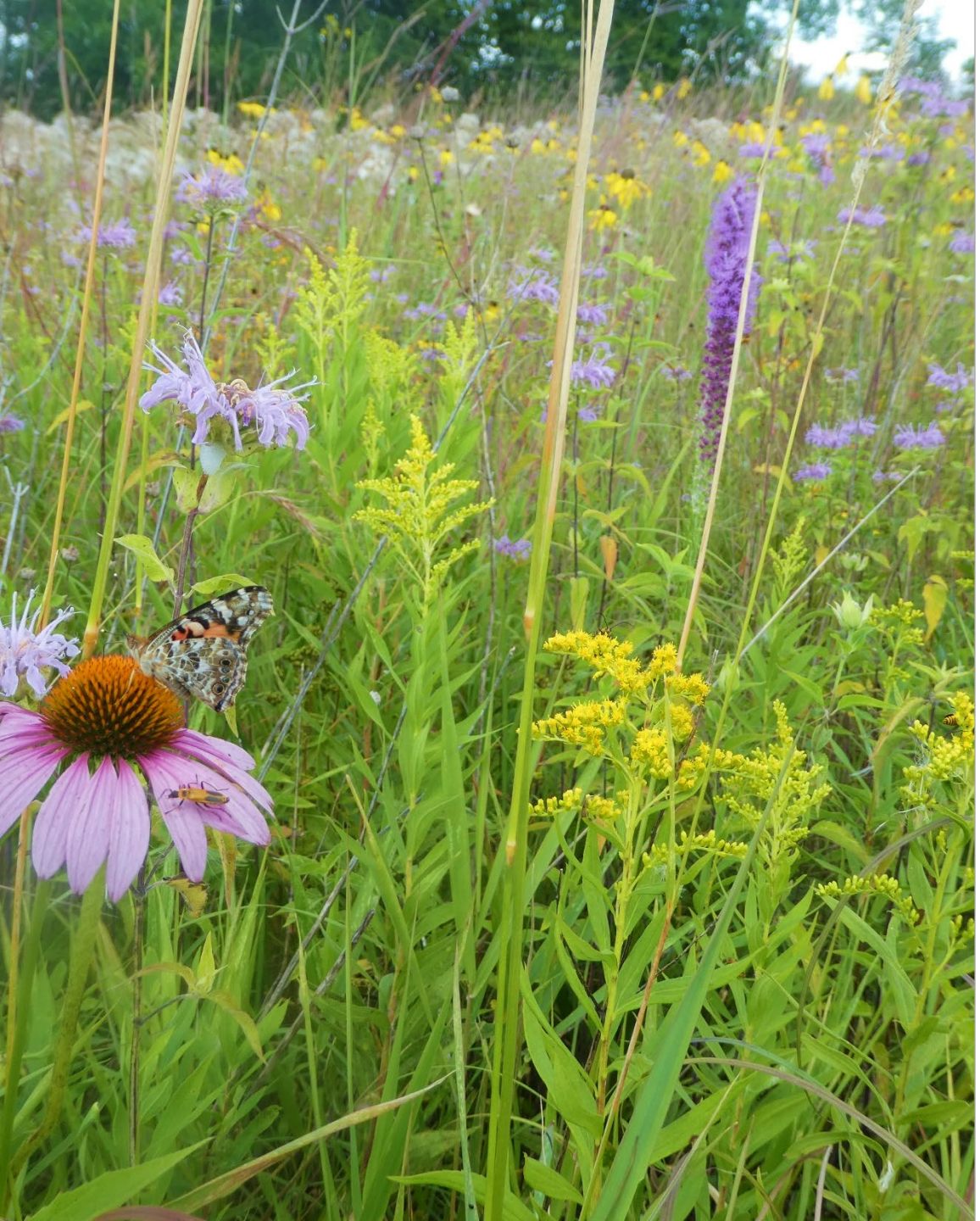

Photo: Xerces Society / Sarah Foltz Jordan

The How and Why of On-Farm Pollinator Habitat

Sarah Foltz Jordan
Xerces Senior Pollinator Conservation Specialist
Duluth, MN

Mark Quee
Scattergood Friends School Farm
West Branch, IA

Practical Farmers of Iowa Conference
January 2020

xerces.org

The Xerces Society for Invertebrate Conservation

Xerces blue butterfly (*Glaucopsyche xerces*), the first U.S. butterfly to go extinct due to human activities

Headquarters: Portland, Oregon

Regional Offices: **Iowa, Minnesota, Indiana, Nebraska, Wisconsin, North Dakota, Oklahoma,** Oregon, Washington, California, Connecticut, Maine, New Jersey, New York, North Carolina

Re-wilding agriculture for biodiversity conservation

xerces.org

Photos: 2018 Xerces staff by Matthew Shepherd / Xerces Society. Blue butterfly by Dana Ross, Farm: Kelly Gill / Xerces Society.

