# Pollinator Plot NW 38-441

Updated: 2023

This mix has been designed to supports specialist bees, many Lepidoptera species and includes a wide range of plant families to maximize insect use, bloom periods and the long-term resiliency of the mix.

Partners also include collaboration among Non-profits, Seed vendors, SWCD, Tribal Governments, Consultants, County and Cities. (See partner list on website)

**38-441 Pollinator Plot Northwest Mix**

| Code | Common Name | Scientific Name | PLS lb/ac | % by PLS lb/ac | Seeds/ft2 | % by Seeds/ft2 |
|---|---|---|---|---|---|---|
| andger | Big Bluestem | Andropogon gerardii | 0.23 | 1.12% | 0.84 | 1.79% |
| boucur | Sideoats Grama | Bouteloua curtipendula | 1.35 | 6.57% | 2.98 | 6.29% |
| elycan | Canada Wild Rye | Elymus canadensis | 0.39 | 1.90% | 0.74 | 1.58% |
| panvir | Switchgrass | Panicum virgatum | 0.10 | 0.49% | 0.51 | 1.09% |
| schsco | Little Bluestem | Schizachyrium scoparium | 0.56 | 2.73% | 3.09 | 6.52% |
| sornut | Indiangrass | Sorghastrum nutans | 0.23 | 1.12% | 1.01 | 2.14% |
| spohet | Prairie Dropseed | Sporobolus heterolepis | 0.09 | 0.44% | 0.53 | 1.12% |
| | | **Grasses Subtotal** | **2.95** | **14.36%** | **9.71** | **20.53%** |
| carbre | Plains Oval Sedge | Carex brevior | 0.05 | 0.24% | 0.53 | 1.13% |
| | | **Sedges & Rushes Subtotal** | **0.05** | **0.24%** | **0.53** | **1.13%** |
| achmil | Common Yarrow | Achillea millefolium | 0.01 | 0.05% | 0.65 | 1.38% |
| agafoe | Anise Hyssop | Agastache foeniculum | 0.04 | 0.19% | 1.32 | 2.80% |
| allste | Prairie Onion | Allium stellatum | 0.06 | 0.29% | 0.24 | 0.51% |
| amocan | Lead Plant | Amorpha canescens | 0.12 | 0.58% | 0.54 | 1.14% |
| anecan | Canada Anemone | Anemone canadensis | 0.02 | 0.10% | 0.06 | 0.12% |
| ascsyr | Common Milkweed | Asclepias syriaca | 0.14 | 0.68% | 0.21 | 0.43% |
| astcan | Canada Milkvetch | Astragalus canadensis | 0.04 | 0.19% | 0.25 | 0.53% |
| dalcan | White Prairie Clover | Dalea candida | 0.04 | 0.19% | 0.28 | 0.59% |
| dalpur | Purple Prairie Clover | Dalea purpurea | 0.45 | 2.19% | 2.48 | 5.24% |
| descan | Showy Tick Trefoil | Desmodium canadense | 0.07 | 0.34% | 0.14 | 0.30% |
| dryarg | Prairie Cinquefoil | Drymocallis arguta | 0.02 | 0.10% | 1.69 | 3.57% |
| echang | Narrow-leaved Coneflower | Echinacea angustifolia | 0.08 | 0.39% | 0.21 | 0.43% |
| genand | Bottle Gentian | Gentiana andrewsii | 0.01 | 0.05% | 1.03 | 2.17% |
| glylep | Wild Licorice | Glycyrrhiza lepidota | 0.03 | 0.15% | 0.04 | 0.09% |
| helmax | Maximilian's Sunflower | Helianthus maximiliani | 0.02 | 0.10% | 0.10 | 0.20% |
| helpau | Stiff Sunflower | Helianthus pauciflorus | 0.03 | 0.15% | 0.04 | 0.09% |
| helhel | Ox-eye Sunflower | Heliopsis helianthoides | 0.43 | 2.09% | 1.00 | 2.10% |
| heuric | Prairie Alumroot | Heuchera richardsonii | 0.01 | 0.04% | 2.00 | 4.23% |
| liaasp | Rough Blazing Star | Liatris aspera | 0.01 | 0.05% | 0.06 | 0.12% |

