Customize Options to Suit Site Conditions

Pick an Ecoregion

○ Xeric (dry) ○ Mesic (medium) ○ Hydric (wet)

○ Prairie ○ Savanna ○ Wetland ○ Woodland

○ Long Term Program ○ Short Term Program

○ Monarch Preferred Species
○ Forage and Biomass (512) Planting

CHOOSE A RATE SPECIFICATION:

◉ lbs/acre PLS (check a mix) ○ Seeds/ft2 PLS (design a mix)

To override default cost, enter your cost in the applicable cell.

USDA United States Department of Agriculture

Natural Resources Conservation Service

Criteria Revision Update 5/26/2020
Species Information Update 5/26/2020

CHOOSE YOUR GRASSES

Input quantity

	Common Name *Select Plants (Click)	Scientific Name Growth Form	Lbs / acre PLS	Seeds / ft2 PLS	Coefficient of Conservatism	Estimated Cost ($/lb)	# Seeds / ft² @ 1 lb. / ac	Pure Stand PLS Rate lbs / ac	% of Mix	Estimated Cost ($/ac)	Functional Group
			Equivalent rate below								
1	**Bluestem, Big**	***Andropogon gerardii***	**2.00**		5	$7	3.0	11.7	14.4%	$14	Perennial Warm Season Grass
		Bunch		**5.97**							
2	**Indiangrass**	***Sorghastrum nutans***	**2.00**		4	$6	3.9	9.0	18.9%	$12	Perennial Warm Season Grass
		Bunch		**7.81**							
3	**Switchgrass**	***Panicum virgatum***	**3.00**		4	$8	9.2	4.0	66.7%	$24	Perennial Warm Season Grass
		Rhizomatous		**27.55**							
4										$0.00	
5										$0.00	
6										$0.00	
7										$0.00	
8										$0.00	
9										$0.00	
10										$0.00	
11										$0.00	
12										$0.00	
13										$0.00	
14										$0.00	
15										$0.00	
16										$0.00	
17										$0.00	
18										$0.00	
19										$0.00	
20										$0.00	
21										$0.00	
22										$0.00	
23										$0.00	
24										$0.00	
25										$0.00	

25										$0.00	
27										$0.00	
28										$0.00	
29										$0.00	
30										$0.00	

	Species Richness	lbs / acre PLS	seeds / ft^2 PLS	Average CC			
GRAMINOID TOTAL	3	7.00	41.32	4.3	ESTIMATED GRAMINOID COST ($/AC)	OST ($/AC)	$50

CHOOSE YOUR FORBS/LEGUMES

Input quantity

	Common Name *Select Plants (Click)	Scientific Name *Select Bloom Period below Scientific Name	Lbs / acre PLS	Seeds / ft2 PLS	Coefficient of Conservatism	Estimated Cost ($/lb)	# Seeds / ft^2 @ 1 lb. / ac	Pure Stand PLS Rate lbs / ac	% of Mix	Estimated Cost ($/ac)	Functional Group	Monarch Preferred
			Equivalent rate below									
1										$0.00		
	Input bloom period ->	Mid										
2										$0.00		
	Input bloom period ->	Early										
3										$0.00		
	Input bloom period ->	Mid										
4										$0.00		
	Input bloom period ->	Mid										
5										$0.00		
	Input bloom period ->	Mid										
6										$0.00		
	Input bloom period ->	Late										
7										$0.00		
	Input bloom period ->											
8										$0.00		
	Input bloom period ->	Late										
9										$0.00		
	Input bloom period ->	Late										
10										$0.00		
	Input bloom period ->	Mid										
11										$0.00		
	Input bloom period ->	Late										
12										$0.00		
	Input bloom period ->	Early										
13										$0.00		
	Input bloom period ->	Late										
14										$0.00		
	Input bloom period ->	Mid										
15										$0.00		
	Input bloom period ->	Late										
16										$0.00		
	Input bloom period ->	Early										
17										$0.00		
	Input bloom period ->	Mid										
18										$0.00		
	Input bloom period ->	Mid										
19										$0.00		
	Input bloom period ->	Mid										
20										$0.00		
	Input bloom period ->	Late										
21										$0.00		
	Input bloom period ->	Late										
22										$0.00		
	Input bloom period ->	Early										

23											$0.00		
	Input bloom period ->	Late											
24											$0.00		
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38											$0.00		
	Input bloom period ->												
39											$0.00		
	Input bloom period ->												
40											$0.00		
	Input bloom period ->												

	Species Richness	lbs / acre PLS	seeds / ft^2 PLS	Average CC			
FORBS/LEGUMES TOTAL	0	0.00	0.00	0.0	ESTIMATED FORB COST ($/AC)	COST ($/AC)	$0