Scattergood Friends School Farm

Scattergood Friends School:

Day and Boarding High School near Iowa City, Iowa

25+ acres of restored prairie

8 acres of IDALS certified organic fruit and vegetable production

Grass-based livestock program supplies meat to the cafeteria

Small classes, experiential learning and intentional community

xerces.org

NRCS Iowa Conservation Innovation Grant: Habitat + Field Days

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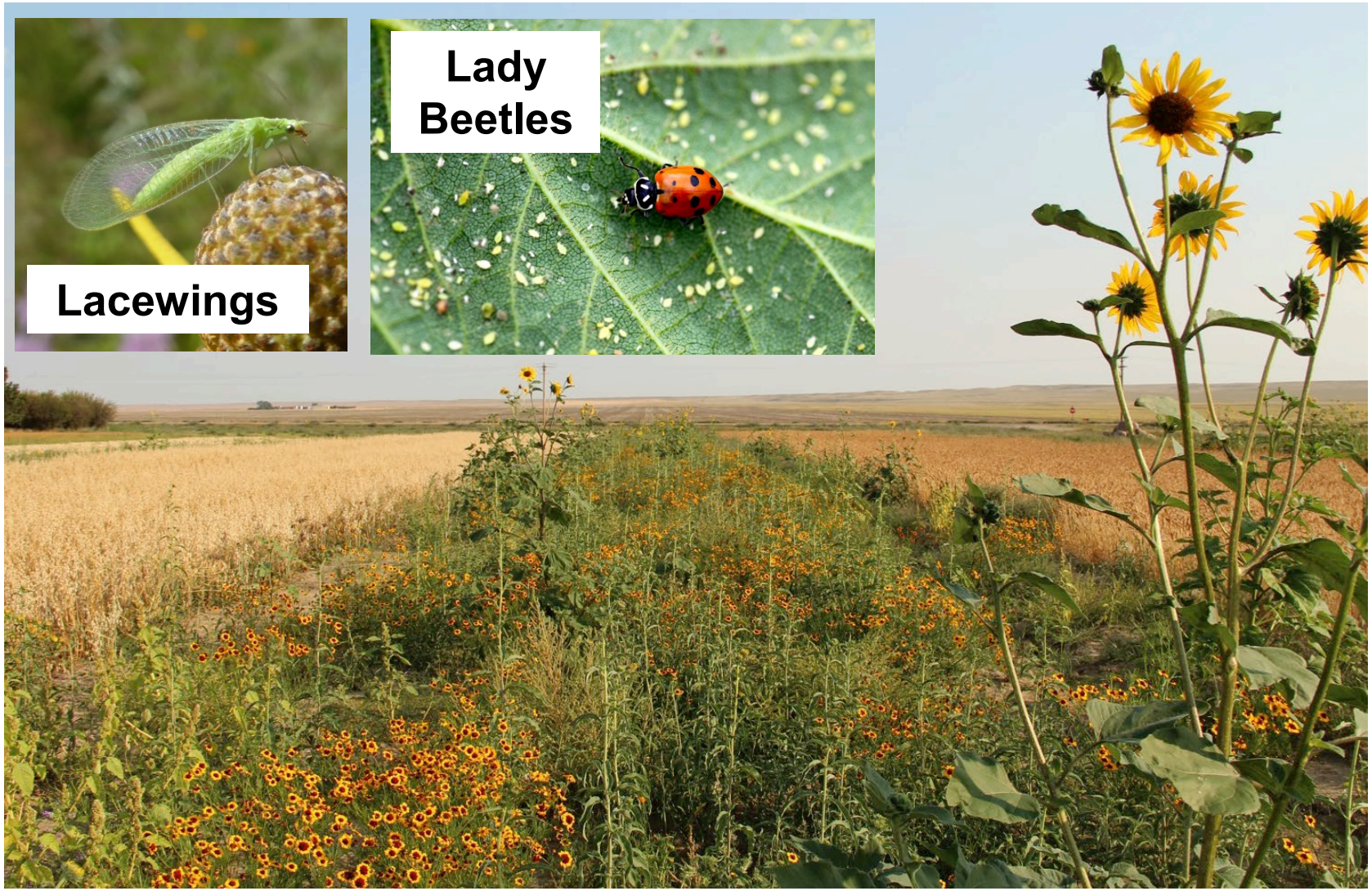
Habitat is key for pollination & natural pest control



Mining Bees

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Photos: Sarah Foltz Jordan, Thelma Heidel-Baker, Adam Varenhorst, Jennifer Hopwood

Not that surprising:

Landscape complexity enhances natural beneficial insect populations in 74% of cases (Bianchi et al. 2011)

Bianchi, F. J. J. A., C. J. H. Booij, and T. Tscharntke. 2011. Sustainable pest regulation in agricultural landscapes: a review on landscape composition, biodiversity and natural pest control. *Proc. R. Soc. B* 273: 1715-1727.

Photos: Matthew Roth, Sarah Foltz Jordan

Pollinator habitat: there's something for everyone!

This talk will focus on:

- Pollinator Habitat Options
- Habitat Restoration Process
    - Site Prep, Planting, Weeding & Management
- Lessons learned at Scattergood Farm!

Photo: Karin Jokela / Xerces Society

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Habitat Opportunities in Ag Landscapes

Photo: The Xerces Society

- ❑ Field Borders
- ❑ Retired Crop Land, Fallow Areas
- ❑ Pollinator / Insectary Strips
- ❑ Beetle Banks
- ❑ Cover Crops & Intercrops
- ❑ Flowering Hedgerows
- ❑ Filter Strips, Wetlands, Buffers
- ❑ Flowering Pasture
- ❑ Orchard Understory Plantings
- ❑ Drift Protection (non-flowering hedgerows)

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On-Farm Pollinator Habitat Opportunities: Native Prairie Plantings

Photo: Sarah Foltz Jordan

Roger Larson Farm, Princeton, MN

Field Borders, Conservation Cover, CRP Plantings, etc.