| | | | | | | |
|---|---|---|---|---|---|---|
| lialig | Meadow Blazing Star | Liatris ligulistylis | 0.04 | 0.19% | 0.15 | 0.31% |
| monfis | Wild Bergamot | Monarda fistulosa | 0.04 | 0.19% | 1.03 | 2.17% |
| oenbie | Common Eveninig Primrose | Oenothera biennis | 0.03 | 0.15% | 0.99 | 2.10% |
| pedcan | Wood Betony | Pedicularis canadensis | 0.01 | 0.05% | 0.14 | 0.30% |
| phlpil | Prairie Phlox | Phlox pilosa | 0.01 | 0.05% | 0.07 | 0.15% |
| pycvir | Virginia Mountain Mint | Pycnanthemum virginianum | 0.01 | 0.05% | 0.81 | 1.71% |
| ratcol | Long-headed Coneflower | Ratibida columnifera | 0.16 | 0.78% | 2.47 | 5.22% |
| rudhir | Black-eyed Susan | Rudbeckia hirta | 0.09 | 0.44% | 3.04 | 6.43% |
| scrlan | Early Figwort | Scrophularia lanceolata | 0.01 | 0.05% | 0.68 | 1.44% |
| siscam | Prairie Blue-eyed Grass | Sisyrinchium campestre | 0.00 | 0.01% | 0.05 | 0.11% |
| solnem | Gray Goldenrod | Solidago nemoralis | 0.02 | 0.10% | 2.20 | 4.66% |
| solpta | Upland White Goldenrod | Solidago ptarmicoides | 0.02 | 0.10% | 0.47 | 0.99% |
| solrig | Stiff Goldenrod | Solidago rigida | 0.07 | 0.34% | 1.05 | 2.23% |
| solspe | Showy Goldenrod | Solidago speciosa | 0.04 | 0.19% | 1.18 | 2.49% |
| symlae | Smooth Blue Aster | Symphyotrichum laeve | 0.04 | 0.19% | 0.81 | 1.71% |
| symool | Sky Blue Aster | Symphyotrichum oolentangiense | 0.03 | 0.15% | 0.88 | 1.86% |
| thadas | Purple Meadow Rue | Thalictrum dasycarpum | 0.07 | 0.34% | 0.19 | 0.40% |
| trabra | Prairie Spiderwort | Tradescantia bracteata | 0.05 | 0.24% | 0.18 | 0.39% |
| verhas | Blue Vervain | Verbena hastata | 0.03 | 0.15% | 1.02 | 2.17% |
| vioped | Prairie Violet | Viola pedatifida | 0.00 | 0.02% | 0.05 | 0.11% |
| zizapt | Heartleaf Alexanders | Zizia aptera | 0.02 | 0.10% | 0.09 | 0.19% |
| zizaur | Golden Alexanders | Zizia aurea | 0.12 | 0.58% | 0.48 | 1.03% |
| | | **Forbs Subtotal** | **2.55** | **12.39%** | **30.37** | **64.22%** |
| cover | Oats/Winter Wheat | Avena sativa/Triticum aestivum | 15.00 | 73.01% | 6.68 | 14.13% |
| | | **Cover Crop Subtotal** | **15.00** | **73.01%** | **6.68** | **14.13%** |
| | | **Total** | **20.55** | **100.00%** | **47.29** | **100.00%** |

# Seed Mix Enhancements or Substitutions

List of Additional Species to Add Diversity or for Substitutions for seed or plugs.

