Co-Location of Agriculture and Solar PV

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

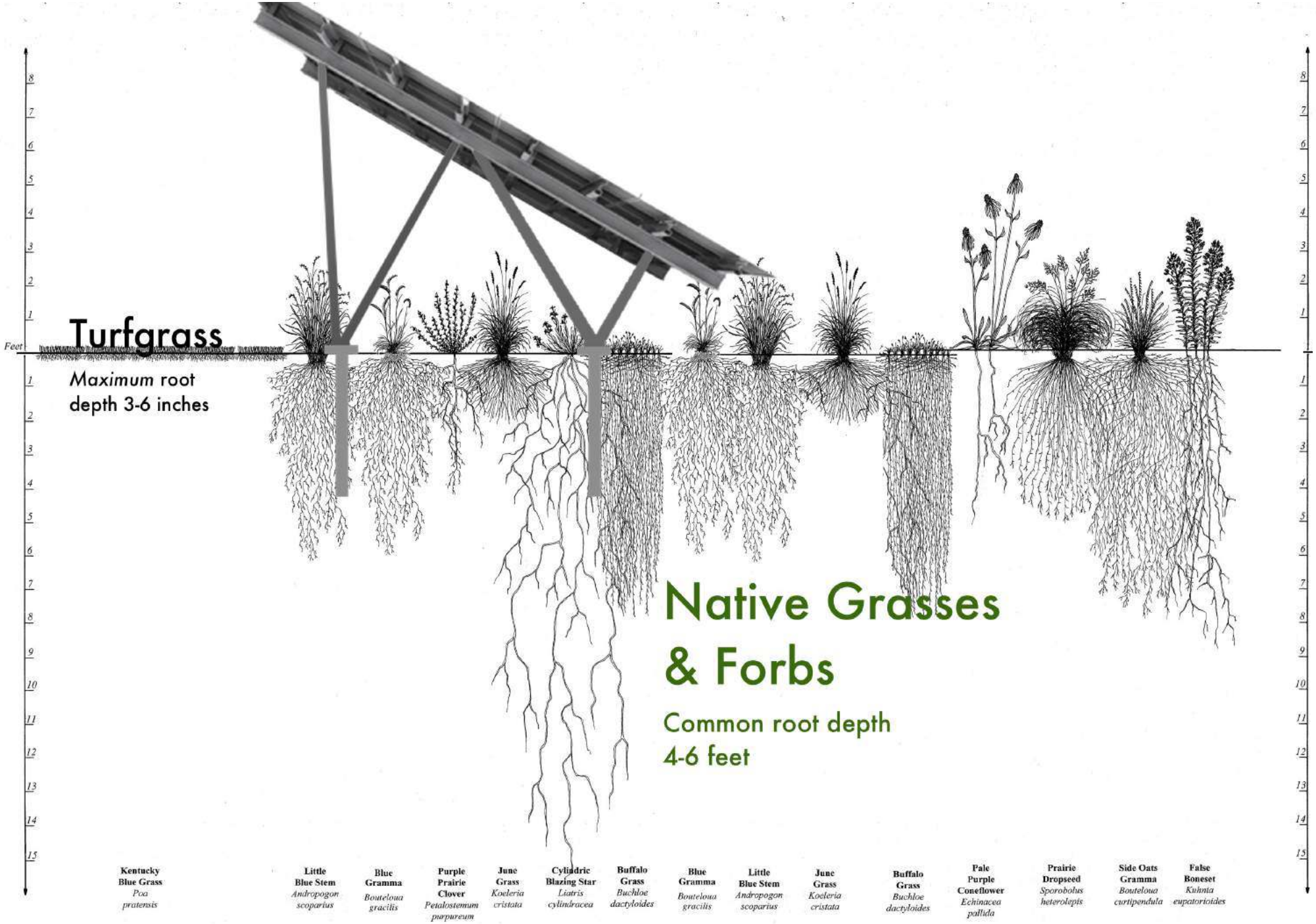
Fresh Energy

Solar Site Vegetation & Performance

- Performance profile for solar site vegetation:
  - Resilient to droughts
  - Resilient to intense downpours
  - Insulation / reduce risk of frost heave
  - Minimal maintenance
  - Low-growing
  - Full-sun & shade tolerant
  - Potential for other ecological services

Benefits of Performance Vegetation on Solar Sites

- Mowing is eliminated after the site's first four years
- Sites that benefit pollinators are particularly attractive to corporate sustainability executives (buyers)
- Stormwater performance of deep-rooted native plants
- Opportunity for significant increase in public support during siting phase and ongoing—beekeepers, fruit/vegetable farmers, and other conservationists
- Insulation / reduce risk of frost heave



Solar Site Management for Soil, Storm Water, and Pollinator Benefits

Rob Davis, Fresh Energy

Connexus Energy
Performance Characteristics:

1. Visual appeal
2. Maintenance free for existing grounds crew
3. No loss of solar performance
4. Ecological services highlighted in company marketing materials

Seeded in Oct. 2014. Pictured in July, 2016.