- Larger footprint prairie restorations
- Intended to be permanent native vegetation

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Scattergood Farm: Pollinator Pallooza Planting

Photos: Sarah Foltz Jordan, Xerces Society

On-Farm Pollinator Habitat Opportunities: Native Insectary Strips

Sogn Valley Farm, Cannon Falls, MN

Photo: Karin Jokela

- Native wildflowers between row crops
- Dispersed throughout fields

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Scattergood Farm: Insectary Strips

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On-Farm Pollinator Habitat Opportunities: Beetle Banks

Grinnell Heritage Farm, Grinnell, IA

Photo: Grinnell Heritage Farm; Bugwood

Permanent native grass strips intercropped with vegetables or row crops

Beetle banks enhance biocontrol:

- Beetles feed on aphids, flies, snails, slugs, mites, insect eggs, grasshoppers
- Several species will consume up to 40 weed seeds per square foot/day

***Pasimachus* ground beetle**

Firefly beetle

On-Farm Pollinator Habitat Opportunities: Annual Insectary Strips

Open Hands Farm, Northfield, MN

Photo: Sarah Foltz Jordan

- Temporary mass wildflower plantings between row crops
- Low cost
- Rapidly blooming species
- Minimal site preparation
- Can provide multiple benefits (Cut flowers, Nitrogen-fixing; Weed control…)

Scattergood Farm: Annual Plantings

Photos: Practical Farmers of Iowa (left), Sarah Foltz Jordan / Xerces Society (right)

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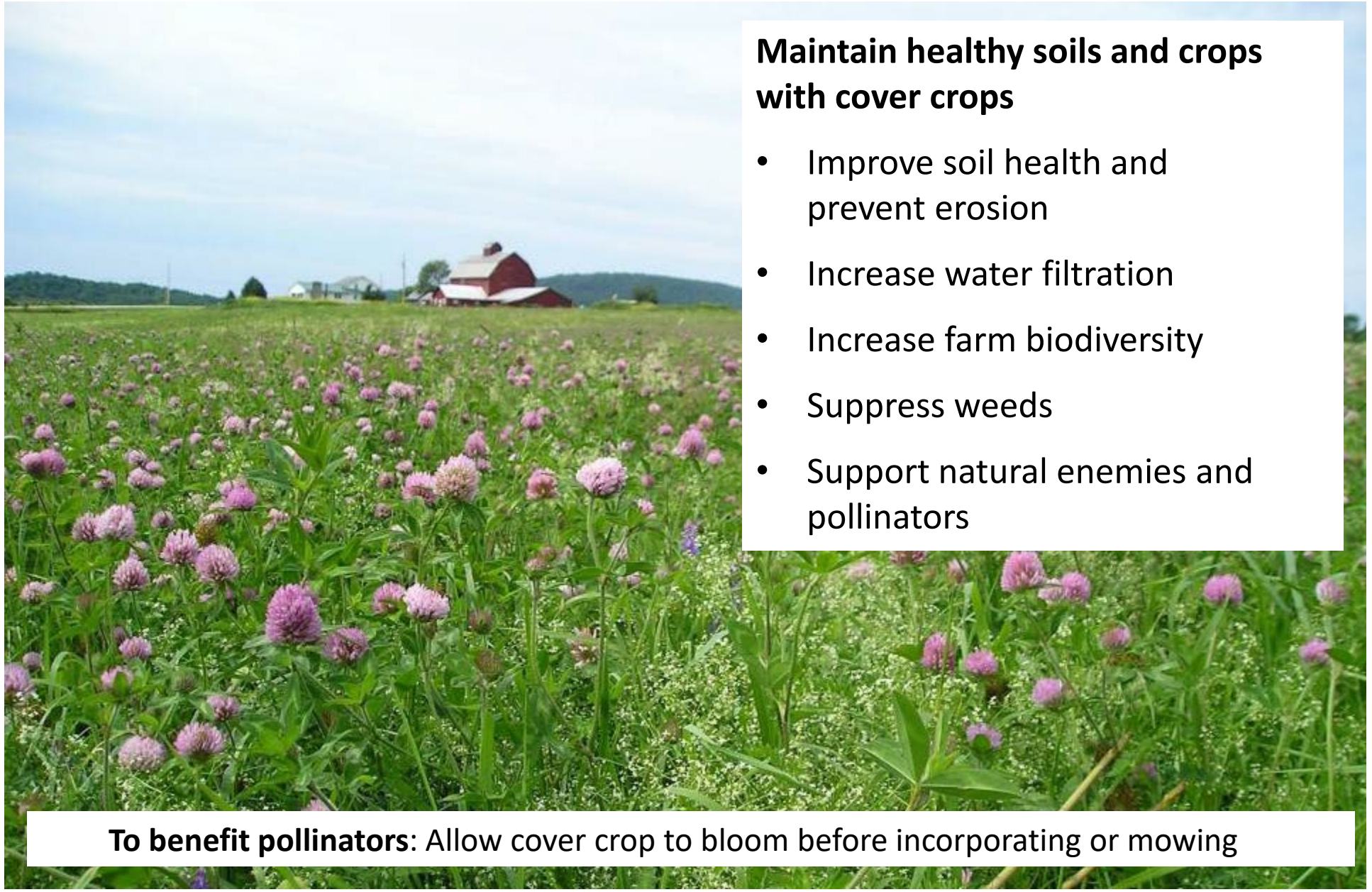
On-Farm Pollinator Habitat Opportunities: Annual Insectary Strips

- Partridge pea
- Plains coreopsis
- Annual blanket flower
- Buckwheat
- Dill
- Cilantro
- Sunflower
- Allysum
- Phacelia
- Holy Basil
- Red clover
- Bachelor's button
- Cosmos

Photo: Sarah Foltz Jordan / Xerces Society

On-Farm Pollinator Habitat Opportunities: Cover Cropping



Maintain healthy soils and crops with cover crops

- Improve soil health and prevent erosion
- Increase water filtration
- Increase farm biodiversity
- Suppress weeds
- Support natural enemies and pollinators

To benefit pollinators: Allow cover crop to bloom before incorporating or mowing

Photo: Toby Alexander, NRCS

Lots of options for cover crops that support beneficial insects!

