

# Pollinators

SD-FS-60  
July 2016



Rusty Patch Bumble Bee  
Photo by Johannes James Helms

## WHAT ARE POLLINATORS AND WHY SHOULD YOU CARE?

The majority of pollinators in South Dakota (SD) are insects such as native bees, honey bees, beetles, flies, moths, and butterflies. Through the process of foraging for pollen and nectar, both native and nonnative pollinators provide pollinating services to roughly 85% of flowering plants. Pollinators forage on almost 40 agricultural crop species grown in SD.

*Perennial* plants such as pollinator-friendly flowering shrubs, legumes, forbs (wildflowers) can provide consistent foraging habitat that supplies abundant pollen and nectar during the spring, summer, and fall. *Annual* plants, including certain commodity, produce, and cover crops provide abundant pollen and nectar.

Pollen (usually moistened with nectar) is used to feed bee larvae, and nectar is used to fuel the flight of adult pollinators. Many native pollinators, such as native bees, butterflies, and flies, are only active as adults for a few weeks each year. Others, such as bumble bees and European honey bees are active as adults throughout the growing season.

During this active period, adult pollinators need nectar as fuel as they fly and reproduce (generally late April through early October). Larval bees need a ready source of pollen for their development, while butterflies and other groups of pollinators need access to specific host plants and nesting sites.

The average foraging distance for native bees ranges from approximately 200 feet to ½ mile. The optimal foraging distance for nonnative pollinators, such as the European Honey Bee, is less than one mile from the colony, but they can travel much farther if necessary to find the nectar and pollen they need.

Relatively undisturbed conditions with suitable ground, plants, and/or nest structure provide nesting sites. Nest sites located throughout a landscape are important because the further the pollinator must travel the less efficient their foraging and the fewer offspring they can leave behind. If pollinators have to travel long distances for food sources, or if they are stressed (e.g., by exposure to insecticides), then they may be more susceptible to environmental factors such as parasites and disease resulting in possible starvation or reduced populations.



Leafcutting Bee  
Photo by David Cappert

Bee Fly  
Photo by Johnny Dell



Bee Fly  
Photo by Johnny Dell

Giant Resin Bee  
Photo by Johnny Dell

## WHERE DO YOU START?

The Natural Resources Conservation Service (NRCS), in cooperation with its partners, has developed two publications to help landowners determine how they can help pollinators. These publications are titled “Farming for Pollinators” and “Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms.” These publications are available at your local USDA Service Center NRCS

office. These publications recommend three initial landowner actions:

- Recognize the pollinators and pollinator habitats that are already on your property.
- Adapt existing production and land management practices to avoid causing undue harm to the pollinators already present.
- Provide habitat for native pollinators on and around the farm.

### WHAT CAN YOU DO?

A range of methods are available for providing pollinator-friendly foraging habitat and providing or protecting nest site habitats. Visit your local NRCS office for pollinator-friendly plant species and example plant mixes.

#### Provide pollinator friendly foraging habitat:

- Plant pollinator-friendly conservation cover consisting of large areas of different forb species that bloom during each month of the growing season.
- Plant pollinator-friendly cover crops consisting of large areas of different forbs/legumes that are allowed to go to full bloom during as many months of the growing season as possible.
- Include pollinator-friendly flowering shrubs and trees in shrub-clump plantings and windbreaks.



Photo courtesy of SD NRCS

#### Provide/protect nest site habitats:

- Provide nest sites such as hollow stems or bare ground within conservation cover, cover crop, and shrub/tree plantings.
- Leave dead wood and standing snags, drill holes in dead wood, and put out trap nests for twig nesting pollinators.
- Install bumble bee nest boxes buried or above ground. Install artificial nest bee boxes.
- Ensure existing odd areas remain undisturbed.



### HOW DO PESTICIDES AFFECT POLLINATORS?

Insecticides are differentially toxic to non target species, depending on the active ingredients, the strength and composition of the formulation (dust, powder, liquid), and the behavioral and physiological response of the target insect. Some pollinator species might not be killed outright by pesticide applications, but they could suffer sublethal effects, including reduced foraging ability that ultimately hampers their productivity.

