

Technical Guide: Establishment and Maintenance of Pollinator-Friendly Solar Projects

Northern Indiana
January 2020

SOURCES

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"Minnesota Department of Natural Resources Prairie Establishment & Maintenance Technical Guidance for Commercial Solar Projects". 2016. Minnesota Department of Natural Resources. New Ulm, Minnesota, USA. 13pp. Revised 2019.

Photos:

Rob Davis, Fresh Energy

<https://fresh-energy.org/beeslovesolar/>

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Introduction

This technical guide serves as a starting point for the establishment and management of pollinator-friendly native seed plantings at ground-mounted solar photovoltaic arrays. Best management practices are continuing to evolve as low-impact solar development projects are implemented. General information about seed mix development, planting layout, and maintenance is included in this document. You will also find resources and contacts for organizations that will help you further develop a project. Solar developers are encouraged to work with relevant experts such as their local planning staff, Indiana Department of Natural Resources (IN DNR) wildlife biologists, farm bill biologists, USDA Natural Resource Conservation Service (NRCS) staff, or local seed companies to develop a planting and management plan specifically tailored to their site.

Audience

The goal of this document is to provide a brief overview of the pollinator-friendly solar benefits, establishment, and maintenance guidelines for a variety of audiences:

- Local Governments - Assist in developing and implementing pollinator-friendly standards in the permitting process or local ordinance.
- Solar Developers - Serve as a local resource to identify and understand the reasons for any local or state requirements in northern Indiana related to solar and pollinator-friendly standards. Provide maintenance recommendations to ensure the best outcome and long-term success of the planting.
- Landowners - Understand the benefits of pollinator-friendly practices and negotiate with solar developers to include these in land lease agreements in the absence of other requirements.

Why establish pollinator-friendly plantings?

Prairie communities native to Indiana occur in open landscapes that are dominated by a diversity of grass and wildflower species. Plant community composition varies from site to site due to differences in slope, soil types, soil moisture, sun exposure, and other factors. Pollinator seed mixes include a diversity of flowering plants that are both pleasing to the eye, and provide excellent wildlife food and habitat for a variety of species.

Creating a pollinator-friendly prairie planting at solar sites can:

- Provide food and habitat for butterflies, bees, and other insects that provide important ecological and agricultural services, such as crop pollination and natural pest control;
- Provide food, cover, and nesting habitat for some species of mammals, birds, reptiles, and amphibians;
- Significantly reduce wind and surface water erosion;
- Significantly reduce fertilizer, herbicide, and pesticide applications, resulting in improved water quality;
- Increase organic matter and water holding capacity of soils. The result is higher quality soils for farming when the site is decommissioned; and
- Improve the aesthetics of the solar facility.





A U.S. Department of Energy funded study named [InSPIRE](#) (Innovative Site Preparation and Impact Reductions on the Environment) is generating a wealth of information about the benefits of and implementation of best practices for low-impact solar development. Detailed information is available on site preparation, site design and construction, operation and maintenance, and ground cover for native vegetation and pollinator habitat. The National Renewable Energy Laboratory summarizes the InSPIRE projects in the article [Beneath Solar Panels, the Seeds of Opportunity Sprout](#) (2019). Purdue Extension also provides information on the pollination services and [Best Management Practices for Indiana Pollinator Habitat](#).

Seed Mix Development

This guide lays out a framework that solar developers should consider when working with a seed company to design a low-stature native pollinator-friendly seed mix. Pollinator seed mixes can be adapted to include only shorter-stature species that will not shade the solar panels or cause undue harm to their primary purpose of creating clean, renewable energy.

Seed Mix Cost

Native seed mixes in general cost more than non-native seed mixes. However the higher seed cost can be offset by the following:

- Diverse seed mixes may bring the cost of the planting up, initially, but this will pay off in the long run by creating a more resilient planting that is less-prone to weed invasion because more ecological niches are filled;
- Limited use of mulch is necessary, or using erosion control blankets only on the steepest banks and highly erodible areas. Depending on site conditions, a temporary cover crop such as 20lbs/acre of oats, rye, or wheat may be recommended to stabilize the soil;
- Fertilizer is rarely needed prior to or after planting;
- Watering recently established native seed plantings is not necessary in the optimal planting window with sufficient time for establishment except in years of extreme drought; and
- A minimum panel height of 3 feet from grade to the lower edge of the panels will allow for a lower cost seed mix, while also reducing the risk of panel shading and panel damage due to debris impacts during mowing.