Buckwheat (*Fagopyrum esculentum*)

Brassica spp.

Lacy phacelia (*Phacelia tanacetifolia)*

Partridge pea (*Chamaecrista fasciculata*)

Opportunities in Agriculture

CONTENTS

Available at: www.sare.org/cover-cropping-for-pollinators or order free hard copies at (301) 779-1007.

SARE Sustainable Agriculture Research & Education

9/15

Cover Cropping for Pollinators and Beneficial Insects

Doug Crabtree uses many tools to make his Montana farm bee friendly. – Photo by Jennifer Hopwood. Phacelia is an attractive pollinator cover crop. – Photo by John Hayden. Clover fixes nitrogen and provides bee forage. – Photo by Judson Reid

DOUG AND ANNA CRABTREE'S VILICUS FARM RESTS on more than 2,000 acres in northern Montana, and it is a model of how cover crops can be a foundation of pollinator and beneficial insect management. Like many farmers, their approach to cover cropping began with an interest in soil health and quickly grew to encompass much broader goals as they recognized the additional benefits cover crops could provide.

"We want to implement pollinator conservation at the field-level scale," Doug says. "Anyone can create a small wildflower strip, but as we scale up, we need conservation areas distributed across the entire operation."

While the Crabtrees have established permanent native wildflower strips around many of their fields to provide a skeleton of habitat throughout the farm, extensive cover crop rotations provide the muscle that makes their operation a rich landscape for bees and other beneficial insects.

This commitment to cover cropping is having clear and positive impacts. Flax, sunflower and safflower are just a few of the Crabtrees' regular crops that either require or strongly benefit from insect pollination. And, because of their commitment to integrating habitat for wild pollinators throughout their holdings, the Crabtrees have never needed to bring honey bee hives onto the farm for pollination. Instead, a walk through their fields quickly reveals an abundance of wild bumble bees, longhorn bees, sweat bees and more—all supported by the farm's habitat. A farm's ability to support its own pollinator community provides security, especially if managed honey bee hives become scarce or expensive.

In addition to supporting the pollinator community, cover crops have many traditional uses on a farm. These range from preventing erosion and improving soil health to managing weeds and serving as an additional source of income when part of a double-crop system. With cover

Photos: Nancy Adamson

Flowering Cover Crops Enhance Pest Control

Telenomus wasp parasitizing stink bug eggs

Tillman 2013: Flowering cover crops near soybeans (buckwheat for nectar) increased wasp parasitism of stink bug eggs by 2 ½ times.

Photos: Eric Mader and Robin Dobson

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On-Farm Pollinator Habitat Opportunities: Native Flowering Hedgerows

- **Early Spring Forage** (hawthorne, wild plum, juneberry, willows, maples)
- **Nesting resources for stem nesting insects** (elderberry, sumac)
- **Screening, wind and dust reduction, living snow fences**
- **Harvestable fruit, tea** (elderberry, juneberry, NJ tea, aronia, highbush cranberry, currants)
- **Seed/berries for birds** (Vibernums, juneberry, hawthorne…)

Little Hill Berry Farm, Northfield, MN

Photos: Sarah Foltz Jordan, Nancy Adamson

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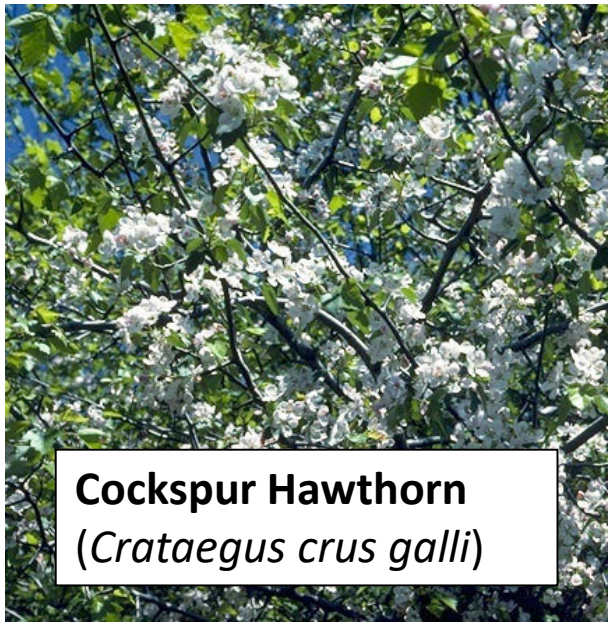
Key Native Flowering Shrubs

- **Elderberry (black** and red**)** (*Sambucus* spp.)
- **Juneberry** (*Amelanchier* spp.)
- **Highbush cranberry** (*Vibernum trilobum*)
- **Nannyberry** (*Vibernum lentago*)
- **Cockspur Hawthorn** (*Crataegus crus galli*)
- **Wild plum** (*Prunus americana*)
- **Currants** (*Ribes* spp.)
- **New Jersey Tea** (*Ceanothus americanus*)
- **Aronia** (*Aronia melanocarpa*)
- **Dogwood** (*Cornus* spp.)
- **Willow** (*Salix* spp.)
- **Lead plant** (*Amorpha canescens*)

*Plants in blue provide edible product



Cockspur Hawthorn
(*Crataegus crus galli*)

New Jersey Tea
(*Ceanothus americanus*)