Newsletter

Connexions

A member update.

CONNEXUS® ENERGY

September 2016

Pollinator haven at Connexus solar garden

For honey bees and butterflies, it doesn't get much better than the pollinator-friendly habitat found in Connexus Energy's community solar garden. Recently, Fresh Energy, with the help of Prairie Restoration, assessed our site, and we received a perfect 100 score on the Solar Site Pollinator Habitat Assessment. That means our solar garden not only provides solar energy for our members, but it also provides exceptional habitat to help struggling pollinators.

What is pollinator-friendly habitat?

Pollinators, such as honey bees, butterflies, hummingbirds, and bats, assist plants in reproduction by transferring pollen. This allows the plant to produce berries, nuts, and other foods important to the survival

"Pollinators are an irreplaceable public resource."

"Insect pollinators, such as bees, butterflies, wasps, flies, and beetles, are critical for the pollination and production of crops and the health of native flora and landscapes."

Commissioner Dave Fredrickson

Minnesota Department of Agriculture

the WHITE HOUSE PRESIDENT BARACK OBAMA

Announcing New Steps to Promote Pollinator Health

MAY 19, 2015

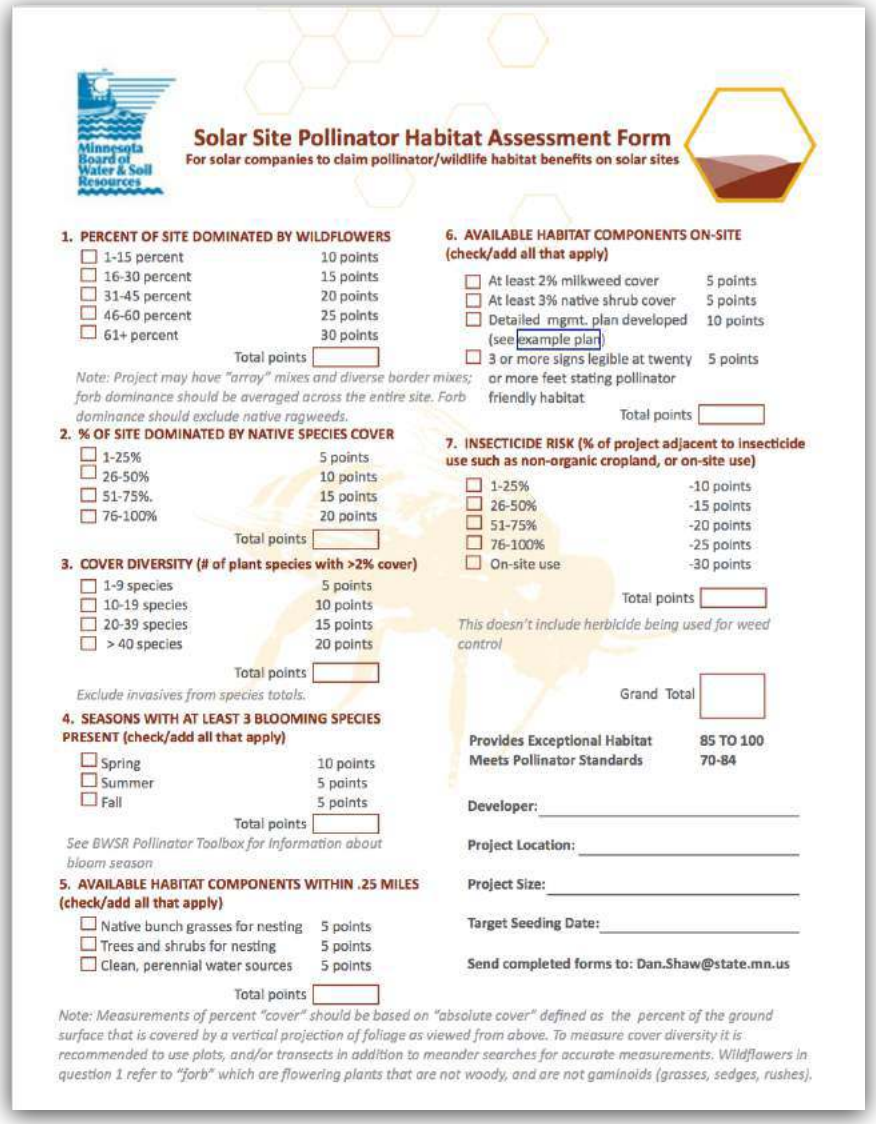
Summary: Pollinators are critical to the Nation's economy, food security, and environmental health.