Incentives may be available. To learn about [Habitat and Wildlife Landowner Assistance](#) such as the Wildlife Habitat Cost-Share Program, contact the [Indiana Department of Natural Resources Biologists](#) or the [local USDA Natural Resource Conservation Service \(NRCS\) office](#).

Seed Source

Ideally, seeds should be sourced from areas with similar conditions within the county or adjacent county. The preferred sequence according to [USDA NRCS guidance](#) is: within the ecological sub-section, ecological section and then within a 200 mile radius of the project site unless otherwise specified.

Using local seed protects existing native prairies from genetic contamination and helps prevent the spread of invasive or noxious species. Plants brought from different areas with significantly different climactic conditions may also not produce viable seed. However, some species of key grasses/sedges may not be available locally or in Indiana. It is also important to ensure the seeds are of good and clean quality. See the USDA guide to [Purchasing Seed for Conservation Plantings](#).

Seed Specification and Diversity

Native plantings with high diversity, meaning many different plant species co-existing together, are the most successful at resisting weed invasion, and also the most ecologically functional, supporting a wide variety of pollinators and other wildlife. In other words, diversity is key to a planting's success. This can help reduce management costs. Over the years, there will be variations in invasive species pressure, soil conditions, and climate, such as extreme drought or extreme moisture. Having a diversity of plants ensures that more species are able to adapt to the extremes and can therefore respond to changing environmental conditions.

Plant species near and under panel arrays should have a maximum height of 3 feet or less and should include shade-tolerant species for fixed panel sites. Fixed panel sites have more shade under the panels than rotating panel sites. For these sites it is recommended to use two different seed mixes; shade-tolerant for under the pan and sun-tolerant for in between the rows and edge areas. Established vegetation under the array reduces stormwater impacts.

Tall warm season grasses (big bluestem, Indian grass, switchgrass) are not recommended in seed mixes at solar sites. The height and density of these grasses may interfere with operations or dominate the stand and out-compete the shorter stature species. If tall warm season grasses are used, they should comprise less than 5% of the total seed mix.

Please note that state-listed species (endangered, threatened, or special concern) seed should not be included in any of the mixes. These could create hurdles in decommissioning the site and returning it to farmland.

Wildflower and Grass Mixes:

- Seed mixes should have a minimum seeding rate of 30 - 40 seeds/sq. ft. Site conditions (wet/dry), species selected, time of planting, weather, and other factors can affect the seeding rates. Higher seeding rates may have a greater likelihood of success. It is highly encouraged to work with a native seed company to ensure proper seeding rate.
- At least 40% of the total seeding rate by count should be composed of perennial wildflowers.
- Native grasses / sedges should compose 25% - 50% of the seed mix.



Wildflower and Grass Seed Mixes [continued]:

- 9 or more native wildflower species with at least 3 species in each bloom period, ideally with 3 colors per bloom period.
 1. Early (April-May)
 2. Mid (June-August)
 3. Late (August-October)

Grass-only seed mixes:

- Seed mixes should have a minimum seeding rate of 30 - 40 seeds/sq. ft.
- 5 or more native grass / sedge species with at least 2 species of bunchgrass.

Wetland / farmed wetland seed mixes to be used outside of panel areas:

- Work with relevant experts to develop a custom seed mix.

Purdue Extension provides a list of [Recommended Indiana-native Plants for Attracting Pollinators](#). Low-stature seed mixes are being developed and tested specifically for solar sites. For, example the [Pheasants Forever Seed Program](#) solar farm seed mixes (under 24", 30", 36") and the [MN BWSR](#) low growing solar seed mixes can be adapted with native Indiana species. Consult relevant experts for assistance, as best practices continue to evolve through InSPIRE and other projects. For example, in Minnesota nodding fescue has shown recent success under the panels compared to clover which can be too aggressive.

Visual Screening

If visual screening is considered for the project site, a taller seed mix or native flowering shrubs could be planted around the perimeter to both provide screening and supplement early-blooming species requirements. Wildflowers and grasses taller than 3 feet should be limited to the perimeter of the site where they will not shade the array.

Use of tree species should only be used when required by approving bodies or to address adjacent landowner concerns. Like shrubs and taller forbs and grasses, trees should be limited to the perimeter to avoid shading the solar panels. Do not plant invasive tree species. Careful selection should be taken when selecting trees to ensure they don't compete and aggressively spread into the prairie portions of the site and surrounding landscapes. Select native trees and shrubs with value for wildlife, such as food, cover, and nesting sites. Selection should be based on site conditions and species native to the region. Suitable shrubs include, but are not limited to: dogwood, mapleleaf viburnum, common elderberry, chokeberry, spicebush, hawthorne, wild plum, and native willow. Whenever possible, counties should avoid requiring use of evergreens such as arbor vitae.

