Appendix H

Vegetation Management Plan

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Vegetation Management Plan (VMP)

Enbridge Solar (Plummer) LLC • Plummer Solar Project

January 2024



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APPENDICES

1.0 EXECUTIVE SUMMARY

This Vegetation Management Plan (VMP) outlines the vegetation management objectives and goals and provides detailed measures to meet those objectives and goals, for Enbridge Solar, LLC's (Plummer Solar's) Plummer Solar Project (Project). The Project involves construction of a solar electric generating facility (up to 130 MW AC) in Emardville Township in Red Lake County, Minnesota (Figure 1-1). Plummer Solar is an independent power producer that will construct, operate, and own the Project. Broadly, Plummer Solar will establish perennial vegetation through implementation of this VMP.



2.0 OVERVIEW OF THE VEGETATION ESTABLISHMENT AND MANAGEMENT PLAN

The primary goal, or intended outcome, of the VMP is to establish perennial vegetation throughout the Project and as much native vegetation as possible outside of the solar arrays. All vegetation on the site is expected to provide some habitat for pollinator species (bees, butterflies, etc.). Non-native seed mixes will be used near the solar panels because these can more easily be maintained at a lower height to prevent the vegetation from shading the panels. The seed mix within the arrays will include low growing grasses and wildflowers that provide a source of nectar for many species of pollinators. Native seed mixes (specifically, native grass and forb species) will be established as much as possible but will not be included next to the solar panels. Vegetation establishment areas are described further in Sections 4.0 and 5.0. Stackable benefits that may be achieved because of implementation of this VMP, while secondary to Plummer Solar's primary goal, and considering the proposed vegetation types as compared to the existing vegetation types, could include:

- improving water infiltration and soil stability via deep rooted perennial plants,
- increasing carbon sequestration through photosynthesis via more robust vegetation, and
- creating more habitat for native pollinator species including bees, butterflies, birds, and others.

The following objectives will be achieved through implementation of this VMP and in support of Plummer Solar's goal to establish native vegetation in as much area as possible outside of the solar arrays:

- Establish 200 or more acres of native plantings using three (3) native seed mixes to establish a diversity of native grasses and forbs where feasible and considering the array design. Native plantings will follow the Vegetation Management Guidance from the Minnesota Department of Natural Resources (MDNR) (reference (1)):
 - o All native seed mixes will adhere to the following requirements:
 - A minimum seeding rate of 40 seeds per square foot.
 - At least 30% of the total seeding rate (by number of seeds) will be comprised of perennial forbs.
 - Seven or more native grass, sedge, or rush species will be included in the mix. If available, at least two species will be bunch-forming.
 - 20 or more native forbs or legumes will be included in the native seed mixes. If available, three species will be selected which bloom each "period": early (April-May), mid (June-August), and late (August-October).
 - At least one species in each of the following vegetative guilds will be included: cool season grasses, warm season grasses, sedges/rushes, legumes and non-legume forbs.
 - Effort will be made to provide high diversity across plant families.
- Achieve successful native vegetation establishment through management which may include mowing, grazing, herbicide treatments, and other adaptive approaches (Section 6.7).
- Control noxious weeds as defined by Minnesota Statutes sections 18.75 to 18.91 through proper site preparation, the establishment of desirable perennial vegetative cover, and through an ongoing maintenance regime that may include mowing, grazing, herbicide applications, and other appropriate means to reduce noxious weed cover to 10% or less in the long-term maintenance phase.
- To control woody plants within the entire project area, especially along pipeline corridor and within/adjacent to solar arrays.

- Vegetation next to the solar panels will need to be carefully managed to remain low growing to maintain operations of the panels and prevent shading. This area will be planted with non-native species that are not invasive and include species that are known to be desirable nectar sources for native pollinators.
 - Where possible, native species will be planted within the arrays in areas that do not shade the panels.

3.0 SITE DESCRIPTION

3.1 PROJECT LOCATION

The Project is situated on approximately 855 acres of privately-owned land under contract or owned by Plummer Solar and/or its affiliates (with the exception of public road right-of-way) (Land Control Area). Of the 855-acre Land Control Area, approximately 796.9 acres are currently designated to host Project infrastructure (Project Site).

The Project Site is located in a sparsely-populated rural agricultural area in Emardville Township, Red Lake County, Minnesota. The city of Plummer and the Clearwater River are northwest of the Project. The Project is located in Sections 12, 13, 14 and 15 of Township 151 North, and Range 42 West. The Project is south of County Highway 126, west of County Highway 129, north of 190th Street SE, and east of U.S. Highway 59. The maximum dimensions of the individual Project Areas 1, 2, and 3 are shown on Figure 3-1.



Figure 3-1 Project Layout

3.2 VEGETATION

The Project Site is located in the Aspen Parklands Subsection of the Lake Agassiz, Aspen Parklands Section of the Tallgrass Aspen Parklands Province as illustrated in Figure 3-2. This subsection is part of an extensive lake plain created by Glacial Lake Agassiz. The subsection was historically extensive forested peatlands to the east and tallgrass prairie mixed with stands of quaking aspen (*Populus tremuloides*) to the west. Pre-European settlement vegetation in this subsection consisted of a combination of aspen savanna, tallgrass prairie, wet prairie, and dry gravel prairie (on gravelly beach ridges). Floodplain forests of silver maple (*Acer saccharinum*), elm (*Ulmus americana*), cottonwood (*Populus deltoides*), and ash (*Fraxinus* spp.) previously occurred along rivers and streams. Little of the natural pre-European settlement vegetation in this subsection is present today, as European settlement converted the land to farmland and altered hydrology.



Figure 3-2 Ecological Classification System Subsection Map

Over a ten-year period (2012 and 2022), primarily soybeans and spring wheat have been planted in the surrounding region followed by alfalfa/other hay, corn, barley, and dry beans (reference (2)). Over the same 10-year period, primarily spring wheat, corn, and soybeans were planted in the Project Site (Table 3-1, reference (2)).

Table 3-1Primary Land Cover by Project Area (2012-2022)

Year	Project Area 1	Project Area 2	Project Area 3
2022	Winter wheat	Corn	Soybeans
2021	Spring wheat	Corn	Soybeans
2020	Soybeans	Soybeans	Corn
2019	Spring wheat	Corn	Soybeans
2018	Soybeans	Soybeans	Corn
2017	Spring wheat	Corn	Soybeans
2016	Soybeans	Soybeans	Corn
2015	Soybeans	Corn	Soybeans
2014	Spring wheat	Soybeans	Herbaceous wetland/
2013	Soybeans	Corn	deciduous forest
2012	Spring wheat	Soybeans	(limited hay crops)

A wetland delineation was completed in 2022 (references (3) and (4)) and includes documentation of vegetation on portions of the site. In addition, the site was reviewed in 2023 to better understand existing vegetation especially with reference to species that may be problematic for future management. Specifically, plant species that are on the state Noxious Weed List (reference (5)) and considered invasive species according to the MDNR (reference (6)).

In 2023, most of Project Area 1 was planted to wheat. Wheat is growing within the drainage swales that provide some drainage within the fields. About 3 acres in the north-central part of Project Area 1 appears to be an old homestead site along 180th Street. The area was dominated by non-native grasses quack grass (*Elymus repens*) and smooth brome (*Bromus inermis*), an invasive species. Other invasive and noxious weed species in the area include common tansy (*Tanacetum vulgare*) and Canada thistle (*Cirsium arvense*). A larger nearby area was previously used as a lay down pipeyard for construction projects. The wheat was not as robust in this area due to apparent previous soil disturbance. Canada thistle and sweet clover (*Melilotus officianalis*), another invasive species, were present in this area. These areas were or will be treated with herbicide to reduce potential long-term problems with these species.

A small area at the southern edge of Project Area 1 including with the wet meadow (PEMA) wetland is predominantly reed canary grass (*Phalaris arundinacea*), also considered an invasive species. In addition, there are native willows (*Salix* spp.) within this area.

In 2023, Project Area 2 was in corn production and Project Area 3 was in soybean. Very little other vegetation was present in these areas.

The ditches surrounding the site have additional invasive species including smooth brome grass and reed canary grass. There are also patches of willows and cottonwoods that may seed into the solar arrays and require control measures.

Delineated wetland types included seasonally flooded basins, farmed wetlands (seasonally flooded basins that are regularly plowed), fresh (wet) meadow, shallow marsh, and shrub carr.

- **Seasonally flooded basins** were dominated by slough grass (*Beckmannia syzigachne*) and Virginia wild rye (*Elymus virginicus*).
- **Farmed wetlands** are seasonally flooded basins that were dominated by cultivated crops (often submerged and/or stunted crops) but also included water plantain (*Alisma subcordatum*), horsetail (*Equisetum arvense*), and hybrid cattails (*Typha X glauca*).
- Fresh (wet) meadows included slough grass, Virginia wild-rye, and reed canary grass.
- Shrub carr is similar to the fresh (wet) meadow but also includes willow shrubs.
- Upland adjacent to emergent wetlands included various species often dominated by smooth brome with ragweed, lamb's quarters, common tansy, Canada thistle, red clover (*Trifolium pratense*), dandelion (*Taraxacum officinale*), alfalfa (*Medicago sativa*), and other herbaceous species.

Figure 3-3 illustrates the locations of winter wheat, corn, and soybeans planted in 2023. The figure also shows field-delineated wetlands and former pasture/open areas. Former pastures and open areas include upland forests, wetlands, and upland areas not used for agricultural purposes.

