Root River Solar

Vegetation Installation and Management Plan

Date: 1/6/2025
Site Location: 42.818594, -87.938952

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Contents

1 Site Overview

Root River Solar is a 6 MWac solar project located in the Village of Caledonia in Racine County, Wisconsin. The approximately 30-acre project site is currently used for agricultural production and was most recently planted in corn. The project area contains hydric soils but no wetlands. The predominant soils on site are moderately well-drained Ozaukee silt loam, poorly-drained Ashkum silty clay loam, and somewhat poorly-drained Blount silt loam. Following construction of the solar array, the site will be planted with native prairie species to provide pollinator habitat.

2 Benefits of Pollinator-Friendly Solar

There are many benefits to installing native prairie plant communities on solar sites. Pollinator friendly solar sequesters carbon into the soil through plants, while carbon emissions are simultaneously reduced by using renewable solar energy. Planting native prairie species restores soil by preventing erosion, improving soil structure, increasing carbon storage, diversifying microbial communities, and increasing soil fertility. In addition to supporting native wildlife, these improvements to the soil will increase the value of the soil for future agricultural production once the solar panels are removed. Agricultural benefits are not limited to future land use. Supporting native pollinator populations can increase yields of nearby pollinator-dependent crops such as soybeans, apples, and many vegetables.

The aesthetic benefits of pollinator habitat provide additional services to the local community for those who appreciate observing the wildflowers, birds, butterflies, and other species that are drawn to the solar site. Native prairie plants prevent stormwater runoff and improve surrounding water quality, which is an important consideration following the construction of solar projects. While the initial costs and amount of planning needed for installing and managing native pollinator habitat may be greater than turfgrass, the benefits outweigh the costs. Following the first five years of management, as the hardier native plant communities become established, reduced management needs are anticipated for the remainder of the time the solar array is in operation.

3 Site Preparation and Temporary Seeding

Construction debris and building materials will be cleared from the seeding area. An herbicide application may be required prior to seeding to remove undesirable vegetation from the site. The type of herbicide used will depend on the target species observed during initial site inspections by environmental specialists. If an herbicide such as glyphosate is used, this would necessitate a 10-day waiting period before disturbing the soil or seeding.

Invasive species observed east of the project area include reed canary grass (*Phalaris arundinacea*) and narrow-leaved cattail (*Typha angustifolia*). Weedy species include barnyard grass (*Echinochloa crus-galli*) and roughfruit amaranth (*Amaranthus tuberculatus*).

The environmental specialist overseeing site preparation activities and selecting herbicide treatments for noxious and invasive species suppression will have comprehensive knowledge and experience selecting and applying herbicides for restricting invasive species and managing vegetation to encourage native plant communities. Additionally, the environmental specialist will have detailed knowledge of Wisconsin flora, excellent vegetation identification skills, and experience in ecological restoration that includes overseeing and conducting native prairie restoration and vegetation assessments.

Winter wheat or oats will be used as a cover crop depending on the time of year and based on the WDNR Technical Standard (1059) and the WisDOT seeding specification (630). A cover crop is also used in disturbed areas throughout construction as part of the Stormwater Pollution Prevention Plan.

4 Permanent Seeding

The soil will be disced and then either harrowed or raked to prepare the soil for seeding. Native grasses will be seeded using a mechanical broadcast spreader at a depth of ¼ to ½-inch. An annual nurse crop of winter wheat or oats will be seeded along with the native grass mix to provide winter stabilization and weed suppression. Following grass seeding, the site will be raked and harrowed. Wildflowers and sedges will be seeded using a mechanical broadcast spreader and covered by raking the site.

The primary seed mix used will be a diverse upland mix of around thirty plant species designed by environmental specialists to suit site-specific soil and microclimate conditions and to provide continuous forage and habitat for pollinators. The seed mix includes flowering species with a wide range of bloom times to cover each season pollinators are active. Species suitable for hydric soils will be included in this seed mix.

