Solar Energy Project Discussion

Adam Thada

Director of Ecological Relationships

The Center at Donaldson

30 July 20

Ancilla College

The CENTER at Donaldson

Objective in “Going Solar”

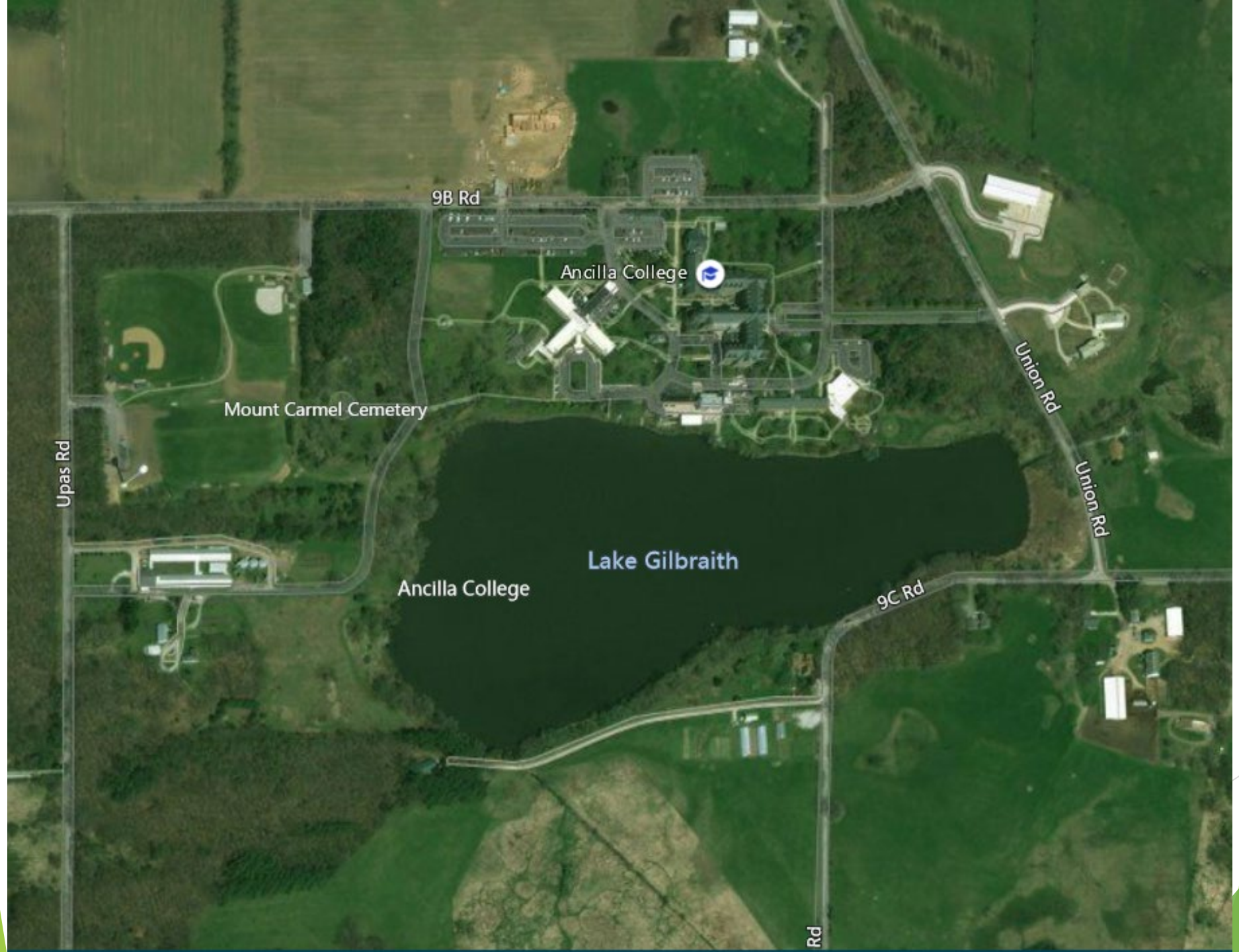
>> Demonstrate renewable energy technologies

Key Metrics:

*economic (quality, reliable, affordable)

*eco-logical (life cycle inputs, land use)

*educational


9B Rd
Ancilla College
Mount Carmel Cemetery
Upas Rd
Union Rd
Union Rd
Lake Gilbraith
Ancilla College
9C Rd
Rd