## Pollinator Plot Northwest 38-441

Updated 11-10-2020

### Grasses:

| Scientific Name | Common Name |
|---|---|
| *Bouteloua hirsuta* | Hairy Grama |
| *Bromus ciliatus* | Fringed Brome |
| *Dichanthelium oligosanthes* | Scribner's Panic Grass |
| *Elymus riparious* | Riverbank Wild Rye |
| *Elymus villosus* | Downy Wild Rye |

| | |
|---|---|
| *Koeleria macrantha* | Junegrass |
| *Panicum virgatum* | Switchgrass |
| *Sorghastrum nutans* | Indian Grass |

## Forbs & Shrubs:

| Scientific Name | Common Name |
|---|---|
| *Agastache scrophulariaefolia* | Purple Giant Hyssop |
| *Allium canadense* | Wild Garlic |
| *Asclepias verticillata* | Whorled Milkweed |
| *Chamerion angustifolium* | Fireweed |
| *Coreopsis palmata* | Bird's Foot Coreopsis |
| *Doellingeria umbellata* | Flat-topped Aster |
| *Drymocallis arguta* | Tall Cinquefoil |
| *Galium boreale* | Northern Bedstraw |
| *Helenium autumnale* | Autumn Sneezeweed |
| *Heterotheca villosa* | Hairy Golden Aster |
| *Heuchera richardsonii* | Alumroot |
| *Liatris punctata* | Dotted Blazing Star |
| *Lobelia spicata* | Rough-spiked Lobelia |
| *Lysimachia ciliata* | Fringed Loosestrife |
| *Monarda punctata* | Horsemint |
| *Pediomelum argophyllum* | Silverleaf Scurfpea |
| *Pediomelum esculentum* | Prairie Turnip |
| *Physostegia virginiana* | Obedient Plant |
| *Polemonium reptans* | Spreading Jacob's Ladder |
| *Ranunculus fasciculatis* | Early Buttercup |
| Rosa arkansana | *Prairie Rose* |
| *Sisyrinchium montanum* | Mountain Blue-eyed Grass |
| *Solidago ptarmicoides* | Upland White Aster |
| *Solidago riddelii* | Riddell's Goldenrod |
| *Symphyotrichum ericoides* | Heath Aster |
| *Symphyotrichum oolentangiense* | Skyblue Aster |
| *Symphyotrichum sericeum* | Silky Aster |
| *Teucrium canadense* | Germander |
| *Verbena stricta* | Hoary Vervain |
| *Veronicastrum virginicum* | Culver's root |
| *Zizia aptera* | Heart-leaved Alexanders |

## Legumes:

| Scientific Name | Common Name |
|---|---|
| *Astragalus crassicarpus* | Ground Plum |
| *Chamerion angustifolium* | Fireweed |
| *Dalea purpurea* | Purple Prairie Clover |

# Bareroot plants or plugs to supplement your planting

| **Scientific Name** | **Common Name** | **Bloom Time** | **Sun/Shade** | **Range** |
|---|---|---|---|---|
| *Anemone patens* | pasqueflower | e | Sun, Part Shade | NW,SW,SE |
| *Antennaria neglecta* | pussytoes | e/m | Sun, Part Shade | NW,SW,SE,NE |
| *Campanula rotundifloria* | Harebell | m/l | Sun, Part Shade | NW,SE, NE, |
| *Fragaria virginiana* | Wild strawberry | e/m | Sun, Part Shade | NW,SW,SE,NE |
| *Geum triflorum* | Prairie smoke | e/m | Sun | NW,SW,SE, NE |
| *Heuchera richardsonii* | Alumroot | e/m | Sun, Part Shade | NW,SW,SE,NE |
| *Lithospermum canescens* | Hoary puccoon | e/m | Sun, Part Shade | NW,SW,SE,NE |
| *Pediomelum esculentum* | Prairie turnip | e/m | Sun | NW,SW, SE |
| *Rosa arkansana* | Prairie rose | m | Sun, Part Shade | NW,SW,SE,NE |
| *Sanguinaria canadensis* | Bloodroot | e | Part Shade, Shade | NW,SW,SE,NE |
| *Sisyrinchium campestre* | Blue-eyed grass | e/m | Sun | NW,SW,SE,NE |
| *Viola palmata var. pedatifida* | Prairie violet | e/m | Sun, Part Shade | NW,SW,SE |
| *Viola spp.* | Violets | e/m | Part Shade | NW,SW,SE,NE |