Figure 3-3 2022 Land Use Within the Land Control Area

3.3 LAND USE

Land use within and adjacent to the Project Site is predominantly agricultural as illustrated by the surrounding land cover data (2011 USGS Gap Land Cover data) shown in Figure 3-4. Similar to the surrounding area, the Project Site is primarily used for agricultural purposes.

The most developed area near the Project is the city of the Plummer, located northwest of the Project Site, and a railroad corridor located west of the Project Site (Figure 3-4). Except for residences in the City of Plummer, residences in the vicinity of the Project Site are primarily associated with farms. Existing infrastructure in the Project Site includes multiple oil pipelines and an electrical transmission line. This infrastructure will not be altered during this Project.



Figure 3-4 Land Cover and Surrounding Land Use

Some lands designated as high value resources, as defined by the MDNR issued Commercial Solar Siting Guidance (reference (9)), are present near the Project Site. Figure 3-5 provides the locations of MDNR Minnesota Biological Survey (MBS) mapped native plant communities (NPCs), MDNR mapped Native Upland and Wetland Prairie, and Sites of Biodiversity Significance (SBS) that are documented as having a ranking of "below" or "moderate" within a 5-mile radius of the Project Site. These resources represent areas with more diversity in vegetation types present as compared to the predominant surrounding agricultural land use. The implementation of this VMP is not anticipated to impact surrounding properties; management will be confined to the Project. Management of noxious and invasive weeds at the site as described further in Section 7.0 will reduce the seed source for the surrounding area.



Project Area 1 was designated as prior converted cropland (PC) by the NRCS in February and April 1992. A PC status means that wetlands were converted to cropland prior to December 23, 1985.

In 1998, a documented crude oil spill occurred as the result of a third-party incident within a portion of the Project Site. MPCA Spill #29074 (MPCA ID: IR0000045) was assigned to the incident and cleanup measures included an MPCA-approved land treatment remedy in which petroleum-impacted soil was tilled to facilitate contaminant degradation. Soil monitoring was completed annually until analyte concentrations were below established clean-up levels. Groundwater contamination was not detected. The MPCA closed the site in 2007 indicating soil monitoring and land treatment requirements had been met. Per the MPCA closure letter, restrictions on agricultural use and cropping of this area remain in place to prevent exposure by humans or livestock to any residual crude oil contamination, if present. Those restrictions include a prohibition on subterranean crops and grazing in this area by domestic livestock. If grazing is to occur on site, this restriction would need to be lifted prior to the grazing activities.

3.4 SOILS

The geology of this Minnesota region generally consists of 250-500 feet of lake-modified glacial till deposits overlying predominately Late Archean age metasedimentary bedrock. The bedrock

expected to be encountered deeply below the glacial till deposits within the Project Site is metasedimentary greywacke or slate.

The U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) Soil Survey Geographic database (SSURGO) maps nine soil series within the Project Site (Table 3-2). The GIS-based mapped soils data is illustrated in Figure 3-6. The majority of the Project Site, according to the USDA-NRCS dataset, is mapped as the Smiley soil series (references (10)). The Smiley soil series is a hydric soil and consists of "very deep, poorly and very poorly drained soils formed in loamy glacial till on lake plains, till plains and moraines." During the wetland delineation in June and July 2022 (references (3) and (4)), most (seven of the nine) soil series were encountered during the wetland soil characterization except for Foxhome sandy loam and Northwood muck. The Project Site includes approximately 4.3 acres of prime farmland, 88.1 acres of farmland of statewide importance, and 605.6 acres of prime farmland if drained. There are no stability or seasonal concerns with this area. Confirming soils are well-vegetated (Section 6.0) as quickly as possible will reduce erosion and rutting concerns across the site. Drain tile presence and maintenance is discussed in Section 3.7.

As seen on Figure 3-6, the soil map units in the surrounding landscape are similar to those at the Project Site and also consist primarily of Smiley loam, 0 to 1% slopes.

Table 3-2 Project Site Soil Characteristics

Soil Map Unit	Area in Project Site (Ac)	Hydric Soil (%) [1]	Drainage Class [2]	Depth of Topsoil (cm)	Depth to Water Table (cm)	Frequency of Flooding	Prime Farmland (Ac) [3]	Farmland of State Importance (Ac) [4]
I19A-Foxhome sandy loam, 0 to 2% slopes	31.30	15%	MWD	30	114	None	No	Yes
I37A-Kratka and Strathcona soils, 0 to 1% slopes	1.43	100%	VPD	30	15	None	No	Yes
I38A-Kratka fine sandy loam, loamy till substratum, 0 to 1% slopes	32.54	94%	PD	30	23	None	Yes*	No
I39A-Linveldt fine sandy loam, 0 to 2% slopes	2.09	19%	MWD	30	114	None	Yes	No
I44A-Newfolden loam, 0 to 2% slopes	2.88	100%	VPD	38	0	None	No	No
I45A-Northwood muck, 0 to 1% slopes	2.23	12%	MWD	30	114	None	Yes	No
I50A-Reiner fine sandy loam, 0 to 2% slopes	573.09	95%	PD	30	23	None	Yes*	No
I59A-Smiley loam, 0 to 1% slopes	7.44	100%	VPD	30	0	None	No	Yes
I60A-Smiley mucky loam, 0 to 1% slopes	47.96	95%	PD	30	23	None	No	Yes
I61A-Strandquist loam, 0 to 1% slopes	31.30	15%	MWD	30	114	None	No	Yes

[1] Soils that are classified as hydric (100 percent), predominantly hydric (67-99 percent), or partially hydric (34-66 percent) by SURGO.

[2] VPD = very poorly drained, MWD = Moderately well drained, PD=Poorly drained.

[3] Includes soils that are classified as "prime farmland" by the NRCS. Two soil map units are classified as "prime farmland" if a limiting factor is mitigated: * Prime farmland if drained.

[4] Includes soils that are classified as "farmland of statewide importance" by the NRCS.



Based on the geotechnical evaluation report for the Enbridge Line 3 Replacement prepared for Enbridge in May 2015, a series of soil borings were conducted at the Project Site in January and April of 2015 (reference (11)). The location of this previous investigation is illustrated in Figure 3-6. Based on the results a typical cross-section was provided in the report:

The site is typically overlain with a surficial thickness of topsoil on the order of 5 to 12 inches. Beneath the topsoil, layers of sandy lean clay, clayey sand, silty sand, sandy silt, poorly graded sand, and sandy silty clay are found to the termination of the borings. The thicknesses of the varying layers range from 1.5 to 32 feet. The relative density and consistency also varies throughout the depth of the borings but typically become very dense to hard below a depth of about 18 to 25 feet. Similar classifications of soil were typically observed at similar elevations throughout the borings, suggesting that the soil layers (at least in the area where drilling occurred) are approximately laterally continuous, although based on the geologic deposition of glacial till, one should expect to see variations in sand, silt and clay content in a given soil layer based on location.

The report also noted that groundwater was encountered during drilling at two locations at depths ranging from 5.4 to 7.0 feet below ground surface (bgs). Given the high groundwater table and the low-lying wetland areas located within the previous area of geotechnical investigation, that site was deemed as possibly prone to flooding and/or high groundwater.

Smiley loam, 0 to 1 percent slopes, is predominantly mapped at the location of the soil borings completed in May 2015 (reference (11)). Smiley loam is predominantly hydric, poorly drained, and includes >6.5 feet of topsoil. The water table is 9.1 feet bgs. A typical profile of Smiley loam

consists of 1 foot of sandy clay loam over 4.6-6.5 feet of clay loam, overlying 12.3-15.9 feet of loam (reference (10)).

Observed soils were different than the mapped soils (i.e., the Smiley Series). Regarding the topsoil thickness, the observed soils had a thinner topsoil thickness (5-12 inches) than the mapped soils (78 inches or 6.5 feet). Regarding soil textures, the field-observed soils contained more sand/silt and less clay than the mapped soils. Finally, the water table was shallower (5.4-7 feet bgs) for the field-observed soils as compared to the mapped soils (9.1 feet bgs).

Geotechnical investigations specific to the Project were completed in the summer of 2023 (reference (12)). Maximum frost depth for the site was estimated to be 7.6 feet based upon the Modified Berggren Method with the freezing season lasting an average of 167 days in Plummer, MN. Borehole logs and laboratory tests were shown to be comprised of stiff lean clays with fines content greater than 25% by sampled mass and moisture content was measured to be 10-20%.

3.5 TOPOGRAPHY

Topography of the Project Site is relatively flat (Figure 3-7). A topographic survey of the Project Site was completed in summer 2023 and is reflected in Figure 3-7. Elevations across the Project Site range from 1,130 feet above mean sea level (AMSL) to 1,144 feet AMSL. Most of Project Area 1 slopes downward from the southwest to the northeast and includes drainage channels that slope north (1,140 to 1,136 AMSL), toward the road ditch along 180th Street SE. The westernmost portion of Project Area 1 and small area in the southwest corner slope to the west, toward US Highway 59. Project Areas 2 and 3 slope northwest toward County Ditch No. 57 (1,138 to 1,134 AMSL).

Prior to agricultural and infrastructure development by the present landowners and land managers, the general elevations were likely similar with gradual slopes from the highest point in the southwest to the northeast. Drainage channels, roads and the pipeline corridor have been built and maintained throughout the Project Site for accessibility, agricultural use and infrastructure maintenance.

Figure 3-7 2022 Topography



Flow direction on Figure 3-7 indicates the approximate surface water flow direction based upon current elevational contours at the site. Due to the relative flat topography of the area, it is anticipated drain tiles and any swales/surficial conveyances will ultimately determine the water movement within and exiting/entering the Project Site.