Planting Specifications

Site Preparation

To have a successful planting, it is important to ensure your site is prepared for seeding. The goal is to eliminate competition with the new seeds until they can get established. Ideally, all existing vegetation should be removed prior to seeding. The easiest, most efficient way to remove vegetation from the current site is to use a non-persistent herbicide application. Glyphosate is most effective. Repeated applications may be necessary. Applications are most effective if applied when the vegetation is actively growing. It is important to follow all of the directions on the label when applying herbicide.

Depending on the scale of the project, alternative methods of removing vegetation and reducing competition such as sheet mulching, smother cropping, or soil inversion may be appropriate. For more information about alternatives, see the [Organic Site Preparation for Wildflower Establishment](#) from the Xerces Society.

For agricultural land, the need to apply herbicide can be greatly reduced by timing construction and planting to occur after harvest and tilling. If the soil will be exposed from construction after the installation of the panels, plant before existing vegetation re-establishes. Seeding should not occur before construction because heavy equipment would compromise the planting. To reduce soil compaction, prepare only the top few inches of soil immediately prior to planting with a cultipacker, a disc-like farm implement. Fertilizer is not necessary before seeding, and may promote competition from undesirable weeds.

Planting Design Recommendations

Planting design is affected by soil, site conditions, and other factors. The location of the different plants is important to consider to ensure the success of the planting. For example, different mixes may be needed for wet and dry areas. Again, plant species chosen for areas under and near the panels should have a maximum height of 3' so that they do not interfere with solar operations. Appendix A provides example seed mixes which are low-stature and have some shade tolerance for being planted under the panels.

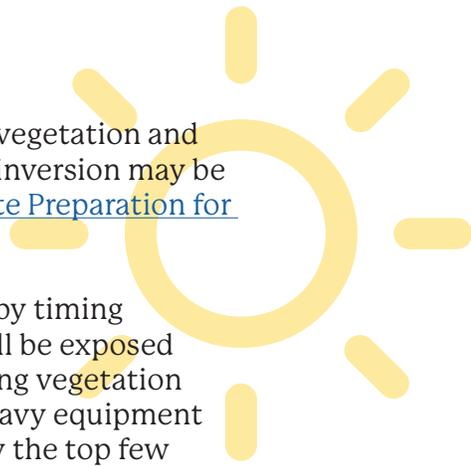
Appendix B shows four basic layout options that will work for the majority of solar sites. Although maximizing the percentage of the site planted with a pollinator mix may be recommended, the choice to use a grass only mix on a portion of the site is based on preference or on the planned uses for the site, such as access through the site for tours or maintenance. The perimeter may have taller species or be only grass. For example, it may be desirable to provide a 40 - 125 foot non-flowering buffer to protect the planting from pesticide drift from adjacent agricultural practices. See the guide [Protecting Conservation Plantings from Pesticides](#) from the MN DNR. Work with relevant experts on the layout.

Planting Method

Refer to additional technical guidance for information on planting methods. Methods may include hand broadcasting, PTO broadcasting, dropseeding, drilling, etc. If drilling is a preferred method, seed drills designed specifically to plant prairie grasses and flowers should be used. Consult with the seed provider or relevant experts for the best planting method for the chosen seed mix. See the IN DNR [Habitat Fact Sheets](#) or the [Upper Midwest Habitat Installation Guide](#).

Timing

Planting should occur post-construction of the solar panels. Attempting to plant after grading and before post and panel installation will result in poor soil to seed contact due to equipment maneuvering. Depending on site conditions and timing, a temporary cover such as 20 lbs/acre of oats can be used as erosion control and site stabilization until construction is complete and the pollinator seed mixes are planted. For example, after the cover crop is winter killed, frost seeding could take place. However, it may not be necessary to use a temporary cover crop and oats may also be included in the seed mix.



Consult relevant experts on when to plant, as planting dates will vary depending on the weather in a particular year and location and when construction occurs. Spring planting should not occur until soil temperatures are above 65°F, but should be completed before June 15. Planting after June 15 is not recommended as supplemental irrigation would likely be needed in July and August so the planting does not fail. If dormant/frost seeding, seed should be broadcast in the fall or winter when soil temperatures are below 55°F to avoid risk of germination, generally around November 1, but before soils freeze. Seeding rates may need to be increased by 25% for dormant seeding due to lower germination rates and loss of seed consumed by wildlife over the winter months. However, dormant seeding may actually improve the establishment of many wildflower species the following spring due to exposure to cold conditions breaking dormancy.