Bloom Time:

| |
|---|
| early |
| Mid |
| Late |

# Pollinator Plot Northwest 38-441 Seed Mix Guidance

**Seed mix name:** Pollinator Plot Northwest Pilot Mix 38-441
**Geographic area:** Minnesota, Southeast
**Year of development:** 2016
**Year/s of update:** 2022
**Status (*Standard or Pilot mix*):** Standard
**Primary and Secondary Functions:**
*Primary* – Terrestrial habitat for pollinators and other invertebrates and improve habitat for beneficial soil organisms
*Secondary* – Carbon sequestration, wildlife habitat, emission reductions,
**Similar State Mixes:** Pollinator Plot Southeast, Pollinator Plot Southwest, Pollinator Plot Northeast
**Compatible NRCS Practice Standards:** 327 Conservation Cover (changing to 420 Wildlife Habitat Planting) - Pollinator Species
**Compatible Minnesota CRP Practices:** CP42
**Suitable Site Conditions**

Areas with mesic soils and full sun for at least 70% of the day where land is being converted from other uses such as lawn, or agricultural fields like row crops or pasture.

**Seed Mix Highlights**

This mix has been designed to supports specialist bees, many Lepidoptera species and includes a wide range of plant families to maximize insect use, bloom periods and the long-term resiliency of the mix.

**How to Customize the Mix for Unique Site Conditions and Goals**

Site conditions such as sunlight, soils, hydrology and existing vegetation along with functional goals for the project such as pollinator habitat, carbon sequestration, and benefit to grassland bird species can all inform species selection and the modification of seed mixes. See the Additional Species List, which can be used to amplify diversity. Use the BWSR Seed Mix Substitution Table when species are not available from vendors, or the landowner has alternative goals for the site.

**Site Preparation**

The primary goal of site preparation is to control weed species and provide ideal growing conditions for native seeds or plants to be installed. Preparation methods vary depending on the current site conditions. For example, sites with introduced perennial grasses require different suppression techniques than sites that have been farmed with row crops. Specific conditions should be considered when selecting site preparation techniques: unique biology of current (unwanted) vegetation, potential desirable and undesirable species in the seed bank, previous pesticide use on site, and potential for soil erosion. Annual cover crops or row crops can be used in preparation for a native planting, as long as they are not grown with persistent pesticides such as neonicotinoids or other long-lasting chemicals that

may negatively impact pollinators or desirable vegetation establishment. For example, following soybean harvest, an un-tilled soybean field provides a good seedbed with potentially little plant residue for planting native prairie mixes. For fields where persistent chemicals have been used (including neonicotinoids or long-lived herbicides) it is recommended to plant a temporary cover crop for one or two seasons to allow the chemicals to break down in the soil. For more details on organic or pesticide-free site preparation techniques, see the Xerces Society guide, Organic Site Preparation for Wildflower Establishment.

***Temporary Cover Crops***

Short-lived temporary cover crops can help stabilize project sites in preparation for planting native seed mixes. Cover crops such as oats (the most commonly used species) should be mowed to 10-12 inches before seeds mature (or harvested upon maturity) to prevent re-seeding. Other cover crops typically used in agricultural fields, such as buckwheat, winter wheat, sorghum sudangrass, and radishes, can help stabilize soil, build soil health, or provide weed competition as part of restoration projects. Residues from temporary covers should be minimized prior to seeding to increase seed to soil contact.