Changes to plant species and their proportions in the mix may be necessary depending on seed availability at the time of planting. The diversity of species and quality of the mix will be maintained.

5 Vegetation Management and Monitoring

Vegetation will be managed to achieve the following objectives:

1. Establish native vegetation cover as prescribed in the selected pollinator seed mixes.
2. Maintain complete vegetation cover while limiting noxious and invasive species.

3. Encourage the growth of flowering species to provide continuous forage and habitat for pollinators.

During the germination year, the site will be mowed to reduce competition and control weed growth. Additional mowing may be required to prevent annual and biennial weeds from setting seed. During the establishment period, which spans about 2 to 5 years after seeding, mowing should occur 2-3 times per year, subject to the recommendations of the environmental specialist. Vegetation will be mowed to a height of 8". Following the establishment period, the site will be mowed as needed invasive and noxious weed species control and to intermittently remove biomass. A suggested timeline for vegetation management is provided in Section 7.

The following objectives will be achieved through vegetation monitoring:

1. Document the presence of desirable native species.
2. Document the presence of noxious and invasive weed species.
3. Provide recommendations for appropriate corrective actions to promote the planned vegetative cover and limit noxious and invasive species.

Specific management activities and timelines will depend on observations during seasonal site inspections. Following a fall seeding, these inspections would begin in late April to mid-June. Following a spring seeding, inspections should begin by mid-May.

Vegetation Management Reports (VMRs) will be completed during each site visit to record the amount of vegetation cover and the presence of noxious and invasive species and native species. Recommended next steps will be noted, and management plans will remain flexible to reflect changes in noxious and invasive weed pressure.

6 Invasive and Weed Species Management

In addition to the removal of invasive species, plant species will be suppressed if they are likely to either outcompete the native species planted or grow to a height that may shade the solar panels. Noting noxious and invasive species through well-timed site inspections and proactively controlling these species during the establishment phase is critical for the long-term success of native vegetation establishment. Control of noxious and invasive species may include spot-spraying with herbicide, spot-mowing, hand weeding, wicking, or other methods selected by the environmental specialist and depending on the target weed species and time of year.

If necessary, the following herbicides may be used for spot-treatment: glyphosate, triclopyr, clopyralid, or aminopyralid. Glyphosate is a non-selective systemic herbicide used to treat broadleaf weeds, grasses, and woody plants, and triclopyr is a selective systemic herbicide used to control woody and herbaceous broadleaf species. Clopyralid and aminopyralid are selective herbicides used to target broadleaf weeds, especially clover and thistle. Herbicide contact with

native species will be limited and herbicides will not be used when wind speeds exceed 10 mph to prevent drift.

Other herbicides may be utilized based on the target species observed and identified for management. Environmental specialists will identify actual herbicide prescriptions based on observations during site inspections. The site will be inspected at least twice a year: once from late April to mid-May, and again in mid-June. Site inspections may be needed at other times, depending on the life cycle of the species targeted for removal. Spot-mowing and removal of invasive species and other weeds will be completed as needed. If biomass removal is needed, the site can be mowed every three years using a flail mower. After the initial 5-year establishment period, the site should not be mowed more than once per year.

7 Vegetation Management Timeline

Year 0		
Seedbed Preparation	Herbicide application, soil bed preparation.	Sep-Oct
Seeding	Site will be seeded with native prairie mix and a nurse crop of winter wheat.	Oct-Nov
Years 1-3		
1st Site Inspection	Document locations of native and weed/invasive species and recommended management activities. Site inspection may take place at the same time as management visit.	Apr-May
1st Mow	Site mowed to 8" vegetation height. Spot-treat weed/invasive species as needed. Timing of mowing is dependent on plant phenology and weed/invasive species pressure documented during site inspection.	Jun
2nd Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Late Jun-early Jul
2nd Mow	Site mowed to 8" height. Spot-treatment of weed/invasive species as needed. Timing of mowing is dependent on observations during site assessments.	July-Aug
3rd Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Late Aug
3rd Mow	Complete site mow to 8" and spot-treatment of weed/invasive species as needed. Timing of mowing is dependent on observations during site assessments.	Sept
Year 4		
1st Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Apr-May