On-Farm Pollinator Habitat Opportunities: Native Flowering Hedgerows

Native elderberry & currant hedgerow

Diverse native hedgerow with forb component

Photos: Sarah Foltz Jordan, Xerces Society

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On-Farm Pollinator Habitat Opportunities: Native Tea Garden

Photos: Practical Farmers of Iowa

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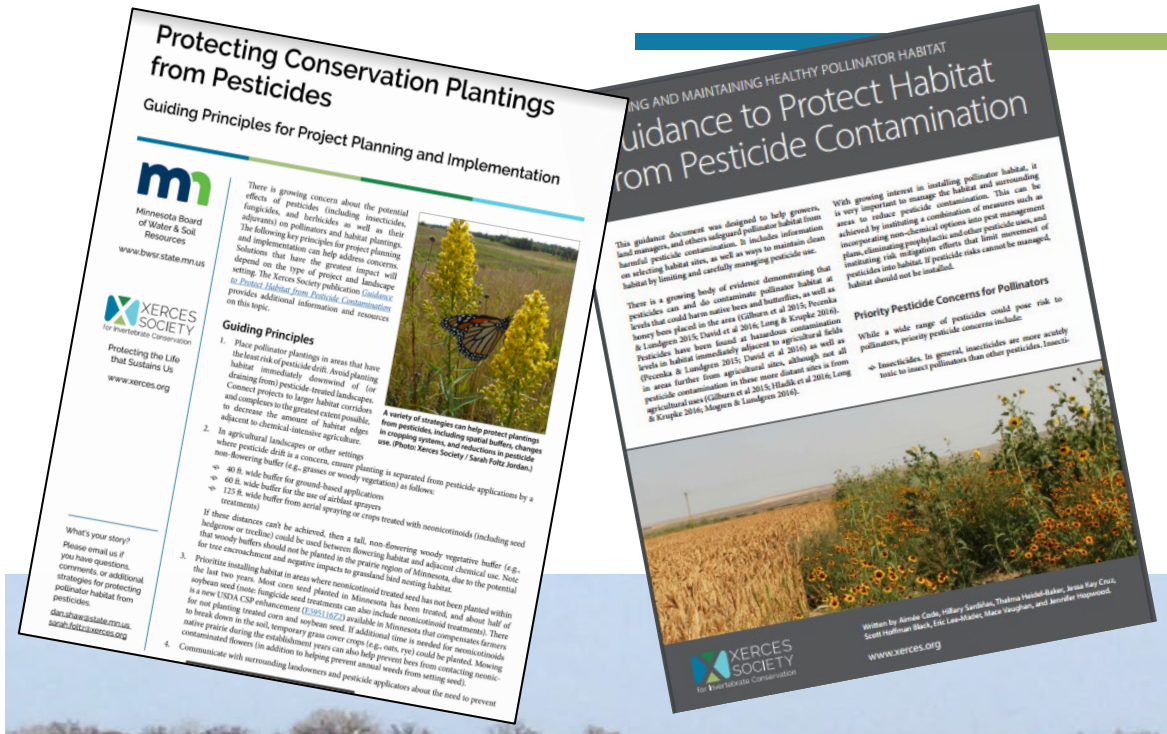
On-Farm Pollinator Habitat: Drift Protection Buffers



- Place habitat away from sites of application (e.g. crops), 40 ft. for ground applications, 125 ft. for neonic treated fields
- Work with farmers/applicators to establish buffers or setbacks: Unsprayed area (30’ – 60’)
- Pesticide drift barriers: ‘Non-habitat’ vegetative barriers (eg. conifers)

Photo: Sarah Foltz Jordan

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On-Farm Pollinator Habitat: Drift Protection Buffers

- Spruce, fir, juniper are better than pine
- Multiple rows of low porosity vegetation are better than a single row of dense vegetation
- Aim for ~60% density

Adamson et al. 2012 . Windbreaks designed with pollinators in mind. Inside Agroforestry 20(1): 8-10. Available at: http://nac.unl.edu/documents/insideagroforestry/vol20issue1.pdf

Photo: Sarah Foltz Jordan

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Interseeding Wildflowers into Grasslands

Management Timelines & Techniques

Timelines below are based on dominant grasses. Grass stands with both cool and warm season grasses can be disturbed in all growing seasons, or treated in alternate seasons in subsequent years after interseeding to help maintain wildflowers. Disturbance & Management techniques details how to use various management and disturbance techniques to interseed wildflowers successfully. Practices may be used alone, or in combination, depending upon which management techniques are available to landowners.

Dominant Grass Season→	YEAR 1: Preparation for Interseeding				YEAR 2: Management During Seedling Establishment				YEARS 3+: Ongoing Management		
	Spring	Summer	Fall	Interseed	Spring	Summer	Fall	Interseed	Spring	Summer	Fall
COOL SEASON GRASS		—				—				—	
WARM SEASON GRASS	—		—		—		—		—		—