Analysis

- aire-nc.org

Phase 1

- Ag Technologies (Rochester, IN)

Phase 1

- Water reclamation facility
  - 76 kW (DC), 256 panels
  - Powers water treatment for entire campus
  - Ample open space (no concrete work or tree clearing)
  - Needed a fence
  - Commerical scale… ~1 order magnitude larger than residential
  - Pollinators

Pollinator planting

- enhance ecological function of footprint of solar energy system

Water reclamation facility

- Footprint: ~0.5 acre
- Soil: sandy loam, well drained
- Historic land use: cattle pasture

Establishment of Pollinator-Friendly Planting

- Site preparation
- Seeding
- Maintenance & Monitoring

Site prep

Seeding

- Dry-medium soil seed mixes
- 42 wildflower (forb) species
- 11 grasses

- Seeded 1/10/19, onto light snow

Native Species concept

- A species that was indigenous to N. America at the time of European colonization
- Why natives?
  - Life cycle of pollinators usually tied closely to a subset of native plants

Monarch Butterfly on Common Milkweed

Queen Anne's Lace (Wild Carot)

- Native to Europe/Asia
- Ancestor of garden carrot
- "Naturalized" in N. America


Site Conditions
May 2019


June 2019


Sept 2019


May 2020


June 2020

Monitoring Results

- Year One sampling: Oct 7, 2019
- Year Two sampling: July 17-20, 2020

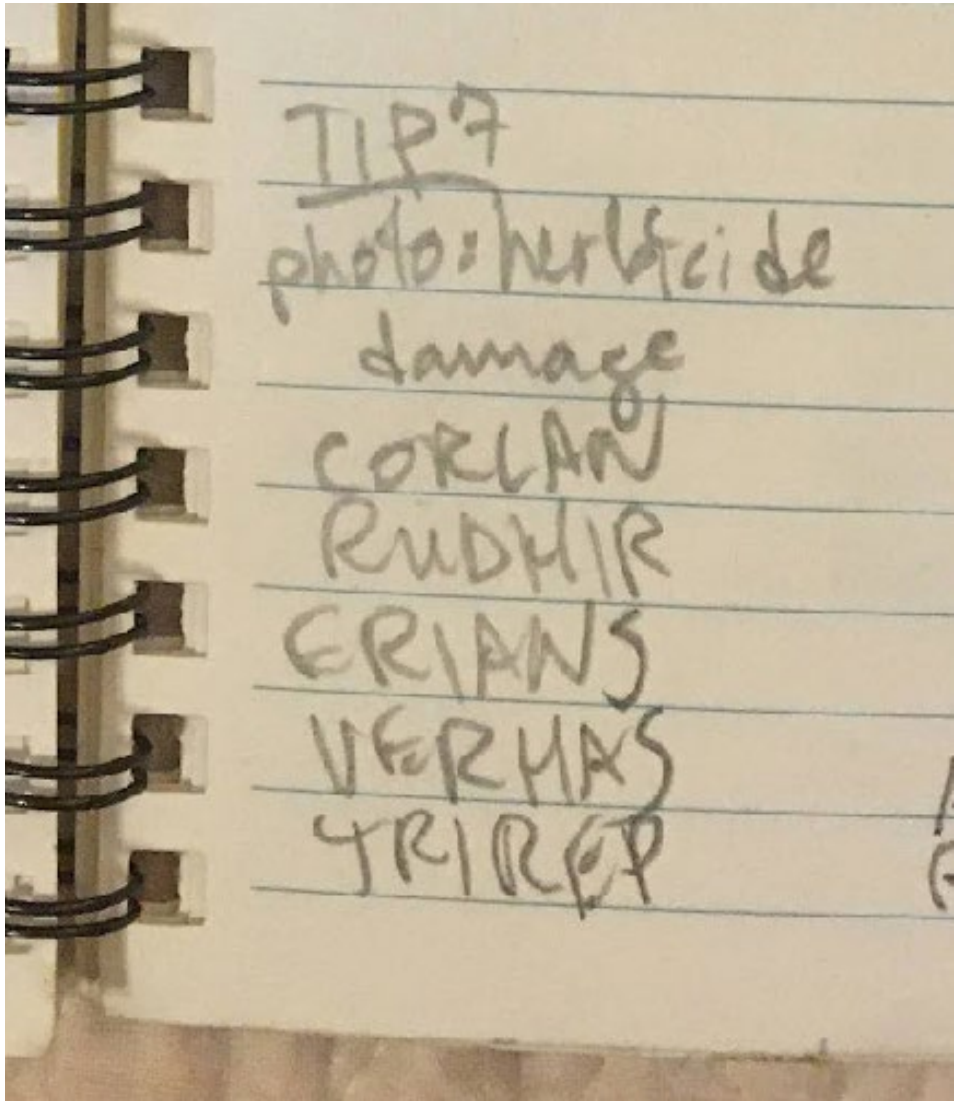
Monitoring Results after 1.5 growing seasons