Most sites will be open fields with minimal vegetation. However, if working on a site with known wildlife presence, habitat work, especially with heavy machinery, should be completed by April 15th. April through July are prime nesting season for wildlife.

Establishment and Maintenance Guidelines

Prairie plantings have both an establishment and a long-term maintenance phase. The establishment phase takes approximately 1-3 years. Long-term maintenance will begin in years 3-5 and continue for the life of the planting. The first year of growth is primarily for root development. In the second and third year of establishment, the above ground growth and flowers are more prevalent as the plants mature. The goal in the first few years should be to control the density of aggressive or fast growing plants, whether native or non-native, and allow the pollinator planting to become established. It is not necessary to eliminate all weeds, as the goal is to focus on removal of noxious weeds.

Maintenance Guidelines

A vegetation management plan should be developed and implemented on a site by site basis, and may depend on equipment and funding available.

Prescribed burning is not an option for solar sites. Management tools like spot mowing, strip disking, spot spraying and controlled use of selective herbicides may be needed from time to time to promote plant regrowth and to reduce competition from woody and other vegetation. For more information, consult the IN DNR [Habitat Fact Sheets](#) on strip disking, and strip spraying, wildflowers, and cool and warm season grass establishment and maintenance.

Spot mowing to control of noxious weeds can be done any year to ensure planting health, even during establishment years. It focuses on specific problem areas which is distinct from mowing the entire site during establishment or portions of the site during long-term maintenance, described later. More care should be taken during spot mowing in establishment years, at a raised height of at least 5” in order to target specific areas with noxious plants and to not damage the desired species. It could also be useful for controlling the height of plants if they grow taller than anticipated and are shading the panels. In some cases desired species that were selected to have a certain maximum height may grow taller under the right conditions. Discuss management tools with relevant experts, as some may

have unintended effects depending on the species and timing. For example, mowing may further the spread of noxious seeds on-site or from off-site. Mowing equipment should be cleaned prior to and after use to prevent the spread of non-native and invasive species into the planting and to other sites. Other methods such as hand pulling may be helpful at times but could stir up the existing seed bank. Grazing with sheep could be an option in certain circumstances.

Spot spraying should target only invasive or noxious plant species. Care should be taken when spot spraying because there is a risk of drift. A licensed applicator can be hired to apply the appropriate selective herbicide. Avoid spraying on windy days or when heavy rainfall is likely. Avoid spraying when pollinators are likely to be foraging. Plantings that include both grasses and wildflowers should not be broadcast-sprayed. To prevent inadvertent spraying of the pollinator planting, it is recommended to be placed on the local Do Not Spray list. This will help prevent damage to your pollinator planting.

To learn about specific invasive or noxious plants and control methods, consult the IN DNR [Invasive Plant Species](#) webpage or the [Midwest Invasive Plant Control Database](#).

Year One

There will be little to no flowering in the first season. The goal is to control weed density, height, and seed setting during establishment and in future years, not to eliminate weeds.

Annual weeds can be controlled by mowing the entire site. In the first year, it is typically recommended that there are at least two mows, one in July and another in August. Mowing should occur in early July (near the 4th of July) and again in late August (before Labor Day). The vegetation at these times should be about 12 -18 inches tall and should be mowed back to approximately 6 - 8 inches. If the vegetation has not reached 18 inches at the beginning of July, hold off until the Labor Day mow. Relevant experts may recommend up to 3-4 times to reduce shading of seedlings from annual weeds for more rapid establishment, but this may need to be balanced with the increased costs and labor. Growth should be monitored closely to adjust plans if necessary. Mowed vegetation can be collected or, depending on the amount, bagged and removed off site to prevent smothering new growth.

Year Two

Weed monitoring and control is still paramount in year two. This is when many natives will either be blooming or emerging for the first time. Mowing twice, in early July and late August, will benefit native grasses and wildflowers

Do not hesitate to mow desired plants. The mowing encourages establishment and root growth while preventing the seed set and spread of undesirable plants. As in year one, mowing should occur when growth is approximately 18 inches and should be mowed down to about 8 inches. Keep a watchful eye on the height of unwanted plants compared to the native planting, and adjust mowing plans accordingly. When appropriate, hand-pulling and spot treatment of herbicide can be used on unwanted plants as in the previous year. It may be necessary to reseed areas if they did not fully establish, or if site conditions changed or don't meet the original specifications (i.e. standing water).