http://bit.ly/2015WhiteHouseBees

Flexible Standard

- Percent wildflowers
- Percent native species
- Diversity of species
- # seasons flowering
- Nearby assets
- Signage? Mgt plan?
- Insecticide risk

- 130 points available



Minnesota Board of Water & Soil Resources

Solar Site Pollinator Habitat Assessment Form

For solar companies to claim pollinator/wildlife habitat benefits on solar sites

1. PERCENT OF SITE DOMINATED BY WILDFLOWERS

- ☐ 1-15 percent — 10 points
- ☐ 16-30 percent — 15 points
- ☐ 31-45 percent — 20 points
- ☐ 46-60 percent — 25 points
- ☐ 61+ percent — 30 points

Total points ☐

Note: Project may have "array" mixes and diverse border mixes; forb dominance should be averaged across the entire site. Forb dominance should exclude native ragweeds.

2. % OF SITE DOMINATED BY NATIVE SPECIES COVER

- ☐ 1-25% — 5 points
- ☐ 26-50% — 10 points
- ☐ 51-75%. — 15 points
- ☐ 76-100% — 20 points

Total points ☐

3. COVER DIVERSITY (# of plant species with >2% cover)

- ☐ 1-9 species — 5 points
- ☐ 10-19 species — 10 points
- ☐ 20-39 species — 15 points
- ☐ > 40 species — 20 points

Total points ☐

Exclude invasives from species totals.

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

- ☐ Spring — 10 points
- ☐ Summer — 5 points
- ☐ Fall — 5 points

Total points ☐

See BWSR Pollinator Toolbox for information about bloom season

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

- ☐ Native bunch grasses for nesting — 5 points
- ☐ Trees and shrubs for nesting — 5 points
- ☐ Clean, perennial water sources — 5 points

Total points ☐

6. AVAILABLE HABITAT COMPONENTS ON-SITE (check/add all that apply)

- ☐ At least 2% milkweed cover — 5 points
- ☐ At least 3% native shrub cover — 5 points
- ☐ Detailed mgmt. plan developed (see example plan) — 10 points
- ☐ 3 or more signs legible at twenty or more feet stating pollinator friendly habitat — 5 points

Total points ☐

7. INSECTICIDE RISK (% of project adjacent to insecticide use such as non-organic cropland, or on-site use)

- ☐ 1-25% — -10 points
- ☐ 26-50% — -15 points
- ☐ 51-75% — -20 points
- ☐ 76-100% — -25 points
- ☐ On-site use — -30 points

Total points ☐

This doesn't include herbicide being used for weed control

Grand Total ☐

Provides Exceptional Habitat — **85 TO 100**

Meets Pollinator Standards — **70-84**

Developer: _____

Project Location: _____

Project Size: _____

Target Seeding Date: _____

Send completed forms to: Dan.Shaw@state.mn.us

Note: Measurements of percent "cover" should be based on "absolute cover" defined as the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above. To measure cover diversity it is recommended to use plots, and/or transects in addition to meander searches for accurate measurements. Wildflowers in question 1 refer to "forb" which are flowering plants that are not woody, and are not gaminoids (grasses, sedges, rushes).

http://bit.ly/BSWRsolar

HASTINGS STAR GAZETTE

Seat of Dakota County, where more than 100 solar projects are proposed

News Headline:

Local solar project to turn land into pollinator haven

"EGP-NA saw the integration of a vegetation plan into the overall site design as an exciting opportunity to proactively support the local farming ecosystem and communities," EGP-NA representatives wrote in an email interview. "For example, the Aurora solar project uses pollinator friendly seed mix and native plant species and wildlife which results in prairie grasses and flowers throughout the site that contribute to the growth of pollinator species populations. These species like bees and monarch butterflies are critical to supporting the pollination and production of local crops and the preservation and health of farmland and native landscapes."

http://bit.ly/AuroraEGP

Before

After

Eliminate risk — use a landscape services firm that will design a performance vegetation plan and install it professionally without disturbing/damaging the panels.