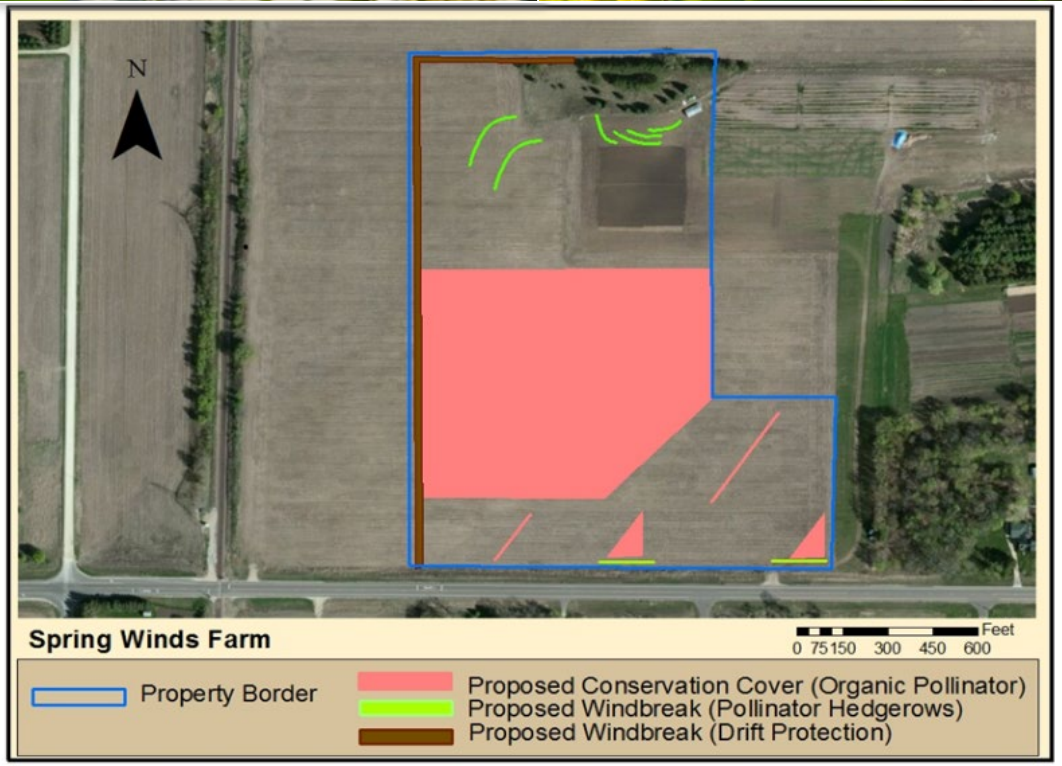
DISTURBANCE & MANAGEMENT TECHNIQUES				
GRAZING	Graze intensively during the entire growing season, or target the growing season of dominant grasses. Grazing also may help remove litter. *Aggressive grasses or weeds may require multiple years of grazing during the appropriate season.*	DORMANT SEASON	Time short duration, intensive grazing to target the growth period of dominant grasses. Monitor to prevent damage to wildflower seedlings.	DORMANT SEASON	Graze ⅓ or less of the site annually. Use fencing to create a rotational grazing system, or pair with burning to patch burn graze. Vary the timing and location of grazing across years.
BURNING	Burn to suppress grasses and remove litter. To target dominant grasses or weeds, burn during their growth period(s). *Aggressive species may require multiple years of burns during the appropriate season.*		Not recommended during seedling establishment.		Burn ⅓ or less of the site regularly. Vary the season and location of burns to target problem grasses, weeds, or woody species, and to reduce negative impacts to desirable species.
HAYING/MOWING	Haying can help suppress grasses and remove litter. If mowing, another method will need to be used to remove litter. Haying/mowing may not adequately suppress aggressive grasses, even over multiple seasons.		Hay or mow 2 to 4 times during the second year, cutting to 8". Cut grasses and weeds before they flower and set seed.		Hay or mow ⅓ or less of the site each year, varying the locations that are treated. Vary the seasonal timing of haying or mowing.
HERBICIDES / GRASS-SELECTIVE HERBICIDES	Multiple applications are necessary if cool season grasses are dominant. Use a **GRASS-SELECTIVE HERBICIDE** if desirable wildflower species are present.		Apply GRASS-SELECTIVE HERBICIDES during seedling establishment. Spot-spray invasive weeds as needed.		If other management options are not available, use GRASS-SELECTIVE HERBICIDES to suppress grasses as needed. Choose **GRASS-SELECTIVE HERBICIDES** with the least toxicity to pollinators and time applications to minimize exposure to pollinators. Litter removal will be necessary.
INTERSEED	Do not interseed site without adequate preparation.		Dormant or early spring seed. Time the planting to regional needs.		If necessary for continued site diversity, dormant or early spring seed.
DISKING (PLOW)	Not recommended. Disking can be used to suppress grasses but can also increase soil erosion, promote weed growth, and disturb soil biology. Though it may be appropriate under some circumstances on previously cropped land, disking should **NEVER** be used on unbroken sod such as native rangeland.				

Farm Planning: Cover Crops (yellow) & Native Prairie Habitat (pink)

Uproot Farm: Isanti Co., MN; 30 acres Organic Vegetables

Photos: Uproot Farm

Farm Planning: Native Ground Cover for Apple Orchard + Native Strips + Hedgerows



Photos: Sarah Foltz Jordan

Native Habitat Installation Process

- ❑ Habitat Evaluation
- ❑ Site Selection
- ❑ Pesticide Risk Mitigation
- ❑ Planting Design / Seed Mix
- ❑ Pre-planting Weed Control
- ❑ Habitat Installation
- ❑ Ongoing Weed Management