Dormant Mow	Mulch biomass by mowing in the spring to reduce competition and encourage native plant growth.	Apr-Jun
2nd Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Jun-Jul
Spot treatment of invasives/weeds	Herbicide treatment types will depend on the target species observed during site inspections.	Variable
Years 5-25		
Site Inspections	Two annual visits to monitor vegetation in the spring and early summer. Spot-mowing or weed/invasive species removal will be completed as needed based on site inspections. If biomass removal is needed, sites can be mowed every three years using a flail mower. Site should not be mowed more than once per year, and mowing should occur from Mar-Apr 15th or Sept-Oct to avoid disturbing nesting birds. Rotating halves or thirds of the site while mowing will increase plant diversity and structure and provide adjacent refuge for wildlife.	Late April to early May & mid-June

8 References

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Walston, L. et al. (2020) Modeling the ecosystem services of native vegetation management practices at solar energy facilities in Midwestern United States. *Ecosystem Services* (47), 101227. https://doi.org/10.1016/j.ecoser.2020.101227.

Appendix A: Native Prairie Seed Mix

Scientific Name	Common Name	% of Mix	Seeds/ft^2
Grasses			
Sideoats Grama	Bouteloua curtipendula	31.53%	9.38
Slender Wheatgrass	Elymus trachycaulus	9.18%	3.14
Plains Oval Sedge	Carex brevior	2.59%	3.72
Wood Gray Sedge	Carex grisea	0.86%	0.38
Troublesome Sedge	Carex molesta	1.18%	1.46
Brown Fox Sedge	Carex vulpinoidea	1.80%	8.93
Silky Wild Rye	Elymus villosus	0.00%	0.00
Virginia Wild Rye (sub)	Elymus virginicus	1.65%	0.34
Little Bluestem	Schizachyrium scoparium	25.10%	18.67
Prairie Dropseed	Sporobolus heterolepis	0.39%	0.31
Forbs			
Common Yarrow	Achillea millefolium	0.63%	5.57
Nodding Onion	Allium cernuum	0.24%	0.09
Lead Plant	Amorpha canescens	1.33%	1.06
Canada Anemone	Anemone canadensis	0.04%	0.02
Wild Columbine	Aquilegia canadensis	0.04%	0.08
Whorled Milkweed	Asclepias verticillata	0.05%	0.03
Common Milkweed	Asclepias syriaca	0.31%	0.06
Butterfly Milkweed	Asclepias tuberosa	0.31%	0.07
Partridge Pea	Chamaecrista fasciculata	4.55%	0.61
White Prairie Clover	Dalea candida	4.98%	4.69
Purple Prairie Clover	Dalea purpurea	5.88%	5.25
Cream Gentian	Gentiana flavida	0.16%	1.11
Virginia Mountain Mint	Pycnanthemum virginianum	0.16%	1.75
Prairie Wild Rose	Rosa arkansana	0.31%	0.04
Black-eyed Susan	Rudbeckia hirta	1.88%	8.58
Gray Goldenrod	Solidago nemoralis	0.27%	4.02
Ohio Goldenrod	Solidago ohiensis	0.20%	1.09
Calico Aster	Symphyotrichum lateriflorum	0.04%	0.50
Sky Blue Aster	Symphyotrichum oolentangiense	0.16%	0.63
Ohio Spiderwort	Tradescantia ohiensis	0.24%	0.10
Hoary Vervain	Verbena stricta	1.41%	1.96
Golden Alexanders	Zizia aurea	2.53%	1.38

Seeding Rate: 13.5 lbs/acre (85 seeds/square foot)

Appendix B: Preliminary Site Plan