- 88 total species identified
  - 35 of which native perennial wildflowers
- 16 of 42 original seeded forbs observed so far

Monitoring Bloom Abundance

- 72 individual plots across site, 1 square meter
- Marked “Presence/Absence” of all species actively flowering in each plot

Example Quadrat



Abundance

Common Name	% of plots w/ blooms
Black-Eyed Susan	76%
Daisy Fleabane	67%
White Clover	42%
Common Yarrow	21%
Blue Vervain	18%
Ox-Eye Daisy	14%
Pokeweed	8%
Sulphur Cinquefoil	6%
Horse Nettle	6%
White Vervain	6%
Lanceleaf Coreopsis	3%
Butterfly Weed	1%
Hoary Alyssum	1%
Queen Anne's Lace	1%
Black Medick	1%
Horsemint	1%
Lady's Thumb	1%
White Campion	1%
Red Clover	1%
Common Mullen	1%
Hoary Vervain	1%

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Lady's Thumb	1%
White Campion	1%
Red Clover	1%
Common Mullen	1%
Hoary Vervain	1%

Shade vs. Sun

- Equal # of plots with 0% sun, 50% sun, and 100% sun
- Compared to reference of cattle pasture

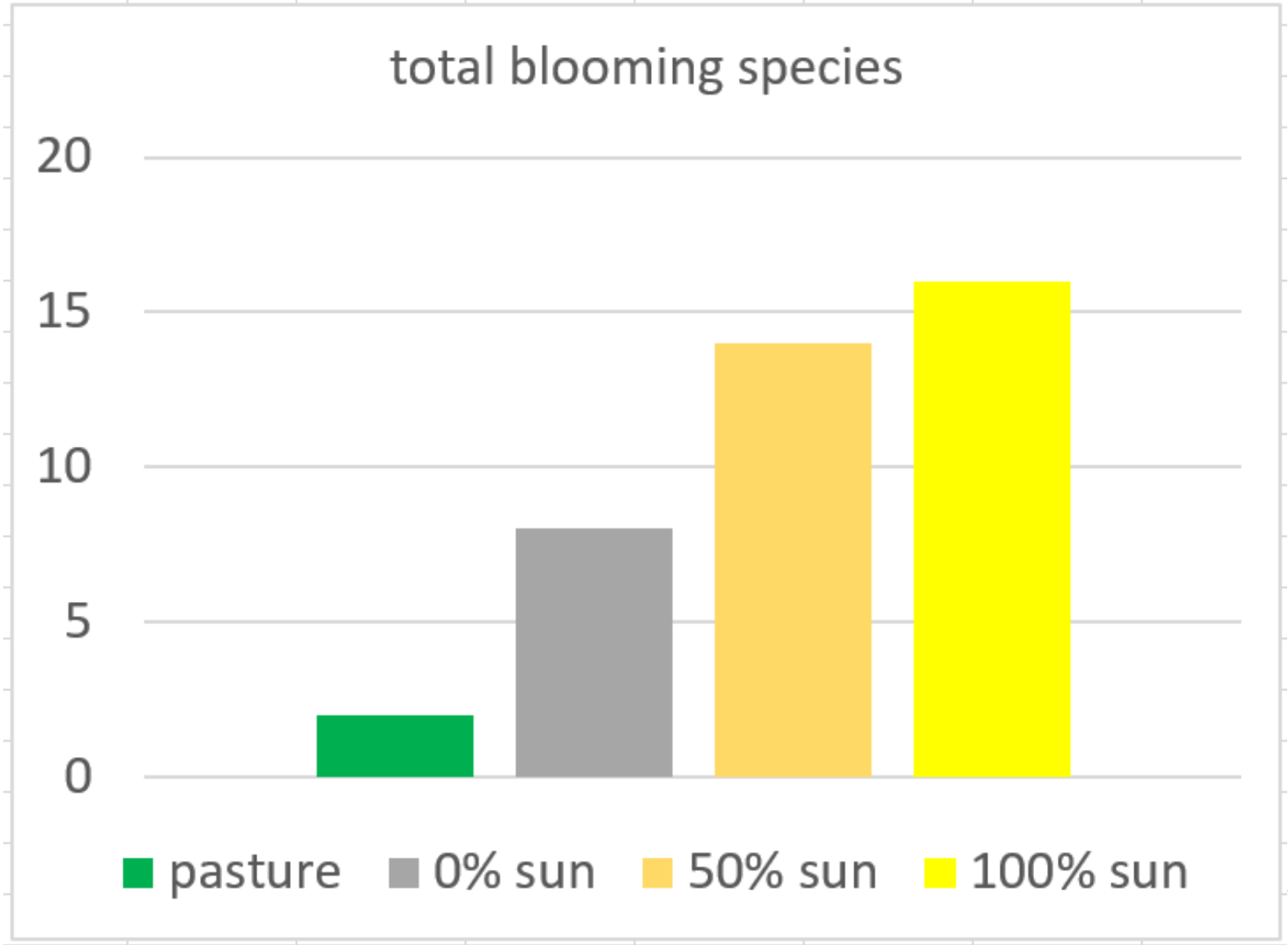
Pasture (reference)