3.6 HYDROLOGY

The Project Site is located within the city of Plummer-Clearwater River Watershed (HUC 090203050702) in the Red River of the North Basin. Figure 3-8 identifies the surface water resources in the Project Site and its vicinity. No MDNR Public Waters Inventory (PWI) watercourses or waterbodies are located within the Project Site. The nearest PWI is the Clearwater River, which is located approximately 0.9 mile northwest of the Project Site. The Clearwater River is listed by MPCA as an impaired water. FEMA flood maps do not show any 100-year floodplain areas within the Project Site; the nearest designated floodplain is CD-57.

There are no streams or lakes within the Project Site. However, there are county ditches (CD): CD-22 and BR-17. CD-22 flows west from the Project Site to the Clearwater River. CD-22 discharges to the Clearwater River in Section 9, T151N, R42W, which is approximately 0.9 mile northwest of the Project Site boundary. In this location, the Clearwater River is designated as a MDNR public water. The western end of CD-22, within the Project Site, is similar to the eastern end, with no standing water at the time of observation in July 2022 (reference (3)). The CD-22 bank slope is distinct, but not steep and the bed is approximately 3 to 5 feet in width with clay and silt soils.

BR-17 flows east of the Project Site toward CD-57, which discharges to the Clearwater River in Section 2, T151N, R42W, which is approximately 1.5 miles north of the Project Site boundary. In this location, the Clearwater River is designated as a MDNR public water. BR-17 is connected to CD-57 through a culvert under 230th Street and has intermittent flow (reference (4)). The eastern portion of BR-17 was inundated in portions with one inch of stagnant standing water at the time of observation. BR-17 was wetter toward the central portion of the evaluation area with up to 6 inches of standing water.

A wetland delineation was conducted in the Project Site on June 20-23 and July 13, 2022 (references (3) and (4)). As shown on Figure 3-8, the delineation documented 6.7 acres of wetlands within the Project Site. Based on the Eggers and Reed wetland community classification system, wetland types identified in the Project Site include fresh (wet) meadow, shallow open water, seasonally flooded basin, shallow marsh, sedge meadow, and shrub-carr. The Project Site contains 700.5 acres of restorable wetlands (Figure 3-9); however, the majority of this restorable wetland area (97% or 851.27 acres) is within Restorable Wetland Class 1 or 2 (i.e., signifying a 0 to 40% probability of being a restorable wetland).

Restorable wetlands are cataloged in the Restorable Wetlands Inventory (RWI), which is a complement to the National Wetlands Inventory (NWI). During the development of the original NWI, an administrative decision was made not to map wetland basins in Minnesota identified as completely drained. The RWI project, administered by Ducks Unlimited, Inc., identifies and digitizes the completely drained depressional wetlands that were not mapped by the NWI process.

Figure 3-8 2022 Delineated Wetlands







3.7 DRAIN TILES

In January 2023, Enbridge contacted Kurt Casavan, Red Lake County Environmental Services Officer, as well as Erik Nymann (tenant and former owner) to inquire about their knowledge of potential drain tiles installed within the Project Site and west of 230th Avenue SE. Neither were aware of any drain tile on the property. For properties east of 230th Avenue SE, Enbridge is aware of installed drain tile.

Plummer Solar is aware of the presence of drain tile within Project Areas 2 and 3 (land which is being leased from a private landowner), which appears to adequately drain the Project Site and discharge off site, primarily into the county-managed ditches. Drain tiles are not present within Project Area 1 (land which is owned by Enbridge entities). No records of drain tile have been found and site surveys have yielded no evidence of drain tile.

Plummer Solar will attempt to avoid existing drainage systems during Project construction, but given the number of pilings to be installed, it's expected that some damage may occur despite prudent efforts. The Project will make plans to maintain drainage system integrity during construction, including rerouting, reinforcement or other methods.

4.0 MANAGEMENT UNITS

The following management units are planned as part of this Project:

- Array Vegetation Management Unit
- Wetland Management Unit
- Stormwater Management Unit
- Existing Linear Corridor Management Unit

The largest management unit will be the Array Vegetation Management Unit established within the solar panel mounted arrays. This area is currently comprised of agricultural areas (primarily spring wheat, soybeans, and corn) with small areas containing few trees and uplands, as previously described.

The Wetland Management Unit is comprised of existing wetlands which will continue to function as wetlands.

The Stormwater Management Unit may include wet ponds and vegetated swales. Final Project design is expected in Q2 2025.

The final management unit is the Existing Linear Corridor Management Unit. This area is currently comprised of agricultural areas (primarily spring wheat, soybeans, and corn).

Separate management units for perimeter plantings and/or screening are not currently planned.

The locations of the management units are illustrated in Figure 4-1.



Figure 4-1 Management Units

5.0 MANAGEMENT OBJECTIVES FOR EACH UNIT

The overall vegetation management objective of the project is to install 200 acres or more of native plantings using four seed mixes to establish a diverse community of native grasses and forbs within the following management areas:

- A. Array Vegetation Management Unit will have a combination of non-native and native vegetation.
- B. Wetland Management Unit will be composed of native vegetation.
- C. Stormwater Management Unit will be composed of native vegetation.
- D. Existing Linear Corridor Management Unit will be composed of native vegetation.

Establishment period and long-term management objectives will be defined independently for the four management units. Unit-specific seed mixes will be designed and installed, but objectives for most management units are consistent. The Array Vegetation Management Unit will be somewhat unique because the vegetation in this area must remain lower to the ground to prevent shading the solar panels. Therefore, a non-native and low growing seed mix will be used and will be supplemented with non-native nectar species that are beneficial to pollinators. Additional vegetation management activity is expected within the arrays to maintain vegetation at a low height to prevent interference with operation of the panels.

5.1 ESTABLISHMENT PERIOD OBJECTIVES (YEARS 0-5)

Seeding will be completed prior to construction activities on the site. Therefore, before construction begins, it is expected that seeded area will be vegetated at least with the cover crop included in each of the seed mixes. Below are the primary objectives for establishing vegetation in each management unit. These objectives are set-up to follow the expected trajectory after initial seeding and the start of construction; management timelines associated with these objectives are described further in Section 6.6. The performance standards described below show a minimum percentage of vegetative cover that will be based on estimates of areal cover not including roads, driveways, pads, or other working areas.

Array Vegetation Management Unit

The Array Vegetation Management Unit will have two seed mixes. The Low Growing Grass/Clover seed mix (**Appendix A**) is meant to stay low to the ground so it does not shade the panels or interfere with operations. It is a low diversity, non-native seed mix that is expected to develop relatively quickly.

The second seed mix in the Array Vegetation Management Unit will be a Native Shortgrass seed mix (**Appendix A**). This mix will be composed of diverse grasses and forbs that tend to stay less than 30 inches tall. This seed mix will be installed within the arrays in areas that will not shade the panels including at the ends of rows and near fences. The specific areas will be determined after more detailed design is completed; final Project design is anticipated in Q2 2025.

Low Growing Grass/Cover seed mix (non-native)

The objectives below apply only to the Low Growing Grass/Clover seed mix (**Appendix A**) that will be the predominant mix within the arrays and under the solar panels in the Array Vegetation Management Unit.

- Provide expeditious soil stabilization and temporary cover using annual cover crop.
- Establish and maintain perennial vegetation with desirable species appropriate for the site/soil conditions and provides beneficial habitat. Establishment will be measured as follows:
 - Stage 1: End of first full growing season/year 1:
 - 60% vegetative cover.
 - Seedlings of desirable grass and forb species shall be identified throughout the planted area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - All areas disturbed during construction shall be seeded with the selected seed mix including cover crop.
 - Stage 2: End of second full growing season/year 2:
 - 80% vegetative cover and at least 40% cover of seeded species.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - Any areas larger than 100 square feet that are disturbed during construction or maintenance activities shall be seeded with the selected seed mix (or similar) including cover crop.
 - Stage 3: End of establishment period/years 2 or 3
 - The seeding will be considered successfully established when the area has a 80% perennial vegetative cover not including noxious weeds.

It should be noted that the low growing species in this seed mix may not be ideally suited for the soils in this region which would likely support taller plant species associated with mesic soil conditions. Therefore, management of these areas will be important to maintain conditions suitable for the solar array operations.

See below for noxious species, monitoring, and other general objectives.

Native Seed Mixes

The objectives listed below apply to the seed mixes used for the following areas of the Project: Native Shortgrass mix (**Appendix A**) used within the Array Vegetation Management Unit, the Wetland Management Units, and the Existing Corridor Management Units.

- Provide expeditious soil stabilization and temporary cover using annual cover crop.
- Establish and maintain perennial and native-dominant vegetation that is adapted to the site/soil conditions and provides beneficial habitat. Establishment will be measured as follows:
 - Stage 1: End of first full growing season/year 1:
 - 60% vegetative cover.
 - Seedlings of at least two desirable grass, sedge, or forb species shall be identified throughout the area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - All areas disturbed during construction shall be seeded with the selected seed mix including cover crop.
 - Stage 2: End of second full growing season/year 2:
 - 75% vegetative cover and 10% dominated by native grasses and forbs.
 - Seedlings of at least five native grass or sedge species and five native forb species shall be present throughout the planted area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - Any areas larger than 100 square feet that are disturbed during construction or maintenance activities shall be re-seeded with the selected seed mix (or similar) including cover crop.
 - Stage 3: End of third full growing season/year 3
 - 80% perennial vegetation cover and 60% cover of native grasses and forbs.
 - Individuals of at least five native grass/sedge species and eight native forb species shall be present throughout the planted area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - Any areas larger than 100 square feet that are disturbed during construction or maintenance activities shall be re-seeded with the selected seed mix (or similar) including cover crop.
 - Stage 4: End of establishment period/years 4 & 5
 - 80% perennial vegetation cover dominated by native grasses and forbs.
 - The seeding will be considered successfully established when the area has a 80% perennial vegetative cover not including noxious weeds.