**Seedbed preparation**

Methods that are used to prepare a seedbed can vary depending on the type of seeding equipment to be used. If a traditional native seed drill will be used, a smooth, firm seedbed is required. Soybean fields usually are sufficiently prepared for a native seed drill. Corn fields should be raked and bailed if possible or light tillage should be used to remove leftover corn residue that would prevent sufficient seed to soil contact. Sites that were recently tilled will require additional soil treatment such as field cultivation, harrowing and rolling to prepare a firm seedbed and prevent seed from being buried too deep. Native seeds will have difficulty germinating if they are buried more than ¼" deep. Broadcast seeding can be conducted on soybean or corn fields; fields that have been disked, should be cultipacked or allowed to settle before seeding. Some practitioners have found that broadcast seeding on a smooth surface (not tilled or disked) leads to the establishment of higher diversity. It is important that the soil surface is not too hard packed, so cultipacking or light harrowing of crop fields before broadcast seeding may be needed. Seed can be lost on smooth surfaces, so it is recommended to seed into temporary cover crops or to roll sites after broadcast seeding. BWSR has seedbed preparation guidance based on current site conditions on our website: https://bwsr.state.mn.us/habitat-establishment-management-resources

**Seeding Methods**

A variety of seeding equipment is used for upland pollinator plantings including broadcast seeders, no-till native seed drills, Brillion seeders and Trillion seeders. Specialized native seed drills can handle a wide variety of seed (fluffy, smooth, large and small) and low seeding rates. Conventional grain drills are not capable of handling diverse seed sizes and will not provide satisfactory results. Broadcast seeding is common for planting pollinator mixes. Broadcast seeding equipment should be used that is designed to spread mixes with different sized seeds (e.g., Vicon Seeders). NRCS recommends broadcast seeding at a rate of 1.5 times the normal seeding rate and cultipacking after seeding (based on Agronomy Tech Note 31).

**Seeding Dates**

Forb-dominated pollinator seed mixes can be installed in the spring or fall but fall dormant plantings allow seeds to naturally stratify and settle into the soil through periods of freezing and thawing over the winter. Spring seedings should be done on or around May 1-July 1 when soil temperatures are at least 60 degrees Fahrenheit or higher. Fall seeding should occur when soil temperatures fall below 50 degrees Fahrenheit for a consistent period of time (usually around October 15 in the northern half of the state and November 1 in the southern half of the state). Fall dormant seedings can help reduce weed pressure during the first year of growth because native cool-season grasses and forbs germinate earlier and start competing with weed species right away. Frost seedings are also an option if the snow cover is shallow, ice-free, and winds are calm. For a frost seeding, seeding rates may need to be increased by 25 -50 percent due to lower germination rates and loss of seed that is consumed by wildlife over the winter months.

**Management Methods**

*Establishment Mowing* – Mowing can be an important step in the establishment of pollinator plantings that have high pressure from annual weeds. Expect to mow at least twice during the first season and once during the second season with a flail mower or stalk chopper (to prevent smothering plants) to decrease competition and to provide sufficient sunlight for seedlings. Haying is another method to remove mowed vegetation that prevents smothering of the native seedlings. Mowing should be conducted before weeds mature and seed out. It is important that mowed vegetation does not smother the planting; therefore, very productive sites may need to be mowed more often in the first year to reduce the mulching effect. Vegetation should be mowed to between five and eight inches before seed is allowed to set (usually as weeds reach 12-24 inches). Mowing height should be raised as native plants establish. Mowing too short can be detrimental to the outcomes of a successful planting. Some grassland managers see success without mowing but the need will vary depending on site conditions (such as soil productivity) and weed pressure.

*Spot Mowing* – As the native plant community is getting established, it may be beneficial to spot mow or weed trim areas with invasive or noxious plants. Spot-mowing should be done at a raised height between 4-6 inches in order to target the invasive plants and to avoid damaging the nearby native species. Spot mowing for control of invasive or noxious weeds can be done every year to increase the diversity and functionality of the planting. A list of noxious/invasive weed species that should be eradicated can be viewed at the Minnesota Department of Agriculture's website. Mowing is a good way to control some species such as thistles, but other methods are needed to control species such as Poison Hemlock, Common Tansy, Leafy Spurge, Spotted Knapweed, Wild Carrot and Wild Parsnip. If there are large areas of these species, it would be helpful to minimize the disturbance of site preparation. There are helpful guidelines in the manual Restoration-Guide-Invasive-Perennial-to-Conservation-Prairie.pdf (nature.org).