Short of eliminating insecticide use altogether, producers can reduce risks to pollinators from pesticides in several ways:

- Utilize pesticides as part of a carefully developed “Integrated Pest Management” (IPM) Plan and only when there is a demonstrated need to apply the pesticide (e.g., an economic threshold is reached).
- Choose appropriate pesticides. Some insecticides have active ingredients that are less likely to cause mortality or sublethal effects in pollinators, to have formulations that are less toxic to pollinators (for example, granular powders are less noxious than dust), and to break down more rapidly than others. Microencapsulated formulations should be avoided because they mimic pollen.
- Apply pesticides selectively. Producers may be able to avoid using insecticides during a crop’s bloom period, or apply them at night while pollinators are in nests, and apply them on the ground rather than in aerial spray.
- Convert some or all fields to organic production.

**For additional information on how to use Farm Bill programs for pollinator conservation contact your local NRCS office.**

# CRP Pollinator Example Mix

Tall Grass Prairie Mix:			MLRA: 102A, 102B, 102C, 56			Site: [Cy/Ly], [CyOv/LyOv], [LSb/SSb], Sb, Sy, SwG								
Common Name	Scientific Name	Habit	Succession	Coefficient of Conservatism <sup>1</sup>	Heterogeneity	Monarch Butterfly Use (Very High, High)	Nesting Cover (Cool Season)	Pollinator (Bloom Period)	Herbicide Tolerance	PLS Seeds/LB	#PLS/Acre	Seeds/ft <sup>2</sup>	% of Mix by weight	full rate
Canada Wildrye	<i>Elymus canadensis</i>	Grass	Early	3	C/B/T		Yes			115,000	0.76	2.00	5.00%	40
Indiangrass	<i>Sorghastrum nutans</i>	Grass	Mid	6	W/S/T					183,000	0.36	1.50	5.00%	30
Western wheatgrass	<i>Pascopyrum smithii</i>	Grass	Mid	4	C/S/M		Yes			112,000	0.49	1.25	5.00%	25
Sideoats grama	<i>Bouteloua curtipendula</i>	Grass	Mid	5	W/B/M					180,000	0.36	1.50	5.00%	30
Slender wheatgrass	<i>Elumus trachycaulus</i>	Grass	Mid	6	C/B/M		Yes			155,000	0.35	1.25	5.00%	25
Black Samson	<i>Echinacea angustifolia</i>	Forb	Mid	7	C/M	High	Yes	June-July		120,000	0.09	0.25	1.00%	25
Black-eyed Susan	<i>Rudbeckia hirta</i>	Forb	Mid	5	C/M	High	Yes	July-September		1,450,000	0.08	2.50	10.00%	25
Butterfly milkweed	<i>Asclepias tuberosa</i>	Forb	Late	9	C/M	Very High	Yes	June-August		67,000	0.16	0.25	1.00%	25
Canada tick trefoil	<i>Desmodium canadense</i>	Forb	Mid	6	C/T		Yes	July-August		88,000	0.12	0.25	1.00%	25
Common milkweed	<i>Asclepias syriaca</i>	Forb	Early	0	C/M	Very High	Yes	May-August		64,000	0.17	0.25	1.00%	25
Cup plant	<i>Silphium perfoliatum</i>	Forb	Mid	6	C/T	High	Yes	July-September		22,400	1.94	1.00	10.00%	10
False sunflower	<i>Heliopsis helianthoides</i>	Forb	Mid	5	C/T	High	Yes	July-September		60,000	0.18	0.25	1.00%	25
Fragrant giant hyssop	<i>Agastache foeniculum</i>	Forb	Mid	7	C/T	High	Yes	July-September		1,440,000	0.04	1.25	5.00%	25
Gray goldenrod	<i>Solidago nemoralis</i>	Forb	Mid	6	C/M	Very High	Yes	July-September		4,800,000	0.01	0.80	2.00%	40
Hoary vervain	<i>Verbena stricta</i>	Forb	Early	2	C/M	High	Yes	June-September		448,000	0.02	0.25	1.00%	25
Ironweed	<i>Vernonia fasciculata</i>	Forb	Early	3	C/M	High	Yes	July-October		384,000	0.03	0.25	1.00%	25
Joe-pye weed	<i>Eupatorium maculatum</i>	Forb	Late	9	C/T	Very High	Yes	July-September		1,520,000	0.01	0.25	1.00%	25
Maximilian sunflower	<i>Helianthus maximiliani</i>	Forb	Mid	5	C/T	High	Yes	August-October		250,000	0.17	1.00	4.00%	25
Meadow blazing star	<i>Liatris ligulistylis</i>	Forb	Late	10	C/T	Very High	Yes	July-September		160,000	0.07	0.25	1.00%	25
Purple prairie clover	<i>Petalostemum purpurea</i>	Forb	Late	8	C/M	High	Yes	July-September		290,000	0.38	2.50	10.00%	25
Shell-leaf penstemon	<i>Penstemon grandiflorus</i>	Forb	Mid	5	C/M		Yes	May-June		273,000	0.20	1.25	5.00%	25
Showy milkweed	<i>Asclepias speciosa</i>	Forb	Mid	4	C/M	Very High	Yes	May-September		70,000	0.16	0.25	1.00%	25
Stiff sunflower	<i>Helianthus pauciflorus</i>	Forb	Late	8	C/M	High	Yes	July-October		85,000	0.13	0.25	1.00%	25
Swamp milkweed	<i>Asclepias incarnata</i>	Forb	Mid	5	C/T	Very High	Yes	June-September		72,000	0.15	0.25	1.00%	25
Thickspike gayfeather	<i>Liatris pycnostachya</i>	Forb	Late	8	C/T	Very High	Yes	July-September		136,000	0.08	0.25	1.00%	25
White prairie clover	<i>Petalostemum candidum</i>	Forb	Late	8	C/M	High	Yes	July-August		278,000	0.39	2.50	10.00%	25
Whorled milkweed	<i>Asclepias verticillata</i>	Forb	Early	3	C/M	Very High	Yes	May-September		176,000	0.06	0.25	1.00%	25
Wild bergamot	<i>Monarda fistulosa</i>	Forb	Mid	5	C/M	Very High	Yes	July-August		1,200,000	0.05	1.25	5.00%	25
<b>Totals</b>										<b>7.00</b>	<b>25</b>	<b>100.00%</b>		