See below for noxious species, monitoring, and other general objectives.

Stormwater Management Unit (Native Seed Mix)

These objectives pertain to Stormwater Management Unit, as needed, for the Project. Vegetation here is expected to be dominated by native vegetation, including many species that grow over 3 feet tall. The conditions for these areas, such as the potential water conveyance, ponding and sediment deposition, may slow development of vegetation. These are expected to develop differently from wetlands because the water in them is expected to be less stable and there may be some sedimentation, especially during the early construction phases. The selected seed mix is included in **Appendix A**.

- Provide expeditious soil stabilization and temporary cover using annual cover crop and/or other BMPs, where appropriate.
- Establish and maintain perennial and native-dominant vegetation. Establishment will be measured as follows:
 - Stage 1: End of first full growing season/year 1:
 - 50% vegetative cover.
 - Seedlings of at least two desirable grass, sedge, or forb species shall be present throughout area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - All areas disturbed during construction shall be seeded with the selected seed mix including cover crop.
 - Stage 2: End of second full growing season/year 2:
 - 60% vegetative cover and 5% dominated by native species.
 - Seedlings of at least three desirable grass or sedge species and three desirable forb species shall be present throughout the planted area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.
 - Any areas larger than 100 square feet that are disturbed during construction or maintenance activities shall be re-seeded with the selected seed mix (or similar) including cover crop.
 - Stage 3: End of third full growing season/year 3
 - 80% vegetative cover and 40% dominated by native grasses and forbs.
 - Seedlings of at least four desirable grass/sedge species and four native forb species shall be present throughout the planted area.
 - No contiguous areas of bare soil larger than 100 square feet shall exist.

- Any areas larger than 100 square feet that are disturbed during construction or maintenance activities shall be re-seeded with the selected seed mix (or similar) including cover crop.
- Stage 4: End of establishment period/years 4 & 5
 - 80% perennial vegetation cover, not including noxious weeds.
 - The seeding will be considered successfully established when the area has a 80% perennial vegetative cover not including noxious weeds.

See below for noxious species, monitoring, and other general objectives.

Noxious Weeds Control for Entire Site

These objectives pertain to all Management Units, as needed, for the Project.

- Implement the establishment-period vegetation management plan in Section 6.0.
- Control state-listed noxious weeds using integrated vegetation management techniques such as spot-spraying herbicide, mowing, and grazing to reduce populations to the following levels:
 - Stage 1: End of first growing season/year 1
 - 25% or less
 - Stage 2: End of second growing season/year 2
 - 20% or less
 - Stage 3: End of third growing season/year 3
 - 15% or less
 - Stage 4: End of establishment period/years 4 & 5
 - 10% or less
- Perform regular monitoring visits to assess vegetation establishment targets as listed above.
 - 3 per year during years 1-3
 - 1 per year during years 4-5
- Conduct supplemental seeding in areas not meeting established targets prior to the next stage or growing season.
- Retain work records and collect observations to incorporate into long-term vegetation management plan.

5.2 LONG-TERM OBJECTIVES (YEAR 5+)

Array Vegetation; Wetland; & Existing Linear Corridor Management Units

- Develop long-term vegetation management plan which incorporates progress, observations, and specific site conditions documented in years 0-5.
- Conduct ongoing annual monitoring to evaluate plant cover and inform vegetation management strategies.
- Continue adaptive vegetation management techniques to achieve and maintain the following standard:
 - o 90% perennial vegetation cover including:
 - At least 75% dominated by native species in Wetland and Existing Linear Corridor Management Units
 - Noxious weed cover of 10% or less. Prevent propagation of noxious weeds through effective control means such as cutting, grazing or herbicide application.

Stormwater Management Unit

- Develop long-term vegetation management plan which incorporates progress, observations, and specific site conditions documented in years 0-5.
- Conduct ongoing annual monitoring to document site conditions and generate recommendations, if needed.
- Continue adaptive vegetation management techniques to maintain noxious weeds at less than 10% within the unit.

6.0 VEGETATION ESTABLISHMENT

The following vegetation establishment guidelines are based on observations of the status of the site, a review of historical site use, expected conditions prior to and during construction, construction timelines, and qualified contractor experience.

6.1 CONTRACTOR QUALIFICATIONS

Seeding contractors must have at least 10 years of experience installing native seed and 5 years of installing native vegetation within solar array projects in Minnesota or the upper Midwest. Contractor to provide references demonstrating the ability to successfully perform similar work on utility scale solar projects. Seeding and site managements contractor(s) to be assigned; contractor(s) will be assigned prior to Project construction. All herbicides will be applied by MDA licensed commercial applicator(s) and according to manufacturer's directions.

6.2 SITE PREPARATION

It is anticipated that that site will be managed for annual crops (wheat, corn or soybeans) until construction is to begin. The crop will be harvested prior to construction, leaving the soil surface ready for seeding with the proper equipment. Seeding is expected to occur either immediately

after the crops have been removed or in the following spring. Therefore, site preparation for seeding will be minimal except when construction will occur within an area that is already seeded. Areas disturbed during construction will require additional soil preparation and seeding, as discussed in the following sections.

6.2.1 SOIL AND SUBSOIL HANDLING

During construction and grading activities, the following protocols will be used to assist in soil segregation and decompaction:

- Separation of topsoil from other subgrade/subsoil materials during earthmoving activities or excavation during grading, road construction, cable installation, foundation installation, etc.
- Subsoil to be returned to the excavation with as little disturbance of the underlying topsoil as practicable when excavated subsoil must be stored on adjacent undisturbed topsoil.
- Laying down a thin, weed-free straw mulch (Type 3) layer as a buffer between the subsoil and topsoil may be used to facilitate more effective separation of the subsoil and underlying topsoil during the excavation backfill process.
- Identify appropriate depth of topsoil that should be stripped and segregated from other subsoil materials during earthwork activities and provide information and recommendations on specific segregation methods/techniques to the environmental monitor (monitor) for review and input.
- The full depth of topsoil will be stripped between up to a maximum of 12 inches in areas of construction grading.
- During the activities that require temporary excavations and backfilling (e.g., trenching) the Contractor will first replace subgrade material in the excavations and compact as necessary, followed by replacing the topsoil to the approximate locations from which they removed it. The Contractor will grade topsoil to the approximate pre-construction contour.
- Plummer Solar will strive to avoid compaction in other areas where the design does not require it.
- Following earthwork activities that require topsoil/subsoil segregation, topsoil materials will be re-spread on top of the backfilled subsoils or disturbed areas and de-compacted as needed or re-spread within the Project Site.

6.2.2 SOIL COMPACTION

In areas where grading occurs, soil will be de-compacted by tilling or ripping and the surface prepared to provide a smooth, even texture prior to seeding. The soil will be loosened to a minimum depth of four inches. The soil surface will be harrowed to remove track imprints from equipment. This may not be necessary in areas where the soil has been regularly plowed for agricultural purposes and there is no disturbance from grading.

6.2.3 SEEDBED PREPARATION, WHERE NECESSARY

In some areas, if existing vegetation is present after crops have been harvested, preparatory herbicide treatments may be implemented. The spraying would be done approximately 14-21 days prior to scheduled seeding with an application of a non-specific herbicide to all live vegetation in the seeding area. Additional herbicides may be incorporated during this process to eradicate particularly resilient weed types. A second herbicide treatment may be applied to any significant areas of undesirable vegetation still growing 14 days after the first herbicide application. Drift would be minimized by utilizing appropriate equipment calibrated to be conducive to the weather conditions at the time of treatment.

Final site preparation herbicide application may not be necessary if the site has been maintained for agricultural crops, particularly if the site is essentially "weed-free" before final harvest of the crops. If so, seeding would occur after harvest; grading and site preparation would occur before Project construction. In accordance with the Project SWPPP, seeding of all graded areas will be completed no later than 14 calendar days after land-disturbing activities have temporarily or permanently ceased.

After grading is completed and before most construction activities, the impacted areas will be de-compacted, if necessary, and prepared for seeding. Seeding will occur soon after the graded areas are impacted. Some seeding may occur in the middle of the summer to follow this timeline but may result in less vegetation establishment success compared to other seeding timelines. All areas will be monitored the following year and re-seeded within the preferred seeding windows (fall or spring) if seedlings are not visible and vegetation is not becoming established as required for the Establishment Period Objectives (Section 5.1). Cover crop seed mixes will be included with all seeding and may include oats if it is planted during the spring or summer; winter wheat will be planted in the late summer or fall.

6.3 INVASIVE SPECIES PREVENTION

Before machinery and equipment is transported onto the site it will be inspected by the monitor for potential undesirable seed. Any plants, seeds, mud, dirt clods, and animals will be removed through washing to prevent the import of undesirable seeds to the site. Any equipment that arrives on the site that is not properly cleaned will be sent away to an off-site location for cleaning and inspection before returning.

During construction, weed management of the site will be achieved through a combination of herbicide applications and mowing to control the production of undesirable seeds that will impede future ground cover development and may impact future management activities. This will include areas nearby within the control of Enbridge, such as the adjacent ditches and fields on Enbridge property. Species off-site may be controlled by mowing (at the discretion of the respective landowner(s)), only to prevent or minimize the potential for undesirable seed to spread onto the bare soils during construction and grading activities.