Year Three and Beyond

Once established, timing of maintenance is important to avoid disturbance to grassland birds and other wildlife. April 1st through August 1st are primary nesting and brood rearing seasons and it is recommended that maintenance is limited at these times. Typically, year three marks the beginning of management with prescribed burning. As this is likely not an option near a solar array, mowing part of the site is the primary alternative that will be used.

Mowing in year three and beyond will be less frequent and the entire site should not be mowed. Vegetation can be cut shorter than in the first two years. The grasses and wildflowers can be mowed to approximately 4 inches tall if clippings can be removed. If not, only mow to 8 inches. Plan to have one annual mow either in early spring (March to April) or fall (September to October). An early spring mow may allow for more standing vegetation in the winter to provide cover for wildlife. In some cases, a fall mow may be preferred if aesthetics are a concern.

In general, plan to disturb (by mowing) one third to one half of the site annually, rotating thirds or halves every year. The same area should not be mowed in consecutive years. Rotating portions of established area to be disturbed is better as the varying stages of development will help increase plant diversity and structure. Assess the weed encroachment on the site to make decisions regarding how large of an area to mow. Always feel free to contact partners for site-specific guidance on mow times and area. Keep in mind that plantings like these are never truly finished. Because this type of habitat is successional, it will always need some maintenance and it is important to be flexible.

With any management activity it is very important to establish regugia (undisturbed areas). These areas play an important role in pollinator conservation and allow for the completion of pollinator life cycles. If possible, 10% of the site should be set aside as semi-permanent refugia that receives limited mowing on a longer return interval of 15 years. Spot-treat undesired plants if necessary, but well-established natives should reduce the need at this point.

Native Seed Suppliers and Restoration Companies

It is recommended that project developers work with a company that specializes in native seed and installing and maintaining prairie restoration projects. Look for companies that are experienced and have a history of successful prairie restorations projects. See the seed supplies list in Appendix C.

Evaluation and Long-Term Success

Currently, Indiana does not have a state-wide standard projects are required to meet to be able to claim to be beneficial for pollinators, song birds, game birds, etc. There is also no standardized evaluation mechanism. However, an example Habitat Assessment Form is included in Appendix D as an example. The MN BWSR Habitat Friendly Solar Program has [Sample Specifications](#) that local governments might use as a template to create specifications as part of local approval processes.

Developers should strive to meet the project planning standard in Appendix D and ensure the long-term success of the pollinator planting. Solar projects are more likely to be accepted by the community if they have environmental benefits, provide conservation habitat, restore the soil over the life of the project, and have a natural aesthetic that is compatible particularly with rural areas.

Resources and Information

Through the [Department of Energy SolSmart program](#) in 2017 and 2019, many local governments in the MACOG region were designated as solar-friendly, solar-ready communities for making it cheaper, easier, and faster to go solar, with technical assistance from MACOG. These communities were recognized for leasing underutilized land for solar projects, training inspectors and fire fighters, and participating in the regional Solarize initiative to educate the public, among other activities. To make solar development easier, local governments have made information available online related to zoning, permitting, and inspections for solar available online. Additional information can be found on the [MACOG Solar Energy Resources](#) page.

Solar developers are encouraged to consult with local planning offices to identify which ordinances or requirements may affect the development of their projects.

Resource Links

[Best Management Practices for Indiana Pollinator Habitat](#), Purdue Extension

[Center for Pollinators in Energy](#), Fresh Energy

[Environmental Quality Incentives Program](#), USDA NRCS

[Habitat and Wildlife Landowner Assistance](#), IN DNR

[Innovative Site Preparation and Impact Reductions on the Environment \(InSPIRE\)](#), U.S DOE

[Invasive Species Resources](#), IN DNR

[Invasive Plant List](#), Indiana Invasive Species Council

[Invasive Plant Control Database](#), Midwest Invasive Plant Network

[MACOG Solar Energy Resources](#), Michiana Area Council of Governments

[Native Plants of Indiana](#), Indiana Wildlife Federation

[Organic Site Preparation for Wildflower Establishment](#), or [Overview](#), Xerces Society

[Protecting Conservation Plantings from Pesticides](#), MN BWSR

[Purchasing Seed for Conservation Plantings](#), USDA

[Recommended Indiana-Native Plants for Attracting Pollinators](#), Purdue Extension

[Sample Habitat Friendly Solar Planting Plan Specifications](#), MN BWSR

[Upper Midwest Habitat Installation Guide](#), Xerces

[Wildlife Habitat Fact Sheets](#), IN DNR

Contacts

[DOE InSPIRE Project](#)