  

<b>Conservatism Guilds</b>	<b>Species</b>	<b>Seed/ft<sup>2</sup> % mix</b>
EARLY SUCCESSIONAL (0-3)	5	12.0%
MID SUCCESSIONAL (4-7)	16	63.1%
LATE SUCCESSIONAL (8-10)	7	25.0%
	<b>28</b>	<b>100%</b>

  

<b>Mix Conservatism</b>	6
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<b>Floristic Quality Index</b>	30
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<b>Evenness Calculation</b>	
Sum of Squares	0.06
Simpson's Evenness:	0.56

  

<b>Heterogeneity</b>	
C = Cool Season W = Warm Season	
B = Bunchgrass S = Sod Grass	
T = Tall (>36") M = Medium (18"-36")	

  

<b>Monarch Butterfly Use</b>	
Very High Percent in Mix	
15.00%	

  

<b>Nesting Cover</b>	
Cool Season Percent (at least 60%)	
90.00%	

  

<b>Pollinator Bloom Period</b>	
April and October. April and October may not be possible due to climate and/or ecological site.	
April	0
May	4
June	7
July	20
August	23
September	13
October	5

  

<b>Herbicide Tolerance</b>	
Aminopyralid Tolerance (e.g., Milestone®)	
Imazapic Tolerance (e.g., Plateau®)	
Imazapic and Aminopyralid Tolerance	
**Please read and follow all pesticide label instructions.**	
The NRCS does not endorse the use of any specific product and makes no claims or implies no warranty regarding herbicide selection, application, and/or results.	

  

<b>Floristic Quality Index (FQI)</b>	Recommended FQI is at least 20.0	<b>Estimated Forage Production (lbs)</b>
<b>Mix Conservatism (CC)</b>	Recommended Coefficient of Conservatism is at least 3.0	*Average Representative Value
<b>Simpson's Evenness</b>	Recommended Evenness (balance) of the mix is at least 70%	[Cy/Ly] 3433/3567
<b>Conservatism Guilds:</b>		[CyOv/LyOv] 4333/4200
Early Successional	Recommended range of 15-33%	[LSb/SSb] 4525/4533
Mid-Successional	Recommended range of 45-65%	Sb 5200
Late Successional	Recommended range of 15-33%	Sy 3433
PLS Seeds/ft <sup>2</sup>	Minimum of 25 seeds/ft <sup>2</sup>	SwG 2600