6.4 SEEDING

Seed installation will occur prior to construction activities. Before seeding, surveyors will located the boundaries of each of the Management Units to guide seed mix installation. Seeding equipment will install each seed mix within the appropriate Management Unit. After construction is completed, disturbed areas will be re-seeded with the same seed mix, appropriate for each Management Unit.

6.4.1 COVER CROP

A cover crop-only seed mix may be installed into any open soils to provide for soil stabilization if there are disturbed soils left for more than 14 days without erosion control or permanent seeding. Cover crop seed mixes may include oats for seeding during the spring or summer, or winter wheat for seeding in the late summer or fall. The cover crops will be included in all permanent seed mixes at a reduced rate (**Appendix A**).

6.4.2 SEED MIXES

Seed mix selection will be appropriate for each Management Unit and designed to meet each Unit's long-term goals and objectives. The proposed seed mixes for each are found in **Appendix A** and the associated Management Units are represented in Figure 4-1.

A. Array Vegetation Management Unit: two seed mixes

- a. Low Growing Grass/Clover mix (non-native)
 - i. This will be the primary mix within the arrays meant to provide operational space for the solar facility without excessive maintenance, mowing, or herbicide management. These plant species are expected to stay low to the ground and will not shade the panels.
 - ii. This mix will be predominantly non-native grasses that are low-growing and turf-forming.
 - iii. The mix will include select forbs species to provide pollinator value
 - iv. Grasses will be predominantly fescues (*Festuca* spp.) and the forbs will include species such as clover (*Trifolium* spp.). These non-native species tend to stay less than 20 inches tall.
- b. Native Shortgrass Prairie mix
 - i. This mix will be used within the arrays in areas where the taller plants will not shade the panels.
 - ii. This is a moderately high diversity mix of native grasses, sedges and forbs that are expected to remain less than 30 inches tall.
 - iii. Forbs species in this mix have overlapping bloom seasons throughout the year.

B. Existing Linear Corridor Management Unit (native):

- a. This mix is expected to provide good habitat for pollinator species with a high diversity of nectar-producing flowering plants in mesic to wet-mesic soils.
- b. This is a high diversity mix of native grasses, sedges, and forbs.
- c. Forb species in this mix have overlapping bloom seasons throughout the year.

- d. This area is a known part of an active corridor and may be periodically disturbed as part of pipeline maintenance activities.
- e. This seed mix will be included in border areas outside of the array but within the Project Site footprint.

C. Wetland and Stormwater Management Units (Native mixes)

- a. This mix is expected to provide good habitat for pollinator species with a high diversity of nectar-producing flowering plants in soils that are saturated at the surface in most growing seasons.
- b. This is a high diversity mix of native grasses, sedges, and forbs.
- c. Forb species in this mix have overlapping bloom seasons throughout the year.
- d. The Stormwater Management Unit is expected to have more difficult growing conditions because of potential for water conveyance, short-term inundation, and sediment deposition. Species in the seed mix are still expected to thrive in those conditions, though the final plant composition may differ from the Wetland Management Unit.

Native seed mixes will adhere to the following requirements, based on the Vegetation Management Guidance from the MDNR (reference (1)):

- A. A minimum seeding rate of 40 seeds per square foot.
- B. At least 40% of the total seeding rate (by number of seeds) will be comprised of perennial forbs.
- C. Seven or more native grass, sedge, or rush species will be included in the mix. If available, at least two species will be bunch-forming.
- D. 20 or more native forbs or legumes will be included in the mix. If available, three species will be selected which bloom each "period": early (April-May), mid (June-August), and Late (August-October).
- E. Include at least one species in each of the following vegetative guilds: cool season grasses, warm season grasses, sedges/rushes, legumes, and non-legume forbs.
- F. Effort will be made to provide high diversity across plant families.

A cover crop of annual oats or winter wheat (seasonally dependent) will be seeded at a rate of 20 pounds per acre with the native seed mixes.

All seed that is supplied for projects will be labeled according to the requirements of Minnesota Seed Law, section 21.82, including limits on noxious weed seed.

The origin of seed will be listed on the seed tag for all native species in a mix. The smallest known geographic area (township, county, ecotype region, etc.) will be listed. Seed purity and percent germination shall be clearly visible on seed tags.

Any seed that cannot be obtained due to lack of availability or other reason will be substituted with an option which will be approved by Plummer Solar.

Seed will be shipped and stored with protection from weather or other conditions that would damage the seed or impair its effectiveness.

6.5 PLANTING

Prior to starting work, the seeding contractor will calibrate and adjust seeding equipment to sow seeds at the proper seeding rate. Equipment will be operated in a manner to confirm complete coverage of the entire area to be seeded. Equipment will be steam cleaned or thoroughly washed prior to starting work to prevent contamination from outside seed sources.

Initial seeding will be completed following the harvest of crops in the season prior to the initiation of site grading and construction. These areas are expected to be in good condition to receive seed using either a no-till drill or a broadcast with a roller attachment or another method to scarify the soil surface to assist with seed to soil contact. Grading is expected to impact approximately 20-30% of the site, much of which may require re-seeding depending on the degree of impact to the seedlings and new vegetation. Where erosion may be an issue or where seed is applied in mid-summer (where it may not begin growing for several weeks), the graded areas may have weed-free straw mulch (Type 3) applied and disc anchored. This would help with water holding and help to protect the soil surface until the vegetation can become established.

All seed will be installed using a Truax no-till drill or Trillion type seeder (or similar) specific to native seed mixes. Where drill-seeding is not practical due to site conditions including the presence of solar panels and posts, seed will be broadcast onto the soil surface using a Vicon seeder (or similar) and raked to ensure good seed-to-soil contact.

6.6 MANAGEMENT TIMELINE

The following vegetation management guidelines have been adapted from BWSR's <u>Sample</u> <u>Habitat Friendly Solar Planting Plan Specifications</u>. These guidelines are general standards for pollinator-solar vegetation management, and additional or fewer services *may* be required based on panel height and other to-be-determined site conditions. Methods listed below will follow the techniques prescribed in Section 6.7 and are informed by the management objectives listed in Section 5.1. This timeline assumes that the majority of seeding occurs in the fall prior to Year 1 or in the early summer (before June) of Year 1. Unless specifically noted, these timelines apply to all Management Units as described in Section 4.0.

Year 1 Maintenance - During the first year, vegetation in the seeded areas should be mowed 2-3 times throughout the growing season as needed to prevent weed seed production, remove shading from small plant seedlings, and prevent shading of solar modules. Herbicide will be used minimally and only as a spot-treatment on aggressive perennial weeds and woody plants during the first year, with mowing utilized as the primary method of controlling undesirable species. Sheep grazing is an alternative to mowing that may be implemented in the first year, depending on vegetation growth/type. **Year 2 Maintenance** – During the second-year, vegetation in the seeded areas will likely require mowing 1-2 times throughout the growing season to control annual weeds, ensure good establishment of seeded species, and prevent shading of modules. From the second year onward, sheep grazing may be substituted for mowing. Noxious, invasive, and woody plants may also require mowing to prevent seed development. Selective spot herbicide treatment should begin during the second growing season for biennial and perennial noxious weeds and woody species, occurring 1-2 times during the summer/early fall and scheduled strategically around mowing/grazing to ensure proper herbicide uptake on the target plants.

Year 3 Maintenance – During the third-year, vegetation in the seeded areas may require mowing 1-2 times throughout the growing season for control of tall-growing annual weeds, woody species, or perennial/noxious weeds at risk of producing seed prior to herbicide application. Height-reduction mowing of the array area or portions thereof may be required in mid-summer to prevent shading of modules. From the third year onward, sheep grazing may also be employed during the dormant season for vegetative thatch and wildfire risk reduction. Targeted herbicide treatment will occur 1-2 times during the growing season for biennial/perennial noxious weeds and woody species, scheduled around mowing/grazing.

Year 4/5 Maintenance – During the fourth and fifth years, the vegetation management strategy will shift to minimizing impact on the desirable plant community while controlling noxious weeds and woody species and preventing shading of modules. Mowing or grazing during the growing season may be required to remove shading and control weeds. Targeted herbicide treatment will continue 1-2 times during the growing season. Volunteer tree seedlings will be removed via cutting and stump treating which is preferred over foliar spraying for effectiveness and prevention of non-target impacts.

Long-Term Maintenance – During the long-term maintenance phase (after year 5), depending upon site conditions and vegetation management needs, the project site may be cleared of thatch on a rotational basis. This will be done by haying, mowing, or grazing. Hayed vegetation should be removed from the site by the management contractor or other approved personnel. Mowing should be done with a flail-type implement to thoroughly chop cut vegetation and minimize thatch accumulation. High-impact grazing should aim to defoliate 90% or more of the vegetation and clear 90% of the accumulated thatch layer. The same area will be cleared on a rotation, with no area cleared at the same time two years in a row.

A potential schedule of seeding is provided below in Table 6-1; specific construction timelines are not yet known, so this is meant to be conceptual. Final Project design and construction timeline are anticipated in Q2, 2025.