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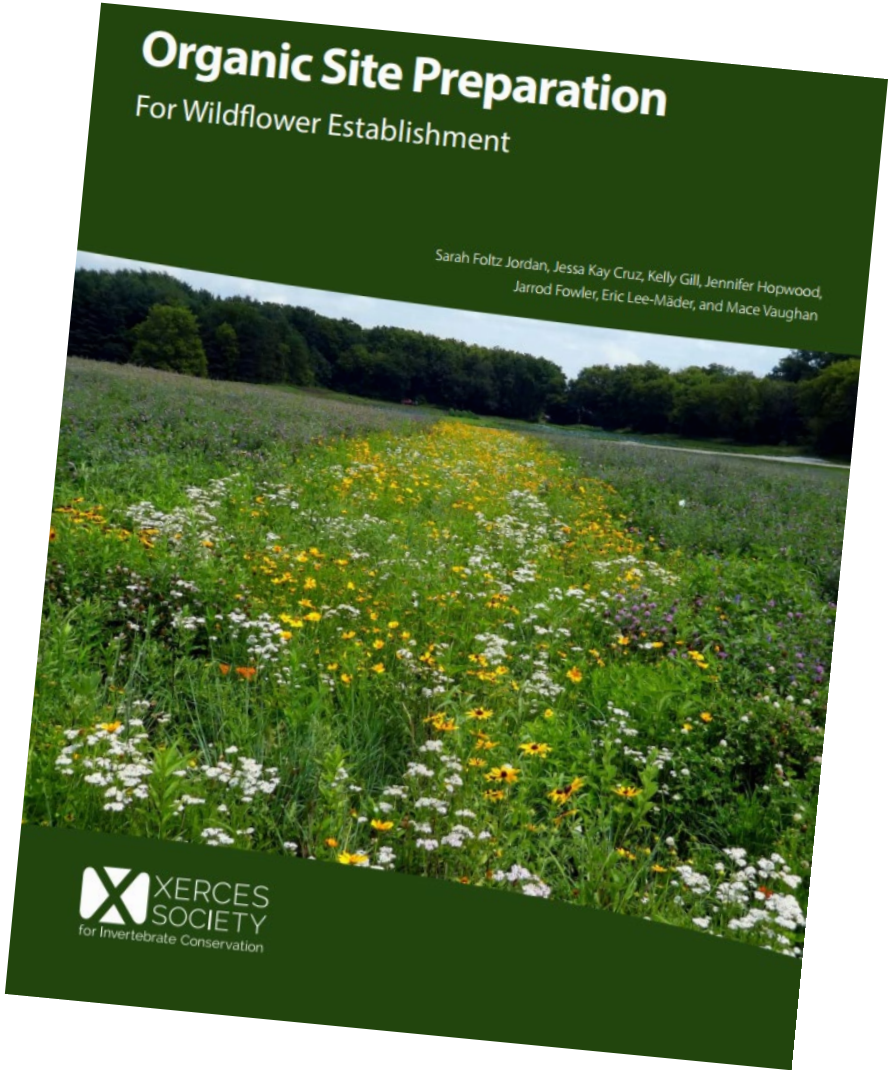
Organic Site Preparation for Wildflower Establishment



- ❑ Smother Cropping
- ❑ Solarization
- ❑ Repeat Cultivation
- ❑ Soil inversion
- ❑ Organic Herbicides
- ❑ Sheet Mulching
- ❑ Sod Removal
- ❑ Weed barriers
- ❑ Livestock Rooting
- ❑ Burning/Grazing

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Smother Cropping: high density cover crop to outcompete weeds

- Duration: 1 or more growing seasons
- Timing is essential;
- Requires attentive management to be effective
- Species selection varies based on soils & weeds
- Termination methods vary (mowing; winter kill; cultivation)

Photos: Kelly Gill, Sarah Foltz Jordan

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Buckwheat Site Prep for Insectary Strips

Scattergood Farm, West Branch, Iowa

Smother Cropping: Buckwheat

Del's Orchard, Leonard, MN

Invasive Weed

Buckwheat Smot

Seeding Fall 2015

Summer 2017

Photos: Sarah Foltz Jordan, Del Stubbs

Smother Cropping

Lots of Options

- ❑ Buckwheat
- ❑ Millet spp.
- ❑ Sorghum sudan
- ❑ Alfalfa
- ❑ Crimson Clover
- ❑ Oats, Peas, Red Clover
- ❑ Diverse species blends

Lacy Phacelia
(*Phacelia tanacetifolia*)

Partridge Pea
(*Chamaecrista fasciculata*)

Oats, Peas, Clover Blend

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Smother Cropping: Oats & Proso Millet

York Farm, Hutchinson, MN

July 2016
Starting conditions: mostly quack grass

Spring 2017:
Oat Smother Crop

Summer 2017:
Proso Millet Smother Crop

Oct. 2017
Light drag;
Broadcast Seeding;
Cultipacking

Photos: Sarah Foltz Jordan

Smother Cropping: Japanese Millet & Sorgum Sudangrass

Waxwing Farm, Webster, MN

Summer 2016
Starting conditions: wet weedy crop field (quack grass, water smart weed, annual weeds)