# CRP Pollinator Example Mix

Mixed Grass Prairie Mix:		MLRA: 53B, 53C, 55B, 55C, 54, 63A, 63B				Site: [Cy/Ly], [Cov/Lov], [LSb/SSb/Sb], Sy, SwG								
Common Name	Scientific Name	Habit	Succession	Coefficient of Conservatism <sup>1</sup>	Heterogeneity	Monarch Butterfly Use (Very High, High)	Nesting Cover (Cool Season)	Pollinator (Bloom Period)	Herbicide Tolerance	PLS Seeds/LB	#PLS/Acre	Seeds/ft <sup>2</sup>	% of Mix by weight	full rate
Blue grama	<i>Bouteloua gracilis</i>	Grass	Mid	5	W/B/T					750,000	0.12	2.00	5.00%	40
Indiangrass	<i>Sorghastrum nutans</i>	Grass	Mid	6	W/S/T					183,000	0.36	1.50	5.00%	30
Western wheatgrass	<i>Pascopyrum smithii</i>	Grass	Mid	4	C/S/M		Yes			112,000	0.49	1.25	5.00%	25
Sideoats grama	<i>Bouteloua curtipendula</i>	Grass	Mid	5	W/B/M					180,000	0.36	1.50	5.00%	30
Slender wheatgrass	<i>Elumus trachycaulus</i>	Grass	Mid	6	C/B/M		Yes			155,000	0.35	1.25	5.00%	25
Black Samson	<i>Echinacea angustifolia</i>	Forb	Mid	7	C/M	High	Yes	June-July		120,000	0.09	0.25	1.00%	25
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Canada tick trefoil	<i>Desmodium canadense</i>	Forb	Mid	6	C/T		Yes	July-August		88,000	0.37	0.75	3.00%	25
Common milkweed	<i>Asclepias syriaca</i>	Forb	Early	0	C/M	Very High	Yes	May-August		64,000	0.17	0.25	1.00%	25
Dotted gayfeather	<i>Liatris punctata</i>	Forb	Mid	7	C/M	Very High	Yes	August-September		136,000	0.12	0.38	1.50%	25
False sunflower	<i>Heliopsis helianthoides</i>	Forb	Mid	5	C/T	High	Yes	July-September		60,000	0.54	0.75	3.00%	25
Fragrant giant hyssop	<i>Agastache foeniculum</i>	Forb	Mid	7	C/T	High	Yes	July-September		1,440,000	0.03	0.88	3.50%	25
Gray goldenrod	<i>Solidago nemoralis</i>	Forb	Mid	6	C/M	Very High	Yes	July-September		4,800,000	0.00	0.40	1.00%	40
Heath aster	<i>Symphyotrichum ericoides</i>	Forb	Early	2	C/M	High	Yes	August-October		3,200,000	0.01	0.40	1.00%	40
Hoary vervain	<i>Verbena stricta</i>	Forb	Early	2	C/M	High	Yes	June-September		448,000	0.05	0.50	2.00%	25
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Stiff goldenrod	<i>Oligoneuron (Solidago) rigida</i>	Forb	Mid	4	C/M	Very High	Yes	August-October		7,718,000	0.007	1.25	5.00%	25
Stiff sunflower	<i>Helianthus pauciflorus</i>	Forb	Late	8	C/M	High	Yes	July-October		85,000	0.13	0.25	1.00%	25
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<b>Totals</b>											<b>4.81</b>	<b>27</b>	<b>100.00%</b>	

  

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<b>Monarch Butterfly Use</b>																																																																											
Very High Percent in Mix																																																																											
21.50%																																																																											
<b>Nesting Cover</b>																																																																											
Cool Season Percent (at least 60%)																																																																											
85.00%																																																																											
<b>Estimated Forage Production (lbs)</b>																																																																											
*Average Representative Value																																																																											
[CY/LY]	2625/2800																																																																										
[Cov/Lov]	3250/3675																																																																										
[LSb/SSb/Sb]	3900/4400/4975																																																																										
Sy	2775																																																																										
SwG	1850																																																																										
<b>Pollinator Bloom Period</b>																																																																											
April and October. April and October may not be possible due to climate and/or ecological site.																																																																											
April	0																																																																										
May	4																																																																										
June	5																																																																										
July	19																																																																										
August	22																																																																										
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Aminopyralid Tolerance (e.g., Milestone®)																																																																											
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# Example Pollinator-Freindly Native Seed Mix

