summer	0.10	4,375		Easily established
Sweet black-eyed susan, <i>Rudbeckia subtomentosa</i>	P, S	M	Summer	1.0	43,000		
Tall tickseed or Tall Coreopsis, <i>Coreopsis tripteris</i>	P, S, W	M, MW	Summer	0.32	14,000		Aggressive seeder
Thimbleweed, <i>Anemone cylindrica</i>	P, S	D, DM, M	Late Spring-Mid Summer	0.60	26,000		Expensive
White heath aster or Frost aster, <i>Aster pilosus</i>	P, S, W	D, DM, M	Sept-Oct	3.2	140,000		Seed no more than 1 ounce/acre
White prairie clover, <i>Dalea candida</i>	P	DM, M	Late Spring-Summer	0.44	19,000		Legume, easily established
White sage <i>Artemisia ludoviciana</i>	P, S	D, DM, M	Aug-Oct	5.4	234,375		Aggressive, expensive
White wild indigo, <i>Baptisia leucantha</i>	P, S	DM, M, WM	June-July	0.04	1,700		
Wild bergamont or Bee balm, <i>Monarda fistulosa</i>	P, S	D, DM, M	Mid Spring-Early sum	1.72	75,000	6-8	Expensive, easily established
Whorled milkweed, <i>Asclepias verticillata</i>	P	D, DM, M	Jun-Aug	0.25	11,000		Expensive
Wild blue larkspur, <i>Delphinium carolinianum</i>	S, W	D, DM, M	June	1.34	60,000		Expensive
Yellow stargrass, <i>Hypoxis hirsuta</i>	P, S	M, WM	May-June	1.84	80,000		Limited supply

Table 3b. Native Woody Shrub Species

Perennial Native Woody Shrub Species	Moisture Regime	Flowering Period	Seeds per ft ² at 1 PLS ounce/acre	Seeds per ounce	pH Range	Remarks
Button bush, <i>Cephalanthus occidentalis</i>	W, WM	June	0.14	6,000	5.3-8.5	
False Indigo, <i>Amorpha fruticosa</i>	DM,M,WM	June	0.07	3250	5.0-8.5	Legume
Leadplant, <i>Amorpha canescens</i>	D, DM, M	June-July	0.14	17,000	5.5-8	Legume
Maryland senna, <i>Cassia marilandica</i>	DM,M,WM	July-August	0.03	1,500	4-7	Legume
Meadow rose, <i>Rosa blanda</i>	DM, M, WM	June	0.06	2,500		
New Jersey tea, <i>Ceanothus americanus</i>	DM, M	Late Spring-Fall	0.16	7,000	4.3-6.5	
Pasture rose, <i>Rosa carolina</i>	DM, M, WM	June – Early July	0.06	2,500	4-7	
Sunshine rose, <i>Rosa arkansana</i>	DM, M	June-July	0.06	2,500		
Redroot, <i>Ceanothus ovatus</i>	DM, M	June	0.23	10,000		
Wild senna, <i>Cassia hebecarpa</i>	DM,M,WM	July-August	0.03	1,400	4-7	Legume

Table 4. Temporary cover crops.

COVER CROP ¹	SEEDING RATE
Fields with atrazine carryover	
Grain Sorghum (milo)	10 lbs./acre
Sorghum-Sudan hybrids (Sudex)	20 lbs./acre
Sudangrass	20 lbs./acre
Corn	2 bushels/acre
Fields where planting is delayed due to lack of suitable seed or late planting date	
Grain Sorghum (milo)	10 lbs./acre
Sorghum-Sudan hybrids (Sudex)	20 lbs./acre
Sudangrass	20 lbs./acre
Corn	2 bushels/acre
Oats	2 bushels/acre
Cereal Rye	2 bushels/acre
Wheat	2 bushels/acre
Annual Ryegrass	15 lbs./acre
Temporary cover for tree plantations	
Wheat	20 lbs./acre
Rye	15 lbs./acre
Oats	15 lbs./acre
1/Cover crops should be mowed no later than early boot to prevent them from setting seed.	

Table 5. Permanent grass and legume cover for tree plantations.

Species	% by weight of mixture (range allowed)	Pure Stand Seeding Rate (lbs./acre)
Kentucky bluegrass	0-100	0.8
Redtop	0-100	0.5
Timothy	0-100	1.5
Virginia wildrye	0-100	23
Ladino clover	0-50	2
Alsike clover	0-50	2.5
Annual lespedeza	0-50	7.5