Expected schedule	Task	Notes		
Year 0 (Sep)	Harvest completed in fields			
Year 0 (Oct-)	Seed directly into stubble from wheat or soybeans as possible after harvest	Include winter wheat cover crop into all mixes		
Year 0 (Oct)-	Major grading activities.	Grading activities are expected to impact		
Year 1 (Sep)	Following grading, de-compact areas and prepare seedbeds.	approximately 20-30% of the site –		

Table 6-1 Expected Vegetation Establishment Sequencing

Expected schedule	Task	Notes
	Re-seeding in disturbed areas, as appropriate - Cover crop included - Straw mulch where needed	requiring re-seeding in most of those areas.
Year 1 (Jun-Sep)	Vegetation monitoring site visits to begin. Mowing or grazing to reduce annual weeds 2 to 3 times during the growing season. Invasive and noxious species management treatments, where needed.	Apply herbicide to target species only. Minimize impact to new desired seedlings. Some touch-up seeding may be needed.
Years 2-5 Establishment	Vegetation monitoring site visits Mowing or grazing to reduce annual weeds once or twice during the growing season, as warranted. Invasive and noxious species management treatments, where needed.	Apply herbicide to kill target species only. Minimize impact to new desired seedlings. Some touch-up seeding may be needed.
Years 5+ Management	Vegetation monitoring site visits Invasive and noxious species management treatments, where needed.	Touch-up seeding after disturbances.

6.7 ADAPTIVE MANAGEMENT TECHNIQUES

A variety of adaptive vegetation management techniques will be implemented on the project site according to the timeline provided in Section 6.6 and adjusted per recommendations from the vegetation management and monitoring contractor(s). Methods will be selected to provide the best control possible of noxious, invasive, and woody species while minimizing impacts on seeded species and ensuring vegetation does not shade or interfere with solar modules and equipment. All weeds on the Minnesota State Noxious Weed List will be managed per their designation category on the list at the time of the inspection, i.e., eradicate or control.

Vegetation management equipment must be cleaned to prevent the spread of invasive species and weed seeds when entering/leaving the Project Site. Equipment will be inspected and cleaned prior to accessing Plummer Solar, and again upon completion of work there.

Some of the management methods may be tested on small areas before implementing across broader sections of the site to better understand if certain approaches work better than others for the specific conditions at the Project Site. Therefore, implementation of certain measures may be completed over multiple years before it is expanded to the full Project Site. Table 6-2 shows a summary of the management techniques to be implemented based upon the site conditions present and the respective Project phase.

Table 6-2	Management	Techniques	Decision	Matrix
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Project Phase	Site conditions		Treatment Options	
	Annual weeds and	Mowing	Follow with haying if thatch is thick	
	tall vegetation	Weed whipping	For vegetation in hard-to-reach areas	
	newly seeded plants	Grazing	Care must be taken during early establishment phases to prevent excessive damage to seedlings	
Establishment	Poor establishment	Supplemental seeding	Consider mulches, decompaction, and soil amendments	
(16015 1-5)	Invasive and Noxious weeds	Herbicide (spot- treatments)	Minimize non-target damage to seedlings	
		Mowing	To prevent seed set before spray or for annual and biennial species.	
	Woody species	Cut and treat stumps	To prevent re-sprouts	
	Erosion	Consult erosion control specialist		
	Tall vegetation	Mowing	Haying if thatch is thick	
Array Management Unit: After establishment	shading panels	Weed whipping	For vegetation in hard-to-reach areas	
		Grazing	High density for short-term	
	Bare soil	Supplemental seeding	Consider mulches, decompaction, and soil amendments	
All Management	Invasive and Noxious weeds	Herbicide (spot- treatments)	Minimize non-target damage to seedlings	
Units: After establishment		Mowing	To prevent seed set before spray applications For annual and biennial species For newly seeded areas, if needed	
	Woody species	Cut and treat stumps	-	
	Erosion	Consult erosion control specialist		

6.7.1 MECHANICAL MOWING AND HAYING

Mowing may occur in any or all of the following areas: solar array area, open areas within fenceline, entrance around gate(s), and area(s) outside fence. Mow areas will be determined by the management contractor and Plummer Solar. Mowing will be accomplished by agricultural tractors with flail or rotary mower attachments, zero-turn mowers, and/or other mechanical option(s) as approved by Plummer Solar. Flail mower implements are preferred to mulch the cut material and avoid forming a mat of cut vegetation which could smother desirable plant growth. Other mechanical cutting implements may be used if haying is expected to follow the mowing operation. Where appropriate, mower height should be at least 6-8" from the ground to avoid damaging native plants.

Wet areas pose challenges for mowing because water restricts access and increases the risk of equipment damaging the soil and/or seeded plants through rutting. Therefore, mowing in low areas will occur only when conditions are dry or mowing may be avoided altogether and replaced with hand cutting/weed whipping, if it is necessary. Yearly onsite evaluations will determine wet area mowing regimes.

Haying would include mowing but would be followed by mechanical removal of the cut thatch material. This is beneficial for the site to minimize the accumulation of material that may pose wildfire risks. In addition, removing the thatch is beneficial for the growth of many species because it allows new seedlings to become established. Haying would be accomplished with implements pulled behind tractors. This method will only be used where practical for access with the necessary equipment. Accessibility will be determined by final Project design.

6.7.1 WEED WHIPPING

Weed whipping may be used to remove excessive vegetation growth in areas that are difficult to access with mechanical mowing equipment or for plants that are not impacted by grazing sheep. These areas may include directly underneath solar panels, around pilings, underneath tracker drivelines or above-ground cabling, around sensitive electrical equipment, around gates/entrances, along fencelines, in wet or steep areas, in areas with biologs or other best management practices (BMPs), and around screening trees/shrubs. Weed whipping services will be directed by Plummer Solar.

6.7.2 GRAZING

Plummer Solar is maintaining the option to utilize grazing as a management tool for the project. As noted in Section 3.3, the MPCA restriction on grazing within the area where the documented crude oil spill occurred would require lifting prior to grazing activities.

Sheep grazing can be implemented in place of mowing to manage vegetation height or density. Grazing provides many of the same impacts as mowing including decreasing vegetation height and module shading, but with the added benefit of doing so immediately adjacent to and underneath sensitive equipment. In addition, grazing helps to remove the vegetative thatch from the site, reducing the risk of wildfires. This is similar to haying, but grazing tends to remove thatch more thoroughly. Sheep grazing also re-introduces valuable services for the overall health of the vegetation by recycling nutrients and has been shown to increase soil carbon and nutrients when grazing in native vegetation (reference (13)). Grazing intensity and timing will vary based on vegetation type and management objectives. Native plantings and targeted noxious weed programs subject to a high-impact grazing should aim to defoliate at least 90% of the vegetation. This requires relatively high stocking density and a limited time within a given paddock, ideally less than four weeks. Cool-season-dominant or forage plantings may be subject to low-intensity or continual grazing. Dormant-season grazing events may be recommended to further reduce thatch at any location.

6.7.3 HERBICIDE TREATMENTS

Herbicides are an effective weed management tool. While mowing/grazing controls annuals and may provide short-term control for some perennials, most woody species and state-listed biennial/perennial noxious weeds must be treated with herbicide to provide effective control. Herbicide treatment will reduce populations, prevent the spread of weed seeds, and kill vegetation that may be encroaching or shading modules and electrical equipment.

Herbicide treatments will begin as needed based on weed populations, if extensive perennial weeds or woody species are present. Ongoing annual herbicide applications will likely be required into the long-term maintenance phase to continue providing control of woody and noxious species introduced to the site from surrounding landscapes. Selective herbicide application, using herbicides formulated for specific plant groups, and spot herbicide application, applying herbicide directly to the foliage of target plants, are preferred over broadcast and non-selective applications in pollinator habitat. These techniques will ensure good control of invasive species while minimizing off-target damage to desirable plants. If broadcast applications are recommended, the most selective herbicide will be utilized and the application will be limited to the minimum effective area. Broadleaf applications may be utilized more freely in areas intentionally not seeded with forbs. If non-selective herbicides are required for certain weed species, their use will be limited to the minimum effective area and application method.

In addition to herbicide treatment for weeds, pre-emergent and non-selective herbicides may be applied to specific areas of the Project Site (around electrical equipment and along roads/gravel) to maintain bare ground. Herbicide treatments for bare ground include a chemical adjuvant to increase soil deposition/adsorption and prevent runoff. Bare ground treatments will be completed at the direction of Plummer Solar.

All herbicide applications will be completed per manufacturer label instructions, and all applicators will hold a valid State of Minnesota Pesticide Applicator License.

6.7.4 SUPPLEMENTAL SEEDING

Supplemental seeding may be necessary where vegetation establishment does not meet requirements in Section 5.2. Establishment failure can occur for a variety of reasons including compacted soil conditions, flooding, drought, and extensive weed competition. Depending on the reason(s) for failure, recommendations may be provided to adjust species in the re-seeding mix to better accommodate growing conditions in the specific area.

If temporary disturbance is necessary after final construction (such as excavating or trenching for repairs or maintenance), the seeding contractor will work with Plummer Solar to choose an appropriate seed mix for these areas.

If certain areas are continually impacted by maintenance activities (such as travel paths) and initially seeded species fail to thrive, these areas may be re-seeded with species that can tolerate a higher level of disturbance.

Seed selection and rate for any supplemental seeding will be determined based upon present site conditions. As needed, temporary cover will also be applied at the site following the rate(s) listed in **Appendix A**. The timing and methodologies of supplemental seeding will be determined for each specific situation based on the conditions, scope and other mitigating factors.

6.7.5 TREE AND SHRUB CONTROL

Woody species (trees, shrubs, and vines) are a concern on solar sites due to the potential for interference with electrical equipment and shading of modules. Woody species will be controlled through a combination of mowing/grazing, manual cutting, and herbicide treatment. Adaptive management will be utilized to select the method with the least non-target impacts and the greatest success at control of the individual of concern.