Tall Grass Prairie Mix:													MLRA: 102A, 102B, 102C, 56			Site: [Cy/Ly], [CyOv/LyOv], [LSb/SSb], Sb, Sy, SwG		
Common Name	Scientific Name	Habit	Succession	Coefficient of Conservatism <sup>1</sup>	Heterogeneity	Monarch Butterfly Use (Very High, High)	Nesting Cover (Cool Season)	Pollinator (Bloom Period)	Herbicide Tolerance	PLS Seeds/LB	#PLS/Acre	Seeds/ft <sup>2</sup>	% of Mix by weight	full rate				
Big bluestem	<i>Andropogon gerardii</i>	Grass	Mid	7	W/S/T					176,000	0.37	1.50	5.00%	30				
Canada Wildrye	<i>Elymus canadensis</i>	Grass	Early	3	C/B/T		Yes			115,000	1.82	4.80	12.00%	40				
Green needlegrass	<i>Nassella viridula</i>	Grass	Mid	5	C/B/T		Yes			180,000	1.09	4.50	15.00%	30				
Indiangrass	<i>Sorghastrum nutans</i>	Grass	Mid	6	W/S/T					183,000	0.36	1.50	5.00%	30				
Little bluestem	<i>Schizachyrium scoparium</i>	Grass	Mid	6	W/B/M					286,000	0.23	1.50	5.00%	30				
Needleandthread	<i>Hesperostipa comata</i>	Grass	Mid	6	C/B/M		Yes			115,000	0.47	1.25	5.00%	25				
Prairie dropseed	<i>Hesperostipa spartea</i>	Grass	Late	10	W/B/T					224,000	0.58	3.00	12.00%	25				
Sideoats grama	<i>Bouteloua curtipendula</i>	Grass	Mid	5	W/B/M					180,000	0.36	1.50	5.00%	30				
Slender wheatgrass	<i>Elumus trachycaulus</i>	Grass	Mid	6	C/B/M		Yes			155,000	0.70	2.50	10.00%	25				
Switchgrass	<i>Panicum virgatum</i>	Grass	Mid	5	W/S/T					390,000	0.22	2.00	5.00%	40				
Western wheatgrass	<i>Pascopyrum smithii</i>	Grass	Mid	4	C/S/M		Yes			112,000	0.49	1.25	5.00%	25				
Black Samson	<i>Echinacea angustifolia</i>	Forb	Mid	7	C/M	High	Yes	June-July		120,000	0.02	0.06	0.25%	25				
Black-eyed Susan	<i>Rudbeckia hirta</i>	Forb	Mid	5	C/M	High	Yes	July-September		1,450,000	0.00	0.06	0.25%	25				
Butterfly milkweed	<i>Asclepias tuberosa</i>	Forb	Late	9	C/M	Very High	Yes	June-August		67,000	0.16	0.25	1.00%	25				
Canada tick trefoil	<i>Desmodium canadense</i>	Forb	Mid	6	C/T		Yes	July-August		88,000	0.03	0.06	0.25%	25				
Common milkweed	<i>Asclepias syriaca</i>	Forb	Early	0	C/M	Very High	Yes	May-August		64,000	0.17	0.25	1.00%	25				
Compass plant	<i>Silphium laciniatum</i>	Forb	Late	8	C/T	High	Yes	June-September		10,560	0.12	0.03	0.30%	10				
Cup plant	<i>Silphium perfoliatum</i>	Forb	Mid	6	C/T	High	Yes	July-September		22,400	0.06	0.03	0.30%	10				
False sunflower	<i>Heliopsis helianthoides</i>	Forb	Mid	5	C/T	High	Yes	July-September		60,000	0.05	0.06	0.25%	25				
Fragrant giant hyssop	<i>Agastache foeniculum</i>	Forb	Mid	7	C/T	High	Yes	July-September		1,440,000	0.00	0.08	0.30%	25				
Gray goldenrod	<i>Solidago nemoralis</i>	Forb	Mid	6	C/M	Very High	Yes	July-September		4,800,000	0.00	0.40	1.00%	40				
Hoary vervain	<i>Verbena stricta</i>	Forb	Early	2	C/M	High	Yes	June-September		448,000	0.01	0.06	0.25%	25				
Ironweed	<i>Vernonia fasciculata</i>	Forb	Early	3	C/M	High	Yes	July-October		384,000	0.01	0.06	0.25%	25				
Joe-pye weed	<i>Eupatorium maculatum</i>	Forb	Late	9	C/T	Very High	Yes	July-September		1,520,000	0.00	0.13	0.50%	25				
Maximilian sunflower	<i>Helianthus maximiliani</i>	Forb	Mid	5	C/T	High	Yes	August-October		250,000	0.01	0.06	0.25%	25				
Meadow blazing star	<i>Liatris ligulistylis</i>	Forb	Late	10	C/T	Very High	Yes	July-September		160,000	0.07	0.25	1.00%	25				
Prairie milkweed	<i>Asclepias sullivanti</i>	Forb	Late	10	C/M	High	Yes	June-August		720,000	0.02	0.25	1.00%	25				
Purple prairie clover	<i>Petalostemum purpurea</i>	Forb	Late	8	C/M	High	Yes	July-September		290,000	0.04	0.25	1.00%	25				
Shell-leaf penstemon	<i>Penstemon grandiflorus</i>	Forb	Mid	5	C/M		Yes	May-June		273,000	0.01	0.06	0.25%	25				
Showy milkweed	<i>Asclepias speciosa</i>	Forb	Mid	4	C/M	Very High	Yes	May-September		70,000	0.27	0.44	1.75%	25				
Stiff sunflower	<i>Helianthus pauciflorus</i>	Forb	Late	8	C/M	High	Yes	July-October		85,000	0.03	0.06	0.25%	25				
Swamp milkweed	<i>Asclepias incarnata</i>	Forb	Mid	5	C/T	Very High	Yes	June-September		72,000	0.15	0.25	1.00%	25				
Thickspike gayfeather	<i>Liatris pycnostachya</i>	Forb	Late	8	C/T	Very High	Yes	July-September		136,000	0.08	0.25	1.00%	25				
White prairie clover	<i>Petalostemum candidum</i>	Forb	Late	8	C/M	High	Yes	July-August		278,000	0.04	0.25	1.00%	25				
Whorled milkweed	<i>Asclepias verticillata</i>	Forb	Early	3	C/M	Very High	Yes	May-September		176,000	0.04	0.15	0.60%	25				
Wild bergamot	<i>Monarda fistulosa</i>	Forb	Mid	5	C/M	Very High	Yes	July-August		1,200,000	0.01	0.25	1.00%	25				
<b>Totals</b>											<b>8.10</b>	<b>29</b>	<b>100.00%</b>					