[Pheasants Forever / Quail Forever Farm Bill Biologists](#)

[IN DNR Wildlife Biologists](#)

[USDA NRCS Local Service Center](#)

[IN DNR Seed Supplier List](#)





Appendix A

Example Wildflower & Grass Mix

Permanent Grasses and Sedges

Botanical Name	Common Name	Ounces/ac	Seeds/oz	Seeds/sq. ft.	Bloom Period
<i>Bouteloua curtipendula</i>	Side-Oats Grama	24.00	9375	5.17	-
<i>Carex bicknellii</i>	Copper-Shouldered Oval Sedge	3.50	33422	2.69	-
<i>Koeleria macrantha</i>	June Grass	1.50	150000	5.17	-
<i>Schizachyrium scoparium</i>	Little Bluestem	64.00	8800	12.93	-
<i>Sporobolus heterolepis</i>	Prairie Dropseed	3.00	14000	0.96	-
		96.00		26.91	

Temp Nurse Crop

Botanical Name	Common Name	Ounces/ac	Seeds/oz	Seeds/sq. ft.	Bloom Period
<i>Avena sativa</i>	Seed Oats	320.00	8125	59.69	-
		320.00		59.69	

Native Forbs

Botanical Name	Common Name	Ounces/ac	Seeds/oz	Seeds/sq. ft.	Bloom Period
<i>Allium cernuum</i>	Nodding Onion	6.00	7700	1.06	Mid
<i>Aquilegia canadensis</i>	Wild Columbine	1.00	25000	0.57	Early
<i>Chamaecrista fasciculata</i>	Partridge Pea	16.00	3800	1.40	Late
<i>Coreopsis lanceolata</i>	Sand Coreopsis	11.00	12500	3.16	Mid
<i>Dalea purpurea</i>	Purple Prairie Clover	7.00	20000	3.21	Mid
<i>Liatris aspera</i>	Rough Blazing Star	2.00	13000	0.60	Late
<i>Lupinus perennis v. occidentalis</i>	Wild Lupine	2.00	1000	0.05	Early
<i>Monarda punctata</i>	Horse Mint	1.50	94000	3.24	Mid
<i>Penstemon hirsutus</i>	Hairy Beard Tongue	1.50	125000	4.30	Early
<i>Solidago nemoralis</i>	Old-Field Goldenrod	1.00	240000	5.51	Late
<i>Symphyotrichum ericoides</i>	Heath Aster	1.00	140000	3.21	Late
<i>Zizia aurea</i>	Golden Alexanders	2.00	12000	0.55	Early
		52.00		26.86	

Total ounces per acre	468.00	53.77
Total pounds per acre	29.25	Total seeds per square foot

Appendix A

Example Grass Only Mix

Permanent Grasses and Sedges

Botanical Name	Common Name	Ounces/ac	Seeds/oz	Seeds/sq. ft.	Bloom Period
Bromus pubescens	Woodland Brome	5.50	7187.5	0.91	-
Carex normalis	Spreading Oval Sedge	2.50	25000	1.43	-
Carex swanii	Downy Green Sedge	2.50	74000	4.25	-
Chasmanthium latifolium	Indian Wood Oats	13.00	7500	2.24	-
Elymus villosus	Silky Wild Rye	10.00	7800	1.79	-
Hystrix patula	Bottlebrush Grass	10.00	4700	1.08	-
Juncus tenuis	Path Rush	1.50	1000000	34.44	-
		45.00		46.13	

Temporary Nurse Crop

Botanical Name	Common Name	Ounces/ac	Seeds/oz	Seeds/sq. ft.	Bloom Period
Avena sativa	Seed Oats	320.00	8125	59.69	-
		320.00		59.69	