CHOOSE YOUR VINE OR Sub-Shrub PLANT SPECIES

	Common Name	Scientific Name Flowering Period	Lbs / acre PLS Equivalent rate below	Seeds / ft2 PLS	Coefficient of Conservatism	Estimated Cost ($/lb)	# Seeds / ft^2 @ 1 oz. / ac	Pure Stand PLS Rate lbs / ac	% of Mix	Estimated Cost ($/ac)	Functional Group	Monarch Preferred
1										$0.00		
	Input bloom period ->	Mid										
2										$0.00		
	Input bloom period ->	Mid										
3										$0.00		
	Input bloom period ->											
4										$0.00		
	Input bloom period ->											
5										$0.00		
	Input bloom period ->											

	Species Richness	Lbs / acre PLS	seeds / ft^2 PLS	Average CC			
VINE & WOODY PLANT TOTAL	0	0.00	0.00	0.0	ESTIMATED VINE & WOODY COST ($/AC)	COST ($/AC)	$0

	lbs / acre PLS	seeds / ft^2 PLS	Average CC	Species Richness	Floristic Quality Index		ESTIMATED GRAND TOTAL COST ($/AC)
GRAND TOTAL	7.00	41.3	4.3	3	7.5	$50	

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FILTER STRIP

Code 393

(Ac)

DEFINITION

A strip or area of herbaceous vegetation that removes contaminants from overland flow.

PURPOSE

- Reduce suspended solids and associated contaminants in runoff and excessive sediment in surface waters.
- Reduce dissolved contaminant loadings in runoff.
- Reduce suspended solids and associated contaminants in irrigation tailwater and excessive sediment in surface waters.

CONDITIONS WHERE PRACTICE APPLIES

Filter strips are established where environmentally sensitive areas need to be protected from sediment, other suspended solids, and dissolved contaminants in runoff.

CRITERIA

General Criteria Applicable to All Purposes

Overland flow entering the filter strip will be uniform sheet flow. Concentrated flow will be dispersed before it enters the filter strip.

Filter strips will not be placed on sites adjacent to larger rivers and streams where the predominant in flow is from out of bank flow.

Filter strips shall be located downslope from a source area of contaminants. Filter strips will not be placed on sites such as larger rivers and streams where the predominant in flow is from out of bank flow.

State-listed noxious or invasive plants will not be established in the filter strip.

The maximum gradient along the leading edge of filter strip will not exceed one-half of the up-and-down-hill slope percent, immediately upslope from the filter strip, up to a maximum of five percent. The drainage area immediately above the filter strip will have a slope of one half percent or greater.

Filter strips shall be established to permanent herbaceous vegetation consisting of predominately sod forming, stiff stemmed grass species

Filter strips will not be used as a travel lane for equipment or livestock.

Seedings will be conducted within the appropriate seeding periods.

The minimum seeding and stem density shall be equivalent to a high quality grass hay. Successful establishment will be based on Illinois Agronomy Technical Note No. IL-2, "Guidelines for Herbaceous Stand Evaluation". Minimum stand densities will be consistent with applicable forage seedings.

Additional Criteria to Reduce Dissolved Contaminants, Suspended Solids and Associated Contaminants in Runoff and Excessive Sediment in Surface Waters.

The filter strip design and land treatment of the contributing area will be adequate to prevent an excess of 6 inches of accumulated sediment in the filter strip over a 10-year life span. Agronomy Technical Note No. 2, "Using RUSLE2 for the Design and Predicted Effectiveness of Vegetative Filter Strips (VFS) for Sediment," and the associated "Illinois Filter Strip Sediment Deposition Worksheet". The minimum flow length (width) shall be based on a 15 minute flow through time determined not to exceed a 30 minute flow through time from Table 2. Filter strip width may be rounded to match increments of the planting width.

Vegetation. The filter strip will be established to permanent herbaceous vegetation.

Species selected will be—

- Tolerant of herbicides used on the area that contributes runoff to the filter strip.
- Stiff stemmed and a high stem density near the ground surface.
- Suited to current site conditions and intended uses.
- Able to achieve adequate density and vigor within an appropriate period to stabilize the site sufficiently to permit suited uses with ordinary management activities.

Plant species, rates of seeding (PLS lbs. /ac) and method of establishment shall be specified before application. Only viable, high quality seed will be used.

Site preparation and seeding/planting shall be performed at a time and in a manner that best ensures survival and growth of selected species.

Schedule planting dates during periods when soil moisture is adequate for germination and establishment. Seeding will be timed so that tillage for adjacent crop does not damage the seeded filter strip.