  

<b>Conservatism Guilds</b>	<b>Species</b>	<b>Seed/ft<sup>2</sup> % mix</b>
EARLY SUCCESSIONAL (0-3)	5	18.1%
MID SUCCESSIONAL (4-7)	21	65.8%
LATE SUCCESSIONAL (8-10)	10	16.1%
	36	100%

  

<b>Mix Conservatism</b>	6
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<b>Floristic Quality Index</b>	36
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<b>Evenness Calculation</b>	
Sum of Squares	0.08
Simpson's Evenness:	0.35

  

<b>Heterogeneity</b>	
C = Cool Season W = Warm Season	
B = Bunchgrass S = Sod Grass	
T = Tall (>36") M = Medium (18"-36")	

  

<b>Monarch Butterfly Use</b>	
Very High Percent in Mix	
10.85%	

  

<b>Nesting Cover</b>	
Cool Season Percent (at least 60%)	
63.00%	

  

<b>Pollinator Bloom Period</b>	
April and October. April and October may not be possible due to climate and/or ecological site.	
April	0
May	4
June	7
July	20
August	23
September	13
October	5

  

<b>Herbicide Tolerance</b>	
Aminopyralid Tolerance (e.g., Milestone®)	
Imazapic Tolerance (e.g., Plateau®)	
Imazapic and Aminopyralid Tolerance	
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<b>Floristic Quality Index (FQI)</b>	Recommended FQI is at least 20.0	<b>Estimated Forage Production (lbs)</b>
<b>Mix Conservatism (CC)</b>	Recommended Coefficient of Conservatism is at least 3.0	*Average Representative Value
<b>Simpson's Evenness</b>	Recommended Evenness (balance) of the mix is at least 70%	[Cy/Ly] 3433/3567
<b>Conservatism Guilds:</b>		[CyOv/LyOv] 4333/4200
Early Successional	Recommended range of 15-33%	[LSb/SSb] 4525/4533
Mid-Successional	Recommended range of 45-65%	Sb 5200
Late Successional	Recommended range of 15-33%	Sy 3433
PLS Seeds/ft <sup>2</sup>	Minimum of 25 seeds/ft <sup>2</sup>	SwG 2600