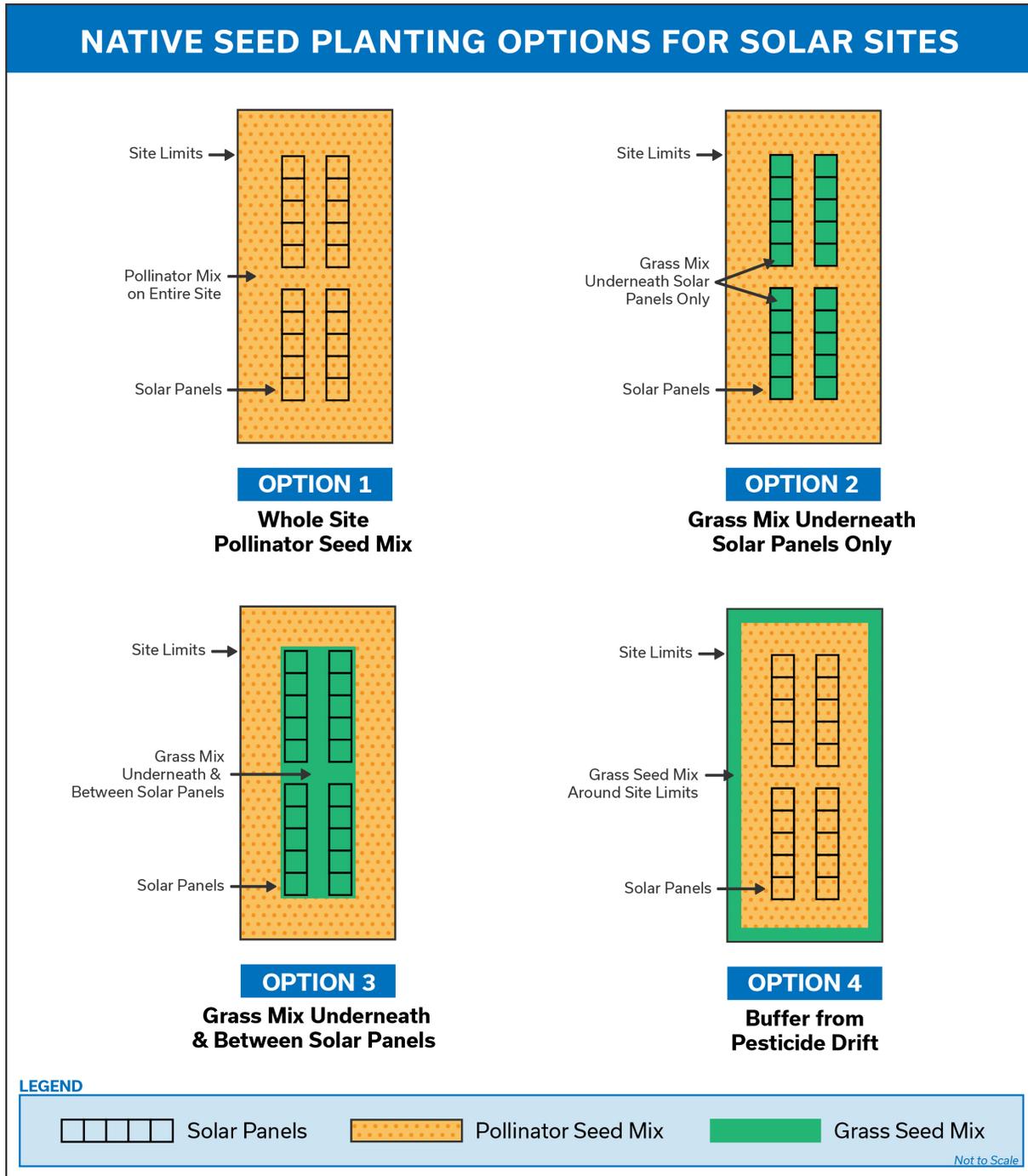
Total ounces per acre	365.00		46.13
Total pounds per acre	22.8125	Total seeds per square foot	

Appendix B

Native Seed Planting Layout Recommendations

It is recommended to work with your seed provided, DNR, or NRCS staff to develop an appropriate seed mix distribution and planting layout for your specific site.

Native Seed Planting Layout Options and Seed Mix Examples for Solar Sites



Appendix C

Seed Supplier List

This list of seed suppliers adapted from the IN DNR is not intended to be all inclusive or a recommendation by the Michiana Area Council of Governments. The listing can be accessed on the [DNR website](#). District biologists and farm bill biologists as well as NRCS staff can help develop seed mixes appropriate for individual sites.

Allender Seed Service
7655 S 100 W
North Judson, IN 46366
574-896-5074

Applegate's Seed House
76 E CR 700 S
Brook, IN 47922
219-275-3664

Bio Town Seeds, Inc.
373 N Diener Road
PO Box 299
Reynolds, IN 47980
219-984-6038
www.biotownseeds.com

Cardno / JFNew
708 Roosevelt Road
Walkerton, IN 46574
574-586-3400
cardnonativeplantnursery.com

Country Feed & Seed Store
10002 Belshaw Road
Lowell, IN
219-696-2767

Elrod Grain Services
5363 E US 50
Dillsboro, IN 47018
812-654-3177

Family Farm Supply
9150 S Gore Road
Bloomington, IN 47403
812-824-1150
www.familyfarmsupply.com