0% Sun

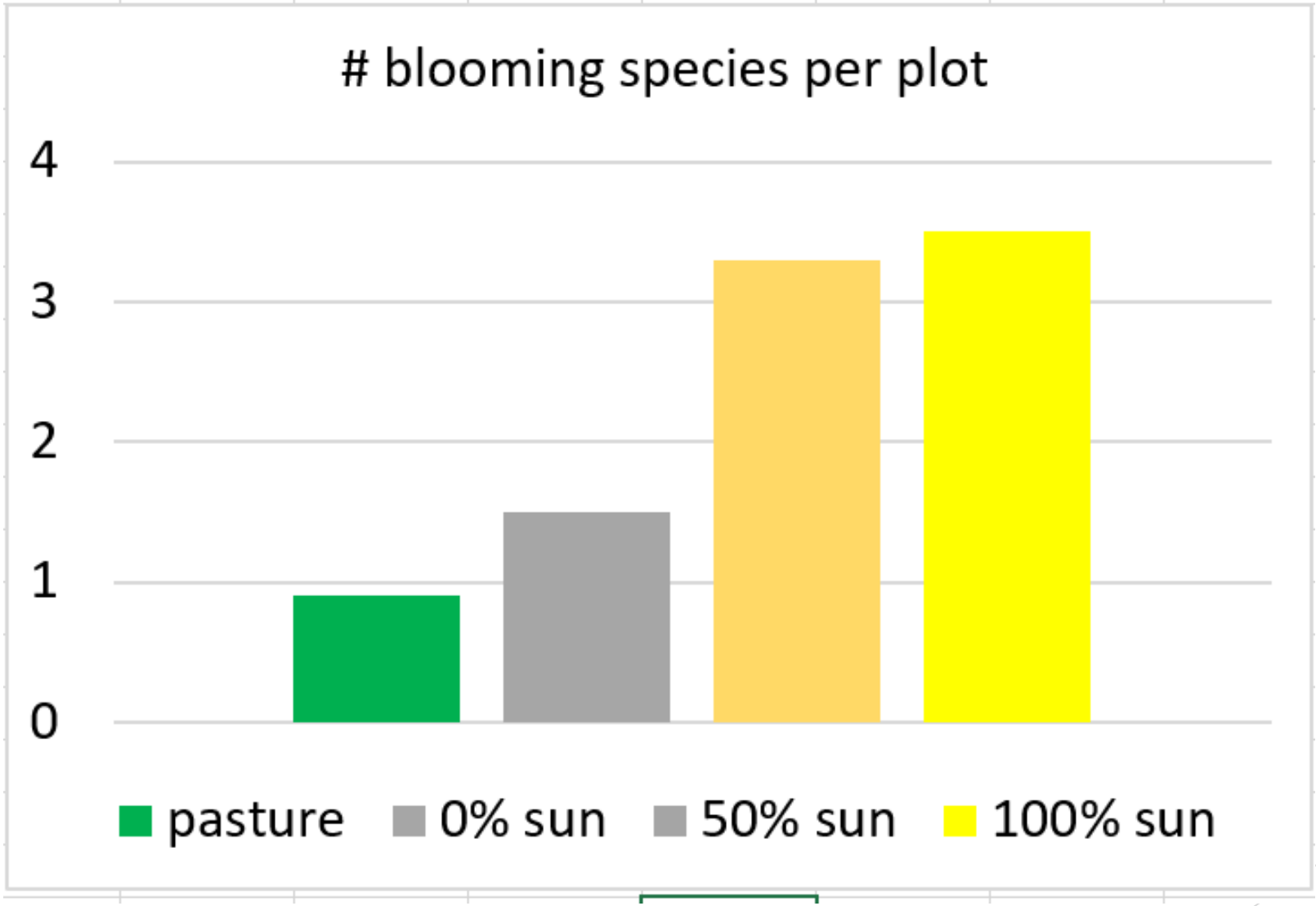
50% Sun

100% Sun

Shade vs. Sun


total blooming species
20
15
10
5
0
pasture
0% sun
50% sun
100% sun

Shade vs. Sun



- Flyover video: https://youtu.be/3zdm9NZ4nLQ

Phase 2 – Ancilla College

- 515 kW (DC)
- 1,400 panels
- Fixed tilt
- 1.5 acre
- Lawn/ag field

GAI

Green Alternatives Inc.
Solar Energy Experts

Seeding Trials

- Native grass only
  - 11 grasses & sedges
- Standard Pollinator Mix
  - 5 grasses + 12 wildflowers
- Enhanced Pollinator Mix
  - 5 grasses + 28 wildflowers

  - Seeded in February 2020

Site prep

Site prep

6/26/20 mowing

7/15/20 mowing

Pollinator Score Cards – Phase 1

about need to prevent drift from adjacent areas. Total points 0

Grand Total 91

Provides Exceptional Habitat >85

Meets Pollinator Standards 70-84

Project Name: ~~Ancilla~~ Ancilla Phase 1

BWSR

Solar Site Pollinator Habitat Assessment Form for Project Planning

For solar companies and local governments to meet pollinator/wildlife habitat certification

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 10

Note. Projects may have "array" mixes and diverse 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 15

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

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

Total points 15

invasives from species totals.

ED SEASONS WITH AT LEAST 3 BLOOMING 'RESENT (check/add all that apply)

- ng (April-May) +5 points
- mer (June-August) +5 points
- (September-October) +5 points

Total points 15

Pollinator Toolbox about bloom seasons

BLE HABITAT COMPONENTS WITHIN (check/add all that apply)

- ive bunch grasses for nesting +2 points
- ive trees/shrubs for nesting +2 points
- an, perennial water sources +2 points
- ated nesting feature/s +2 points
- e blocks, etc.) Total points 0