*Spot Management of Weeds* – Some persistent perennial weeds may require digging, pulling, girdling, smothering or spot treatment with herbicides for sufficient control. Some persistent perennial plants include reed canary grass, smooth brome, quack grass, purple loosestrife, Canada thistle, Kentucky bluegrass, crown vetch, birds-foot trefoil, and woody species, such as box elder, common buckthorn, Siberian elm, and Tartarian honeysuckle. Control methods should be conducted carefully during the early establishment phase, to avoid adverse impacts to native plant seedlings. Herbicides should only be used on persistent perennial weeds; most other weeds will be excluded over time as the native planting

matures. Herbicide use should be species specific, sprayed in a discriminating and targeted way (minimizing non-target organisms), and applied according to rates specified on the label. All pesticides should be selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment. ---

*Prescribed Burning* – Prescribed burning is beneficial to remove thatch, control invading woody and invasive plants in prairies, fertilize the soil with ashes, stimulate seed germination and new plant growth, and increase diversity in plantings. Burning is typically initiated after the third or fourth years of establishment, as native plants become the dominant cover. Uplands benefit from burning every three to five years. The timing of a burn can also help with management goals. Late spring burns are used to set back cool-season non-native species such as smooth brome and reed canary grass. Fall burns can release spring-blooming species for pollinators. Fall and spring burns should be alternated periodically to simulate natural variation. Burn plans are needed to define the details of how the burn will be conducted, who will be involved and for contingency planning. In many cases, permits are also required. It is recommended to only burn one-third or less of a project site at a time, especially if there is no adjacent refuge or conservation area nearby for wildlife to escape the fire. Partial burns and burns that are patchy may also benefit pollinator populations if timed correctly (when pollinators are not actively foraging, or pollinators have pupated and are mobile).

**What to Expect in Year 1**

During the first year of establishment, many native grasses, sedges and flowers will remain about one to three inches tall. Mowing will help to keep agricultural weeds (foxtail, barnyard grass, ragweed etc.) managed so the native plant seedlings receive sufficient water and sunlight. The planting may have a somewhat weedy appearance in the first year (see establishment mowing paragraph above).

(IMAGE)

**What to Expect in Year 2**

During year two, some of the native grasses, sedges and flowers may reach their mature height and some of them may even flower. Depending on when the seeding was conducted (spring or dormant), there might also be many first-year native seedlings germinating alongside native plants that established the year prior. Mowing may still play a key role in managing weeds and allowing seedlings to grow.

(IMAGE)

**What to Expect in Year 3 and Beyond**

By the end of year three many of the native plants will be mature and should start flowering. There may be some species that are slow to establish and may not show up for several years.

**Problem Solving**

*Poor Establishment After Year 1* – It is often difficult to determine if a seeding is successful during the first year, as establishment may vary depending on weather conditions and some species may be slow to establish. It is typically best to wait until the second year to conduct any corrective actions. Looks for species such as Black-Eyed Susan seedlings in year 1 for confirmation the seeding was a success.

*Poor Establishment After Year 2* – If native plant seedlings are not establishing about every one to two feet it may be necessary to interseed some species into the planting. Monitor the site during the growing season to determine which species are present, and which species may need to be supplemented. Interseeding should be conducted after the second growing season.

*High Annual and Biennial Weed Competition* – Typically, annual and biennial weed competition is not a big problem in prairie plantings as they are short lived and frequent mowing in the first year of establishment reduces their contributions to the seed bank. In addition, perennial native plants tend to outcompete annual and biennial weeds as the planting matures.

*High Perennial Weed Competition* – Dense establishment of perennial species can be a problem as it can prevent the establishment of native species. Prescribed burning, prescribed grazing, and/or spot herbicide application may be needed to manage perennial weeds.

*Low Forb Diversity After Year 3* – If grasses and sedges are establishing successfully but there is a lack of forbs it is recommended to interseed additional forbs in late fall or after a prescribed fire in spring or fall. See the Xerces Society guide for additional information and guidance about interseeding wildflowers.