Mowing can be relied on to temporarily cut back woody species, removing or preventing shading conditions on modules. However, cutting alone will not kill deciduous tree species and most will re-sprout afterwards. Foliar herbicide treatment can be utilized to kill vines and small tree/shrub seedlings less than approximately 4' tall and $\frac{1}{2}$ " diameter, provided all leaf surfaces are thoroughly covered with an appropriate herbicide and rate. For tree and shrub seedlings larger than 4' tall and $\frac{1}{2}$ " diameter, the least-impactful method of control is manual cutting with brush blades or chainsaws and stump treating to prevent re-sprouting. Present site conditions, infrastructure, and safety needs will be taken into consideration when selecting the method of control for woody species.

7.0 VEGETATION MONITORING

Vegetation maintenance will follow an integrated and adaptive approach to encourage proper long-term establishment of the seeded species as described in Section 6.7. The 5-year postinstallation period is very important for establishment, and vegetation management and monitoring must be consistent during this period. Consistent vegetation management includes properly-timed cutting or grazing events, selective herbicide applications, and regular monitoring visits to evaluate the impacts of those techniques and generate future recommendations. This section provides detailed timelines and descriptions of the vegetation monitoring that will be conducted at Plummer Solar to ensure proper implementation of the adaptive management techniques listed above.

7.1 CONTRACTOR QUALIFICATIONS

One or more contractors may be enlisted to fulfill the responsibilities identified in Section 7.0 regarding the site monitoring services for the Project. Contractor(s) must have at least five years of experience maintaining native vegetation of a similar scope within solar array projects in Minnesota or the Upper Midwest. Contractor(s) must be able to demonstrate a familiarity with the seeded species; the presumed invasive species of the region; and the implementation of the management techniques required for proper establishment and maintenance. Contractor will be selected prior to the completion of Project construction.

The vegetation monitoring contractor will complete the monitoring requirements listed in Section 7.0 unless otherwise specified.

7.2 VEGETATION MONITORING

Ongoing site monitoring will be conducted by a qualified restoration ecologist during the lifetime of the Project. Monitoring will evaluate the establishment of seeded species, identify invasive, noxious, and woody species presence, check for erosion or other site issues, and determine vegetation maintenance needs and timing. These monitoring visits will occur three times per year/growing season during the early establishment period (years 1-3) and once per year/growing season thereafter.

During years 1-3, monitoring visits will occur at regular intervals throughout the growing season to continually evaluate and adjust vegetation management strategies, approximately in May, July, and September/October. After the early establishment period, monitoring visits should be conducted mid-summer (June/July) and coordinated with vegetation management activities to ensure an accurate assessment of the site vegetation and provide timely recommendations for further management services. Qualitative monitoring will be completed in accordance with

"Guidance for Developing a Vegetation Establishment and Management Plan for Solar Facilities (March 2021)."

During the establishment period (Years 1 through 5), an interim monitoring report will be provided to Plummer Solar by the monitoring contractor within twenty days of each monitoring visit. Each report will contain the following:

- A map showing the Project Site outline, monitored locations and areas requiring management. The location of any erosion concern(s) will also be shown on the map.
- Photographs of the areas requiring management and of the areas which received management during the same growing season.
- A summary of notable populations or occurrences of noxious/invasive species on-site including a recommendation for management.
- A summary of erosion concerns present on-site.
- Overall vegetation percent cover estimate of each management unit or subset.
- Quantitative monitoring results will not be included in the interim reports.

8.0 ANNUAL REPORTING

Annual reports will be submitted by Plummer Solar, if necessary, in accordance with "Guidance for Developing a Vegetation Establishment and Management Plan for Solar Facilities (March 2021)."

9.0 REFERENCES

1. **Minnesota Department of Commerce.** Guidance for Developing a Vegetation Establishment and Management Plan for Solar Facilities. March 2021.

2. **U.S. Department of Agriculture.** CDL2021 Area of Interest. *CropScape - Cropland Data Layer.* [Online] [Cited: January 6, 2023.] Regional and Project Area. https://nassgeodata.gmu.edu/CropScape/.

3. Barr Engineering, Co. Wetland Delineation Report; Plummer Area Solar Power Project. September 23, 2022.

4. —. Wetland Delineation Report Addendum; Plummer Area Solar Power Project Additional East Parcels. March 15, 2023.

5. **Minnesota Department of Agriculture.** Minnesota Noxious Weed List. [Online] [Cited: January 19. 2023.] https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list.

6. **Minnesota Department of Natural Resources.** *Invasive species in Minnesota.* [Online] [Cited: November 20, 2023.] https://www.dnr.state.mn.us/invasives/index.html

7. —. Native Plant Encyclopedia. [Online] [Cited: January 19, 2023.]

https://webapps15.dnr.state.mn.us/restore_your_shore.

9. **Minnesota Department of Natural Resources.** *Minnesota Department of Natural Resources Guidance for Commercial Solar Projects.* St. Paul, Minnesota : s.n., 2023, Revised February 2023. p. 18.

10. **U.S. Department of Agriculture.** Smiley series. [Online] [Cited: January 20, 2023.] https://soilseries.sc.egov.usda.gov/OSD_Docs/S/SMILEY.html.

11. **Barr Engineering Co.** Geotechnical Evaluation Report: Line 3 Replacement Plummer Pump Station and Substation. May 2015.

12. Ash, J. Stephen. ENBRIDGE PLUMMER PROPOSED SOLAR FARM, PLUMMER, MINNESOTA. WSP. September 29, 2023.

13. **Towner, E., Karas, T., Janski, J., Macknick, J. & Ravi, S.** Managed sheep grazing can improve soil quality and carbon sequestration at solar photovoltaic sites. *AGU Fall Meeting 2021.* New Orleans : s.n., 2021.

14. **U.S. Department of Agriculture Natural Resources Conservation Service.** Web Soil Survey. [Online] https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

15. **Minnesota Department of Natural Resources.** Aspen Parklands Subsection. *Ecological Classification System.* [Online] https://www.dnr.state.mn.us/ecs/223Na/index.html.

Natural Resources Conservation Service. National Soil Survey Handbook (NSSH).
 [Online] https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054242.
 Minnesota Department of Natural Resources. Plants Valuable for Wildlife. Value to

Wildlife. [Online] [Cited: January 19, 2023.] https://www.dnr.state.mn.us/rys/in/wildlife.html.

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12.0 APPENDIX A

Appendix A Seed Mixes

Appendix A Seed Mixes



Enbridge - Plummer Solar Array Management Unit Non-native Fescue & Clover Mix

			% of	PLS	
	Scientific Name	Common Name	Mix	lbs/ac	Total PLS lbs
Fescue	Low Grow Fescue Blend	Creeping Red Fescue	24.19	37.50	37.50
		Sheep Fescue	24.19	37.50	37.50
		Chewings Fescue	24.19	37.50	37.50
		Hard Fescue	24.19	37.50	37.50
Forbs:	Trifolium repens	White Clover	0.65	1.00	1.00
	Trifolium pratense	Red Clover	1.29	2.00	2.00
	Prunella vulgaris	Self-heal	1.29	2.00	2.00

Terms:

Order Minimum: Custom seed mixes less than \$250 will be assessed a \$50 mixing fee. Minimum \$10 order per individual species.

Pricing: Prices and availability subject to change at any time without notice.

Terms: Payment due upon receipt for all customers. Approved credit customers Net 30 days.

Freight: All prices are FOB Foley MN. Shipping and/or delivery available.

Warranty: MNL strives to produce the highest quality native seed and plants, but we do not warranty/guarantee our products due to factors outside



Enbridge - Plummer Solar Array Management Unit Native Prairie Shortgrass Mix

Grass PLS lbs/ac:	7.27
Sedge/Rush PLS lbs/ac:	0.53
Forb PLS lbs/ac:	1.20
Cover Crop PLS lbs/ac:	25.00

			% of	PLS		
	Scientific Name	Common Name	Mix	lbs/ac	Total PLS lbs	Bloom Season
Grasses:	Bouteloua curtipendula	Side-oats Grama	18.00	1.62	1458.00	
	Bouteloua gracilis	Blue Grama	2.00	0.18	162.00	
	Elymus canadensis	Canada Wild Rye	7.50	0.68	607.50	
	Elymus trachycaulus	Slender Wheat Grass	7.50	0.68	607.50	
	Elymus virginicus	Virginia Wild Rye	18.00	1.62	1458.00	
	Glyceria striata	Fowl Manna Grass	1.50	0.14	121.50	
	Poa palustris	Fowl Bluegrass	5.75	0.52	465.75	
	Schizachyrium scoparium	Little Bluestem	18.00	1.62	1458.00	
	Sporobolus heterolepis	Prairie Dropseed	2.50	0.23	202.50	
Sedges/Rushes:	Carex brevior	Plains Oval Sedge	1.50	0.14	121.50	
	Carex houghtoniana	Houghtons Sedge	1.00	0.09	81.00	
	Carex vulpinoidea	Fox Sedge	3.00	0.27	243.00	
	Juncus dudleyi	Dudley's Rush	0.40	0.04	32.40	
Forbs:	Agastache foeniculum	Fragrant Giant Hyssop	0.45	0.04	36.45	Summer
	Anemone canadensis	Canada Anemone	0.20	0.02	16.20	Spring
	Aquilegia canadensis	Columbine	0.20	0.02	16.20	Spring
	Asclepias syriaca	Common Milkweed	0.50	0.05	40.50	Summer
	Dalea purpurea	Purple Prairie Clover	4.00	0.36	324.00	Summer
	Galium boreale	Northern Bedstraw	0.10	0.01	8.10	Summer
	Liatris ligulistylis	Meadow Blazing Star	0.25	0.02	20.25	Summer
	Lobelia siphilitica	Great Blue Lobelia	0.15	0.01	12.15	Summer
	Lythrum alatum	Winged Loosestrife	0.20	0.02	16.20	Summer
	Mimulus ringens	Monkey Flower	0.30	0.03	24.30	Summer
	Prunella vulgaris	Self-heal	2.00	0.18	162.00	Summer
	Pycnanthemum virginianum	Mountain Mint	0.30	0.03	24.30	Summer
	Ratibida columnifera	Long-headed Coneflower	0.25	0.02	20.25	Summer
	Rudbeckia hirta	Black-eyed Susan	1.50	0.14	121.50	Summer
	Solidago riddellii	Riddell's Goldenrod	0.50	0.05	40.50	Fall
	Solidago ptarmicoides	Upland White Goldenrod	0.25	0.02	20.25	Fall
	Symphyotrichum laeve	Smooth Blue Aster	0.25	0.02	20.25	Fall
	Symphyotrichum lanceolatum	Panicled Aster	0.25	0.02	20.25	Fall
	Symphyotrichum oolentangiense	Sky-blue Aster	0.25	0.02	20.25	Fall
	Verbena hastata	Blue Vervain	0.50	0.05	40.50	Summer
	Zizia aurea	Golden Alexanders	0.95	0.09	76.95	Spring
Cover Crop:	Avena sativa	Oats		25.00	22500.00	

Terms:

Order Minimum: Custom seed mixes less than \$250 will be assessed a \$50 mixing fee. Minimum \$10 order per individual species.