ent "cover" should be based on "absolute cover" (the percent of the ground surface that is covered by a ojection of foliage as viewed from above). To measure cover diversity use plots, and/or transects in addition to earches. Wildflowers in question 1 refer to "forbs" (flowering plants that are not woody or graminoids) and can roduced clovers and other non-native species beneficial to pollinators. All project plans must include detailed establishment and management specifications (see sample specs on BWSR's Habitat Friendly Solar Webpage).

6. SITE PLANNING AND MANAGEMENT

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

Total points 15

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 (pg.7-8 of Guidance) +5 points
- ☒ At least 2% milkweed cover to be established from seed/plants +10 points

Total points 15

8. INSECTICIDE RISK

- ☐ Planned on-site insecticide use or pre-planting seed/plant treatment (excluding buildings/ electrical boxes, etc.) -40 points
- ☐ Communication/registration with local chemical applicators about need to prevent drift from adjacent areas. +10 points

Total points 0

Grand Total 91

Provides Exceptional Habitat >85

Meets Pollinator Standards 70-84

Project Name: ~~Ancilla~~ Ancilla Phase 1

Vegetation Consultant: Adam

Project County: Marshall (IN)

Project Size: 0.25 ac

Projected Seeding Date: June '19

Send completed forms, project plans, seed mixes and any communication with pesticide applicators to dan.shaw@state.mn.us

Michigan Pollinator Habitat Planning Scorecard for Solar Sites

This form was developed by the MSU Department of Entomology to guide vegetation management at solar installations to make them more supportive for native pollinators. Check the boxes and add up the points to determine whether the plans meet or exceed the minimum requirements. For more local information on pollinators and habitat: www.pollinators.msu.edu

PROJECT DETAILS

Solar developer: Ag. Technologies

Vegetation consultant: Adam

Project location: Marshall Co. IN

Project size (acres): 0.25 ac.