# Example Pollinator-Freindly Native Seed Mix

Mixed Grass Prairie Mix:													MLRA: 53B, 53C, 55B, 55C, 54, 63A, 63B			Site: [Cy/Ly], [Cov/Lov], [LSb/SSb/Sb], Sy, SwG		
Common Name	Scientific Name	Habit	Succession	Coefficient of Conservatism <sup>1</sup>	Heterogeneity	Monarch Butterfly Use (Very High, High)	Nesting Cover (Cool Season)	Pollinator (Bloom Period)	Herbicide Tolerance	PLS Seeds/LB	#PLS/Acre	Seeds/ft <sup>2</sup>	% of Mix by weight	full rate				
Big bluestem	<i>Andropogon gerardii</i>	Grass	Mid	7	W/S/T					176,000	0.37	1.50	5.00%	30				
Blue grama	<i>Bouteloua gracilis</i>	Grass	Mid	5	W/B/T					750,000	0.12	2.00	5.00%	40				
Green needlegrass	<i>Nassella viridula</i>	Grass	Mid	5	C/B/T		Yes			180,000	0.73	3.00	10.00%	30				
Indiangrass	<i>Sorghastrum nutans</i>	Grass	Mid	6	W/S/T					183,000	0.36	1.50	5.00%	30				
Little bluestem	<i>Schizachyrium scoparium</i>	Grass	Mid	6	W/B/M					286,000	0.46	3.00	10.00%	30				
Needleandthread	<i>Hesperostipa comata</i>	Grass	Mid	6	C/B/M		Yes			115,000	0.95	2.50	10.00%	25				
Prairie sandreed	<i>Calamovilfa longifolia</i>	Grass	Mid	5	W/S/T					275,000	0.24	1.50	5.00%	30				
Sideoats grama	<i>Bouteloua curtipendula</i>	Grass	Mid	5	W/B/M					180,000	0.73	3.00	10.00%	30				
Slender wheatgrass	<i>Elumus trachycaulus</i>	Grass	Mid	6	C/B/M		Yes			155,000	0.70	2.50	10.00%	25				
Switchgrass	<i>Panicum virgatum</i>	Grass	Mid	5	W/S/T					390,000	0.13	1.20	3.00%	40				
Western wheatgrass	<i>Pascopyrum smithii</i>	Grass	Mid	4	C/S/M		Yes			112,000	0.97	2.50	10.00%	25				
American licorice	<i>Glycyrrhiza lepidota</i>	Forb	Early	2	C/M		Yes	June-August		58,000	0.05	0.06	0.25%	25				
Black Samson	<i>Echinacea angustifolia</i>	Forb	Mid	7	C/M	High	Yes	June-July		120,000	0.03	0.08	0.30%	25				
Black-eyed Susan	<i>Rudbeckia hirta</i>	Forb	Mid	5	C/M	High	Yes	July-September		1,450,000	0.00	0.08	0.30%	25				
Canada tick trefoil	<i>Desmodium canadense</i>	Forb	Mid	6	C/T		Yes	July-August		88,000	0.04	0.08	0.30%	25				
Common milkweed	<i>Asclepias syriaca</i>	Forb	Early	0	C/M	Very High	Yes	May-August		64,000	0.43	0.63	2.50%	25				
Compass plant	<i>Silphium laciniatum</i>	Forb	Late	8	C/T	High	Yes	June-September		10,560	0.10	0.03	0.25%	10				
Dotted gayfeather	<i>Liatris punctata</i>	Forb	Mid	7	C/M	Very High	Yes	August-September		136,000	0.12	0.38	1.50%	25				
False sunflower	<i>Heliopsis helianthoides</i>	Forb	Mid	5	C/T	High	Yes	July-September		60,000	0.05	0.06	0.25%	25				
Fragrant giant hyssop	<i>Agastache foeniculum</i>	Forb	Mid	7	C/T	High	Yes	July-September		1,440,000	0.00	0.06	0.25%	25				
Gray goldenrod	<i>Solidago nemoralis</i>	Forb	Mid	6	C/M	Very High	Yes	July-September		4,800,000	0.00	0.40	1.00%	40				
Heath aster	<i>Symphotrichum ericoides</i>	Forb	Early	2	C/M	High	Yes	August-October		3,200,000	0.00	0.20	0.50%	40				
Hoary vervain	<i>Verbena stricta</i>	Forb	Early	2	C/M	High	Yes	June-September		448,000	0.01	0.06	0.25%	25				
Ironweed	<i>Vernonia fasciculata</i>	Forb	Early	3	C/M	High	Yes	July-October		384,000	0.01	0.06	0.25%	25				
Joe-pye weed	<i>Eupatorium maculatum</i>	Forb	Late	9	C/T	Very High	Yes	July-September		1,520,000	0.00	0.06	0.25%	25				
Maximilian sunflower	<i>Helianthus maximiliani</i>	Forb	Mid	5	C/T	High	Yes	August-October		250,000	0.01	0.08	0.30%	25				
Purple prairie clover	<i>Petalostemum purpurea</i>	Forb	Late	8	C/M	High	Yes	July-September		290,000	0.04	0.25	1.00%	25				
Shell-leaf penstemon	<i>Penstemon grandiflorus</i>	Forb	Mid	5	C/M		Yes	May-June		273,000	0.01	0.08	0.30%	25				
Showy milkweed	<i>Asclepias speciosa</i>	Forb	Mid	4	C/M	Very High	Yes	May-September		70,000	0.47	0.75	3.00%	25				
Stiff goldenrod	<i>Oligoneuron (Solidago) rigida</i>	Forb	Mid	4	C/M	Very High	Yes	August-October		7,718,000	0.00	0.25	1.00%	25				
Stiff sunflower	<i>Helianthus pauciflorus</i>	Forb	Late	8	C/M	High	Yes	July-October		85,000	0.03	0.06	0.25%	25				
Swamp milkweed	<i>Asclepias incarnata</i>	Forb	Mid	5	C/T	Very High	Yes	June-September		72,000	0.08	0.13	0.50%	25				
White prairie clover	<i>Petalostemum candidum</i>	Forb	Late	8	C/M	High	Yes	July-August		278,000	0.04	0.25	1.00%	25				
Whorled milkweed	<i>Asclepias verticillata</i>	Forb	Early	3	C/M	Very High	Yes	May-September		176,000	0.03	0.13	0.50%	25				
Wild bergamot	<i>Monarda fistulosa</i>	Forb	Mid	5	C/M	Very High	Yes	July-August		1,200,000	0.01	0.25	1.00%	25				
<b>Totals</b>											<b>7.30</b>	<b>29</b>	<b>100.00%</b>					