Pricing: Prices and availability subject to change at any time without notice.

Terms: Payment due upon receipt for all customers. Approved credit customers Net 30 days.

Freight: All prices are FOB Foley MN. Shipping and/or delivery available.

Warranty: MNL strives to produce the highest quality native seed and plants, but we do not warranty/guarantee our products due to factors outside



Enbridge - Plummer Solar Existing Linear Corridor Management Unit Perimeter Pollinator Mix

Grass PLS lbs/ac:	5.81			
Sedge/Rush PLS lbs/ac:	0.45			
Forb PLS lbs/ac:	2.75			
Cover Crop PLS lbs/ac:	25.00			

			% of	PLS		
	Scientific Name	Common Name	Mix	lbs/ac	Total PLS lbs	Bloom Season
Grasses:	Bouteloua curtipendula	Side-oats Grama	15.00	1.35	135.00	
	Elymus canadensis	Canada Wild Rye	12.50	1.13	112.50	
	Elymus virginicus	Virginia Wild Rye	12.50	1.13	112.50	
	Schizachyrium scoparium	Little Bluestem	16.00	1.44	144.00	
	Sporobolus compositus	Rough Dropseed	6.00	0.54	54.00	
	Sporobolus heterolepis	Prairie Dropseed	2.50	0.23	22.50	
Sedges:	Carex brevior	Plains Oval Sedge	2.50	0.23	22.50	
	Carex vulpinoidea	Fox Sedge	2.50	0.23	22.50	
Forbs:	Agastache foeniculum	Fragrant Giant Hyssop	1.00	0.09	9.00	Summer
	Anemone canadensis	Canada Anemone	0.50	0.05	4.50	Spring
	Asclepias incarnata	Swamp Milkweed	2.00	0.18	18.00	Summer
	Asclepias syriaca	Common Milkweed	3.00	0.27	27.00	Summer
	Astragalus canadensis	Canada Milk Vetch	2.00	0.18	18.00	Summer
	Desmodium canadense	Showy Tick-trefoil	2.00	0.18	18.00	Summer
	Echinacea angustifolia	Narrow-leaved Coneflower	0.50	0.05	4.50	Summer
	Glycyrrhiza lepidota	Wild Licorice	2.00	0.18	18.00	Summer
	Helenium autumnale	Sneezeweed	1.00	0.09	9.00	Fall
	Helianthus maximiliani	Maximillian's Sunflower	0.50	0.05	4.50	Fall
	Heliopsis helianthoides	Common Ox-eye	2.25	0.20	20.25	Summer
	Liatris ligulistylis	Meadow Blazing Star	1.00	0.09	9.00	Summer
	Liatris pycnostachya	Prairie Blazing Star	1.00	0.09	9.00	Summer
	Monarda fistulosa	Wild Bergamot	0.50	0.05	4.50	Summer
	Penstemon grandiflorus	Large-flower Penstemon	0.50	0.05	4.50	Spring
	Pycnanthemum virginianum	Mountain Mint	0.50	0.05	4.50	Summer
	Ratibida pinnata	Yellow Coneflower	1.00	0.09	9.00	Summer
	Rudbeckia hirta	Black-eyed Susan	1.00	0.09	9.00	Summer
	Solidago rigida	Stiff Goldenrod	1.00	0.09	9.00	Fall
	Solidago speciosa	Showy Goldenrod	0.50	0.05	4.50	Fall
	Symphyotrichum laeve	Smooth Blue Aster	1.00	0.09	9.00	Fall
	Symphyotrichum lanceolatum	Panicled Aster	0.75	0.07	6.75	Fall
	Symphyotrichum oolentangiense	Sky-blue Aster	1.00	0.09	9.00	Fall
	Symphyotrichum novae-angliae	New England Aster	1.00	0.09	9.00	Fall
	Thalictrum dasycarpum	Purple Meadow Rue	0.50	0.05	4.50	Summer
	Verbena hastata	Blue Vervain	1.00	0.09	9.00	Summer
	Veronicastrum virginicum	Culver's Root	0.50	0.05	4.50	Summer
	Zizia aurea	Golden Alexanders	1.00	0.09	9.00	Spring
Cover Crop:	Avena sativa	Oats		25.00	2500.00	

Terms:

Order Minimum: Custom seed mixes less than \$250 will be assessed a \$50 mixing fee. Minimum \$10 order per individual species.

Pricing: Prices and availability subject to change at any time without notice.

Terms: Payment due upon receipt for all customers. Approved credit customers Net 30 days.

Freight: All prices are FOB Foley MN. Shipping and/or delivery available.

Warranty: MNL strives to produce the highest quality native seed and plants, but we do not warranty/guarantee our products due to factors outside



Enbridge - Plummer Solar Wetland & Stormwater Management Unit Wet Meadow Mix

Grass PLS lbs/ac:	5.20			
Sedge/Rush PLS lbs/ac:	1.10			
Forb PLS lbs/ac:	1.70			
Cover Crop PLS lbs/ac:	25.00			

			% of	PLS		
	Scientific Name	Common Name	Mix	lbs/ac	Total PLS lbs	Bloom Season
Grasses:	Beckmannia syzigachne	American Slough Grass	15.00	1.20	3.60	
	Bromus ciliatus	Fringed Brome	10.00	0.80	2.40	
	Calamagrostis canadensis	Blue-joint Grass	2.00	0.16	0.48	
	Elymus virginicus	Virginia Wild Rye	10.00	0.80	2.40	
	Glyceria striata	Fowl Manna Grass	5.00	0.40	1.20	
	Leersia oryzoides	Rice Cutgrass	10.00	0.80	2.40	
	Panicum virgatum	Switchgrass	3.00	0.24	0.72	
	Spartina pectinata	Prairie Cordgrass	10.00	0.80	2.40	
Sedges/Rushes:	Carex hystericina	Porcupine Sedge	2.00	0.16	0.48	
	Carex stipata	Awl-fruited Sedge	3.00	0.24	0.72	
	Carex vulpinoidea	Fox Sedge	6.00	0.48	1.44	
	Scirpus atrovirens	Green Bulrush	1.50	0.12	0.36	
	Scirpus cyperinus	Woolgrass	1.25	0.10	0.30	
Forbs:	Acorus americanus	Sweet Flag	1.00	0.08	0.24	Summer
	Anemone canadensis	Canada Anemone	0.50	0.04	0.12	Spring
	Asclepias incarnata	Swamp Milkweed	3.25	0.26	0.78	Summer
	Bidens cernua	Nodding Beggarstick	2.00	0.16	0.48	Summer
	Doellingeria umbellata	Flat-topped Aster	0.50	0.04	0.12	Fall
	Eutrochium maculatum	Joe-pye Weed	1.00	0.08	0.24	Summer
	Eupatorium perfoliatum	Boneset	0.50	0.04	0.12	Fall
	Helenium autumnale	Sneezeweed	1.00	0.08	0.24	Fall
	Iris versicolor	Northern Blueflag Iris	1.00	0.08	0.24	Spring
	Liatris pycnostachya	Prairie Blazing Star	1.00	0.08	0.24	Summer
	Mimulus ringens	Monkey Flower	0.50	0.04	0.12	Summer
	Solidago uliginosa	Bog Goldenrod	0.50	0.04	0.12	Fall
	Sparganium eurycarpum	Giant Burreed	4.00	0.32	0.96	Summer
	Symphyotrichum lanceolatum	Panicled Aster	1.00	0.08	0.24	Fall
	Verbena hastata	Blue Vervain	1.00	0.08	0.24	Summer
	Vernonia fasciculata	Ironweed	1.00	0.08	0.24	Summer
	Veronicastrum virginicum	Culver's Root	0.50	0.04	0.12	Summer
	Zizia aurea	Golden Alexanders	1.00	0.08	0.24	Spring
Cover Crop:	Avena sativa	Oats		25.00	75.00	

Terms:

Order Minimum: Custom seed mixes less than \$250 will be assessed a \$50 mixing fee. Minimum \$10 order per individual species.

Pricing: Prices and availability subject to change at any time without notice.

Terms: Payment due upon receipt for all customers. Approved credit customers Net 30 days.

Freight: All prices are FOB Foley MN. Shipping and/or delivery available.

Warranty: MNL strives to produce the highest quality native seed and plants, but we do not warranty/guarantee our products due to factors outside