SITE SCORES

1. SITE PLANNING AND MANAGEMENT
   - [x] Detailed plant establishment and vegetation management plan developed +10 pts
   - [x] Site plan developed with a vegetation management company + 5 pts
   - [ ] Signage legible at forty or more feet stating pollinator friendly solar habitat +3 pts

2. HABITAT SITE PREPARATION PRIOR TO IMPLEMENTATION
   - [x] Measures taken to control weeds during season prior to seeding +10 pts
   - [ ] No weed control -20 pts

3. INSECTICIDE RISK
   - [ ] Planned on-site use of insecticide or pre-planting seed/plant treatment (excluding buildings/electrical boxes, etc) -40 pts
   - [ ] Communication with local chemical applicators and site registered on https://mi.driftwatch.org/map +20 pts

4. AVAILABLE HABITAT COMPONENTS WITHIN 0.25 MILES (check/add all that apply)
   - [x] Native bunch grass for bee nesting +1 pt
   - [x] Open sandy soil areas for bee nesting +1 pt
   - [x] Trees/shrubs for bee nesting +1 pt
   - [x] Clean, perennial water sources +1 pt

FLOWERING PLANT SCORES

5. FLOWERING PLANT SPECIES SEEDED IN PERIMETER AREA (species with more than 1% cover)
   - [ ] 5-10 species +1 pts
   - [ ] 10-15 species +3 pts
   - [ ] 16-20 species +8 pts
   - [x] >20 species +10 pts

   Exclude invasive plant species from total

6. PLANT DIVERSITY UNDER SOLAR ARRAY*
   - [ ] Grass only +2 pts
   - [ ] Clover/grass mix +8 pts
   - [x] Low-growing wildflower mix +10 pts

7. PERCENT OF SITE PLANNED TO BE DOMINATED BY WILDFLOWERS**
   - [ ] 0 - 25% 0 pts
   - [ ] 26- 50 % +3 pts
   - [x] 51-75 % +8 pts
   - [ ] More than 75% +15 pts

   Projects may have different species mixes under the solar array panels and in the perimeter. Flower cover should be averaged across the entire site.

8. SEEDS USED FOR WILDFLOWER AREAS
   - [x] Mixes are seeded using at least 40 seeds/square foot +5 pts
   - [ ] All wildflower seeds are from a source within 150 miles of the site +5 pts

9. SEASONS WITH AT LEAST THREE BLOOMING FORB SPECIES PRESENT (check all that apply)
   - [x] Spring (April-May) +5 pts
   - [x] Summer (June-August) +5 pts
   - [x] Fall (September-October) +5 pts

Total points:	[redacted]
Provides exceptional habitat	**90+ points**
Meets pollinator standards	**76 – 89 points**
Does not meet standards	**below 75 points**

** For seeding in the panel array, these can be a short-stature wildflower mix or clovers and other non-native species beneficial to pollinators. If clovers are used, these should be seeded in locations separate from the native wildflowers in the perimeter locations.*

*** Wildflowers in Question 7 refer to forbs which are flowering plants that are not woody, and are not grasses, sedges, etc. Measurements of percent cover should be based on the percent of the ground surface covered by foliage as viewed from above.*

Refer to www.nativeplants.msu.edu or a local native wildflower supplier for advice on plants that are attractive to pollinators and will work in various Michigan settings.

For more on pollinator habitat: www.pollinators.msu.edu

MICHIGAN STATE UNIVERSITY | Extension

Total points: [redacted]

Provides exceptional habitat **90+ points**

Meets pollinator standards **76 – 89 points**

Does not meet standards **below 75 points**

Pollinator Score Cards – Phase 2

- Minnesota:

Grand Total **96**

Provides Exceptional Habitat	**>85**
Meets Pollinator Standards	**70-84**

Project Name: Ancilla College, Phase 2

Vegetation Consultant: Adam Thada

Project County: Marshall Co., IN

Project Size: 1.5 ac

Projected Seeding Date: Jan 2020

Send completed forms, project plans, seed mixes and

Pollinator Score Cards – Phase 2

- Michigan:

Total points:	**77**
Provides exceptional habitat	**90+ points**
Meets pollinator standards	**76 – 89 points**
Does not meet standards	**below 75 points**

MICHIGAN POLLINATOR INITIATIVE

MICHIGAN STATE UNIVERSITY | Extension

Wildlife Usage