Grazing Systems Supply
2300 E CR 1100 N
Batesville, IN 47006
800-808-4474
grazingsystemssupply.com

Grazing Systems Supply
1131 B. Westbridge Parkway
Greensburg, IN 47240
888-635-8588
grazingsystemssupply.com

Heartland Restoration Services
14921 Hand Road
Fort Wayne, IN 46818
260-489-8511
www.earthsourceinc.net

Jackson-Jennings Farm Bureau
Co-op
Multiple Locations
See Website
www.jacksonjennings.com

Lacrosse Seed
PO Box 445
Elwood, IN 46036
800-562-2459
www.lftseed.com

Langdon Bros. Seed
3590 S 100 E
Hartforn City, IN 47648
800-526-4366
www.langdonbrosseed.com

Laughery Valley Ag Co-op
336 N Buckeye Street
Osgood, IN 47037
800-221-9731
www.laugheryvalleyag.com

Pheasants Forever Seed
Program
(866) 914-7373
www.pheasantsforever.org

Spence Nursery
2220 E Fuson Road
Muncie, IN 47302
765-286-7154
www.spencenursery.com

Tenbargeseeds
100 E Haub Street
Haubstadt, IN 47639
800-467-0158
www.tenbargeseeds.com

Appendix D

Habitat Assessment Form Example

This form may be used to evaluate a project in the planning state. As of December 2019, no scorecards have been published for Indiana. However, a scorecard is under development by Purdue University and this document will be updated upon publication. Established plantings should also be evaluated every 3 years beginning in year 3. See the [MN BWSR Assessment Form for Established Plantings](#) for an example.



Pollinator-friendly solar scorecard

The entomologist-approved standard for what constitutes "beneficial to pollinators" within the managed landscape of a PV solar facility. Only for use in countries and/or states that have not yet adopted a standard.

1. PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY WILDFLOWERS

- 31-45 % +5 points
- 46-60 % +10 points
- 61+ % +15 points

Total points

Note: Projects may have "array" mixes and diverse open area/ border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds (from all seed mixes) to be planted.

2. PLANNED % OF SITE DOMINATED BY NATIVE SPECIES COVER

- 26-50% +5 points
- 51-75% +10 points
- 76-100% +15 points

Total points

3. PLANNED COVER DIVERSITY (# of species in seed mixes; numbers from upland and wetland mixes can be combined)

- 10-19 species +5 points
- 20-25 species +10 points
- 26 or more species +15 points

Total points

Note: exclude invasives from species totals.

4. PLANNED SEASONS WITH AT LEAST 3 BLOOMING SPECIES PRESENT (check/add all that apply)

- Spring (April-May) +5 points
- Summer (June-August) +5 points
- Fall (September-October) +5 points

Total points

Note: Check local resources for data on bloom seasons

5. AVAILABLE HABITAT COMPONENTS WITHIN .25 MILES (check/add all that apply)

- Native bunch grasses for nesting +2 points
 - Native trees/shrubs for nesting +2 points
 - Clean, perennial water sources +2 points
 - Created nesting feature/s (bee blocks, etc.) +2 points
- Total points

6. SITE PLANNING AND MANAGEMENT

- Detailed establishment and management plan developed with funding/contract to implement +15 points
- Signage legible at 40 or more feet stating "pollinator friendly solar habitat" (at least 1 every 20ac.) +5 points

Total points

7. SEED MIXES

- Mixes are composed of at least 40 seeds per square foot +5 points
- All seed genetic origin within 175 miles of site +5 points
- At least 2% milkweed cover to be established from seed/plants +10 points

Total points

8. INSECTICIDE RISK

- Planned on-site insecticide use or pre-planting seed/plant treatment (excluding buildings/ electrical boxes, etc.) -40 points
- Perpetual bare ground under the panels as a result of pre and post emergent herbicide. -40 points
- Communication/registration with local chemical applicators about need to prevent drift from adjacent areas. +10 points

Total points

9. OUTREACH/EDUCATION

- Site is part of a study with a college, university, or research lab. +5 points

Grand total

Provides Exceptional Habitat >85
Meets Pollinator Standards 70-84

Project Name:
 Vegetation Consultant:
 Project Location:
 Total acres (array and open area):
 Projected Seeding Date:

Note: Percent "cover" should be based on "absolute cover" (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above). To measure cover diversity use plots, and/or transects in addition to meander searches. Wildflowers in question 1 refer to "forbs" (flowering plants that are not woody or graminoids) and can include introduced clovers and other non-native, non-invasive species beneficial to pollinators.