  

<b>Conservatism Guilds</b>	<b>Species</b>	<b>Seed/ft<sup>2</sup> % mix</b>
EARLY SUCCESSIONAL (0-3)	6	4.0%
MID SUCCESSIONAL (4-7)	24	93.8%
LATE SUCCESSIONAL (8-10)	5	2.3%
	35	100%

  

<b>Mix Conservatism</b>	<b>Heterogeneity</b>	<b>Pollinator Bloom Period</b>
5	C = Cool Season W = Warm Season B = Bunchgrass S = Sod Grass T = Tall (>36") M = Medium (18"-36")	April and October. April and October may not be possible due to climate and/or ecological site. April 0 May 4 June 5 July 19 August 22 September 13 October 5

  

<b>Floristic Quality Index</b>	<b>Monarch Butterfly Use</b>	<b>Herbicide Tolerance</b>
31	Very High Percent in Mix 11.00%	Aminopyralid Tolerance (e.g., Milestone®) Imazapic Tolerance (e.g., Plateau®) Imazapic and Aminopyralid Tolerance **Please read and follow all pesticide label instructions.** The NRCS does not endorse the use of any specific product and makes no claims or implies no warranty regarding herbicide selection, application, and/or results.

  

<b>Evenness Calculation</b>	<b>Nesting Cover</b>	<b>Estimated Forage Production (lbs)</b>
Sum of Squares 0.07 Simpson's Evenness: 0.39	Cool Season Percent (at least 60%) 67.00%	*Average Representative Value [CY/LY] 2625/2800 [Cov/Lov] 3250/3675 [LSb/SSb/Sb] 3900/4400/4975 Sy 2775 SwG 1850

  

<b>Floristic Quality Index (FQI)</b>	<b>Conservatism (CC)</b>	<b>Simpson's Evenness</b>
Recommended FQI is at least 20.0	Recommended Coefficient of Conservatism is at least 3.0	Recommended Evenness (balance) of the mix is at least 70%
<b>Conservatism Guilds:</b>		
Early Successional	Recommended range of 15-33%	
Mid-Successional	Recommended range of 45-65%	
Late Successional	Recommended range of 15-33%	
PLS Seeds/ft <sup>2</sup>	Minimum of 25 seeds/ft <sup>2</sup>	