Example Seed Mixtures

Species	Introduced Species	Lbs. PLS/ac	Native Species	Lbs. PLS/ac
<u>Pheasants</u> Prefer cool season grass- legume mix or moderately dense warm season grass.	<u>Mixture 1</u>		<u>Mixture 1</u>	
	Smooth Brome	3	Sideoats Grama	1
	Timothy	1/2	Indiangrass	1
	Alfalfa	6	Little Bluestem	2
			Purple Prairie Clover	1
			Illinois Bundleflower	1
	<u>Mixture 2</u>		<u>Mixture 2</u>	
	Smooth Brome	1	Little Bluestem	2
	Orchardgrass	1	Sideoats Grama	2
	Alfalfa	6	Canada Wildrye	1
		Diverse Forb Mixture (10-20 species)	1-2	
<u>Mixture 3</u>		<u>Mixture 3</u>		
Orchardgrass	1			
Timothy	1	Little Bluestem	2	
Red Clover	6	Sideoats Grama	2	
		Purple Prairie Clover	1	
		Illinois Bundleflower	1	
Species	Introduced Species	Lbs. PLS/ac	Native Species	Lbs. PLS/ac
<u>Whitetail Deer</u> Moderately dense warm season grasses or cool season grass- legume mix. Legumes are an important deer food and should be included in a mixture with other species or planted in a block as a food plot.	<u>Mixture 1</u>		<u>Mixture 1</u>	
	Smooth Brome	3	Big Bluestem	1
	Orchardgrass	1/2	Switchgrass	1
	Alfalfa	6	Indiangrass	1
			Prairie Clover	2
	<u>Mixture 2</u>		<u>Mixture 2</u>	
	Smooth Brome	1	Big Bluestem	1
	Timothy	1	Little Bluestem	2
	Alfalfa	4	Sideoats Grama	1
	Red Clover	4	Partridge Pea	1
		Illinois Bundleflower	1	
		Purple Prairie Clover	1/2	

Species	Introduced Species	Lbs. PLS/ac	Native Species	Lbs. PLS/ac
<u>Bobwhite Quail</u> Prefer stands of bunch forming grasses that form overhead canopies with open space at ground level interspersed with legumes and other annual plant species.	<u>Mixture 1</u>		<u>Mixture 1</u>	
	Red Top	3/4	Little Bluestem	2
	Timothy	1 1/4	Sideoats Grama	2
	Red Clover	6	Partridge Pea Purple Prairie Clover Roundhead Lespedeza	1 1/2 1/2
	<u>Mixture 2</u> (Zones 2 & 3 only)		<u>Mixture 2</u>	
	Redtop	3/4	Little Bluestem	2
	Orchardgrass Red Clover Annual lespedeza	1 1/4 4 5	Sideoats Grama Diverse forb mix (10-20 species)	2 1
Species	Introduced Species	Lbs. PLS/ac	Native Species	Lbs. PLS/ac
<u>Waterfowl¹</u>	<u>Mixture 1</u>		<u>Mixture 1</u>	
	Smooth Brome	2	Big Bluestem	1
	Orchardgrass	1	Switchgrass	2
	Alfalfa	6	Clover Indiangrass Black-eyed Susan Illinois Bundle Flower Purple Prairie	1 1 oz. 1 1/4
	<u>Mixture 2</u>		<u>Mixture 2</u>	
	Smooth Brome	1		
	Timothy	1/2	Little Bluestem	2
	Orchardgrass	1/2	Sideoats Grama	2
	Red Clover	6	Canadian Wildrye Diverse Forb Mixture (10-20 species)	2 1
	^{1/} - Different duck species have different preferences of vegetation height for nesting. For example, Pintails like short grasses, Blue Wing Teal prefer medium height species, and Mallard and Gadwalls prefer tall species.			
NOTE: The mixes above are only example mixes. Planners may elect to design other mixtures using Table 2 and/or Table 3 of this standard or consult with IDNR or NRCS Biologist for mixes that meet specific goals of landowners that desire other target species or uses for the area. Forb mixtures provide more diversity may be used as a substitute for the legumes provided above. A sample for mixture is provided in the following table.				

Sample Forb Mixture

Forbs and Legumes	Native Ecosystem	Moisture Regime	Flowering Period	Seed Rate PLS ounce/acre	Seeds per ft ²	pH Range	Remarks
Black-eyed susan, <i>Rudbeckia hirta</i>	P, S	D, DM, M, WM	July-Sept	1.0	2.0	6.0-7.0	Biennial ,Seed no more than 1 oz./ac.
Foxglove beardedtongue, <i>Penstemon digitalis</i>	P, S	M	Late Spring-Mid Summer	1.0	2.8	5.5-7	
Illinois bundle flower, <i>Desmanthus illinoensis</i>	P, S, W	DM, M	Early Summer	2.0	0.56	5.0-8.0	Legume
Purple coneflower, <i>Echinacea purpurea</i>	P, W	M	June-July	4.0	0.14	6.5-7.2	
Purple prairie clover, <i>Dalea purpureum</i>	P	D, DM, M	July-Aug	2.0	0.80		Legume
New England aster, <i>Aster novae-angliae</i>	P, S	M, WM	Aug-Oct	1.0	1.5		
Roundhead lespedeza, <i>Lepedeza capitata</i>	P,S	D, DM, M	July-Sept	1.0	0.18	5.7-8.2	Legume
White prairie clover, <i>Dalea candida</i>	P	DM, M	Late Spring-Summer	2.0	0.88		Legume
Wild bergamont or Bee balm, <i>Monarda fistulosa</i>	P, S	D, DM, M	Mid Spring-Early sum	1.0	1.72	6-8	
Rigid or Stiff goldenrod, <i>Solidago rigida</i>	P	D, DM, M	Aug-Oct	1.0	1.0		
TOTAL				16.0	12		