Where the purpose is to remove phosphorus, remove (or harvest) the filter strip aboveground biomass at least once each year where permitted.

Additional Criteria to Reduce Suspended Solids and Associated Contaminants in Irrigation Tailwater and Excessive Sediment in Surface Waters.

Filter strip vegetation will be a small grain or other suitable annual plant.

The seeding rate shall be sufficient to ensure that the plant spacing does not exceed 4 inches (about 16–18 plants per square foot).

Establish filter strips prior to the irrigation season so that the vegetation is mature enough to filter sediment from the first irrigation.

CONSIDERATIONS

General Considerations.

Filter strip width (flow length) can be increased as necessary to accommodate harvest and maintenance equipment.

Filters strips with the leading edge on the contour will function better than those with a gradient along the leading edge.

Increase Carbon Storage. Increasing the width of the filter strip beyond the minimum required will increase potential for carbon sequestration.

PLANS AND SPECIFICATIONS

Seeding Periods

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

Seed Quality

All seed shall be of high quality and comply with Illinois Seed and Weed Laws; and originate from the United States or Canada.

All seed shall comply with Illinois Seed and Weed Laws and originate from the United States or Canada.

Seed rates will be based on Pure Live Seed (PLS) per acre. Computation of Pure Live Seed will based on the following formula:

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

Germination tests are required for all warm and cool season grasses and legumes (excluding companion crops). Germination tests may not be older than 12 months at time of seeding excluding the month of testing. Germination tests are not required for native forbs.

Seed Mixtures

Approved seed mixtures are found in Table 3.

Criteria for seed mixtures:

All filter strip seed mixtures will be predominately (60%) sod forming species.

Native grass seed mixtures shall be seeded at 40 PLS seeds/ft^2. The sod forming component shall be at least 24 PLS seeds/ft^2. Custom seed mixtures can be developed using Tables 4 and 5.

Introduced cool season species mixtures will shall consist of predominately sod forming species based on the full seeding rates listed in Table 6. Custom seed mixtures can be developed using Tables 6 and 7. Introduced cool season grass seed mixtures shall include a legume from Table 8.

Legume Inoculation

Legume seeds shall be treated with a pure culture of nitrogen fixing bacteria prepared specifically for the species being seeded. Where more than one legume is included in the seed mixture, inoculate each species separately. A sticker, as recommended by the inoculant manufacturer, will be used to secure the bacteria to the seed. Refer to Illinois Agronomy Technical Note Number 20 for guidance.

Uncoated seed pre-inoculated greater than 60 days will be re-inoculated. Pre-inoculated seed that has been coated must be seeded within 12 months of inoculation, otherwise re-inoculate. In no cases shall inoculum be used after the expiration date including inoculum that is included with the seed as a pre-treatment.

Legumes not pre-inoculated will be inoculated within 24 hours of seeding.

Inoculation of native legumes is recommended when commercial inoculum is available.

Companion (Nurse) Crop

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 of introduced grasses and legumes 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 at a rate of 1 bushel/acre may be used for late summer if planted no later than 45 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. Companion crops will be mowed no later than just prior to seed head emergence the late boot stage. Companion crops shall not be allowed to form seeds.

Specifications for establishment and operation of this practice will be prepared for each field or treatment unit. Record the specifications using the Illinois Filter Strip Job Sheet. The specifications will identify at a minimum the following:

- Practice purpose(s).
- Length, width (width refers to flow length through the filter strip), and slope of the filter strip to accomplish the planned purpose(s).
- Plant species selection and PLS seeding rates to accomplish the planned purpose.
- Planting dates and planting method(s).
- A statement that only viable, high quality, and adapted seed will be used.
- Site preparation instructions sufficient to establish and grow selected species.

OPERATION AND MAINTENANCE

For the purposes of filtering contaminants and nutrients (phosphorus), permanent filter strip vegetative plantings will be harvested (unless prohibited due to conservation program regulations) and removed as appropriate to encourage dense growth, maintain an upright growth habit and remove nutrients and other contaminants that are contained in the plant tissue.

Control undesired weed species, especially State-listed noxious weeds. When needed, invasive plant species may be controlled through mowing, herbicides, and hand weeding.

If Conservation Practice Standard (CPS) Prescribed Burning (Code 338) is used to manage and maintain the filter strip, an approved burn plan must be developed.

Inspect the filter strip after storm events and repair any gullies that have formed, remove unevenly deposited sediment accumulation that will disrupt sheet flow, reseed disturbed areas and take other measures to prevent concentrated flow through the filter strip.

Apply supplemental nutrients as needed to maintain the desired species composition and stand density.

Periodically regrade and reestablish the filter strip area when sediment deposition at the filter strip-field interface jeopardizes its function. Reestablish the filter strip vegetation in regraded areas, if needed.

If grazing is used to harvest vegetation from the filter strip, the grazing plan must ensure that the integrity and function of the filter strip is not adversely affected.

REFERENCES

Dillaha, T.A., J.H. Sherrard, and D. Lee. 1986. Long-Term Effectiveness and Maintenance of Vegetative Filter Strips. VPI-VWRRC Bulletin 153.

Dillaha, T.A., and J.C. Hayes. 1991. A Procedure for the Design of Vegetative Filter Strips: Final Report Prepared for U.S. Soil Conservation Service.

Foster, G.R. Revised Universal Soil Loss Equation, Version 2 (RUSLE2) Science Documentation (In Draft). USDA-ARS, Washington, DC. 2005.

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

Revised Universal Soil Loss Equation Version 2 (RUSLE2) Web site (checked May 2007): http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm.

M.G. Dosskey, M.J. Helmers, and D.E. Eisenhauer 2008. A Design Aid for Determining Width of Filter Strips. Journal of Soil and Water Conservation. July/Aug 2008—vol. 63, no. 4.

Table 1. Seeding Dates

Time of Seeding	Plant Suitability Zone[1]	Cool Season Species	Warm Season Species
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
1 - Refer to the "Plant Suitability Zones" map locate in Section I, IL-FOTG-Climatic Data			

Table 2. Filter strip flow length (width) based on land slope at the upslope filter strip boundary and flow through time in minutes.

Flow through time (0.5" depth)	Percent Slope					
	0.5%	1.0%	2.0%	3.0%	4.0%	5.0% or greater
	Filter Strip Flow Length (Feet)					
15 minutes	36	54	72	90	108	117
30 minutes	72	108	144	180	216	234

Table 3. Approved seed mixtures.

Native Species Mixtures	Lbs. PLS/Acre	SITE SUITABILITY
Switchgrass	5	Well, adapted to mesic and moist sites. Will withstand droughty sites. Tolerant to atrazine.
Switchgrass Indiangrass Big Bluestem	5.5 2.5 3.5	Adapted to most sites except for extremely wet soils. Tolerant to atrazine. Indiangrass susceptible to atrazine prior to establishment.
Western Wheatgrass	16	This mixture is tolerant to frequent, short duration floods. Low tolerance to atrazine.
Introduced Species Mixtures (Include a companion legume)	**Lbs. PLS/Acre**	**SITE SUITABILITY**
Redtop[1]	4	Adapted to poorly drained soils. Low tolerance to atrazine.
Redtop[1] Timothy	2.5 2.5	Adapted to poorly drained soils. Fair tolerance to atrazine.
Smooth Bromegrass[1]	16	Adapted to well drained to somewhat poorly drained soils. Fair tolerance to atrazine.
Smooth Bromegrass[1] Timothy	9.6 2.5	Adapted to well drained to somewhat poorly drained soils. Fair tolerance to atrazine.

Tables 4. Native sod forming grasses.

Native Sod Forming Species	Seeds per square foot at 1 lb. PLS/acre	Comments
Switchgrass	9.2	
Western Wheatgrass	2.5	

Table 5. Native bunch forming grasses.

Native Bunch Forming Grasses	Seeds per square foot at 1 lb. PLS/acre	Comments
Big Bluestem	3.0	
Indiangrass	4.0	
Sideoats Grama	4.4	
Virginia Wildrye	1.7	
Canadian Wildrye	2.6	

Table 6. Introduced cool season sod forming species.

Introduced Sod Forming Cool Season Species	Full seeding Rate PLS lbs./acre	60% Full Seeding Rate PLS lbs./acre	Comments
Smooth Bromegrass	16	9.6	
Redtop	4	2.4	

Table 7. Introduced cool season bunch forming species.

Introduced Bunch Forming Cool Season Species	Full seeding Rate PLS lbs./acre	40% Full Seeding Rate PLS lbs./acre	Comments
Orchardgrass	8	3.2	
Timothy	6	2.4	
Perennial Ryegrass	15	6.0	

Table 8. Companion legumes for introduced cool season seed mixtures.

COMPANION LEGUMES	Lbs. PLS/Ac.	SITE SUITABILITY
Alsike Clover	1-3	Adapted to poorly drained soils
Ladino Clover	0.5-1.0	Adapted to poorly drained soils
Alfalfa	6	Not adapted to poorly drained soils.
Annual Lespedeza	6	Plant Suitability Zone 2 and 3 only. Not adapted to poorly drained soils.
Birdsfoot Trefoil	3	
Red Clover	6	
Crimson Clover	5	