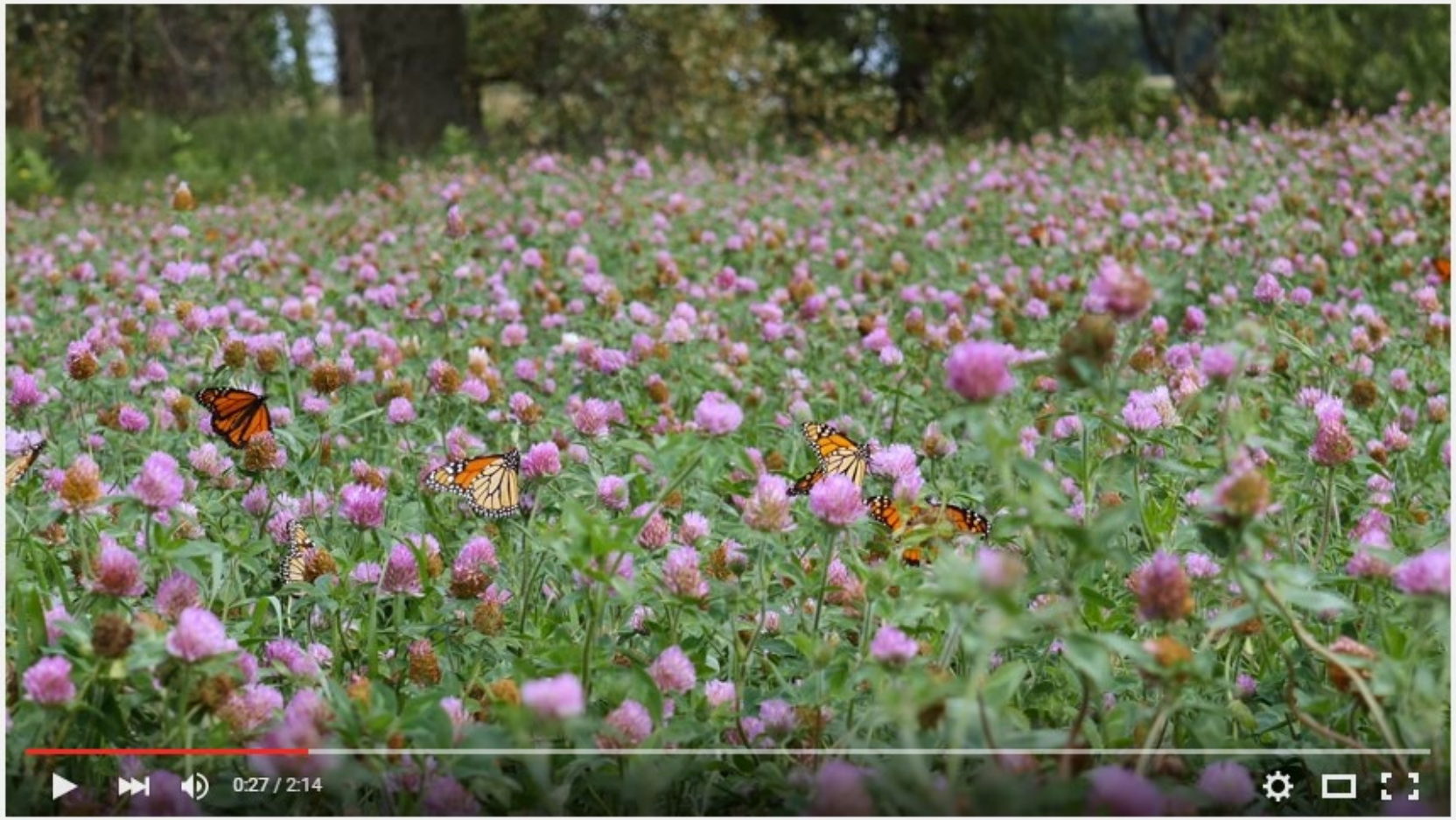
Summer 2017
50:50 Sorghum Sudan: Japanese Millet Smother

Summer 2018
Sorghum Sudan Smother

Oct-Nov. 2018
Controlled Burn & Seeding

Photos: Karin Jokela; Waxwing Farm

Red clover…fuel for monarch migration?



250 monarchs nectaring in field of red clover Sumpter, Minnesota Aug. 29, 2015

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Solarization: smothering weeds; heating soil to kill weed seeds

1. Cultivate or mow to create a seed bed (spring)

2. Dig trench around perimeter (spring)

3. Lay solarization plastic (spring)

4. Remove plastic (fall)

5. Broadcast seed (fall)

Photos: Sarah Foltz Jordan; Eric Mader

- Duration- 1 growing season
- 4 or 6 mil UV stabilized, *clear* high tunnel plastic (USED is great)
- Ideally no airflow, repair rips throughout season (may need deer fence)
- DO NOT TILL after removing plastic
- Not effective against some weeds
- Costly; plastic disposal issues

Used Plastic

Photo: Sarah Foltz Jordan, Xerces Society

Piecing it together

Photo: Sarah Foltz Jordan, Xerces Society

Moving a piece of plastic through an area over multiple years

Heidel Family Dairy Farm, Random Lake, WI

Photos: Sarah Foltz Jordan

Solarization- Dry Soils

Keepsake Farm, Princeton MN

June 2015

June 2018

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Solarization- Dry Soils

Keepsake Farm, Princeton MN

Photos: Sarah Foltz Jordan

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Solarization Case Study: Wet Basin with Reed Canary

Open Hands Farm, Northfield, MN

Sept. 2014: regularly mowed weedy basin (reed canary, narrow-leaf cattail, some CA thistles)

Solarized 2015 (full growing season)

Seeded March 2016

Photos: Sarah Foltz Jordan

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Solarization Case Study: Wet Basin with Reed Canary

Open Hands Farm, Northfield, MN

August 2018: cardinal flower, great blue lobelia, swamp milkweed, blue vervain, false aster, monkey flower, meadow rue, bur marigold, bottle gentian, brown-eyed susan…

Photos: Sarah Foltz Jordan

Weeds Differ in their Response to Solarization

In my experience in the Upper Midwest….

Solarization Works Well

- ❑ Quack
- ❑ Smooth Brome
- ❑ Reed Canary
- ❑ Kentucky Bluegrass
- ❑ CA Goldenrod
- ❑ Burnet Saxifrage (carrot family)
- ❑ Yellow Bedstraw

Solarization Hasn't Worked Well

- ❑ Canada Thistle
- ❑ Yellow Nutsedge
- ❑ Purslane

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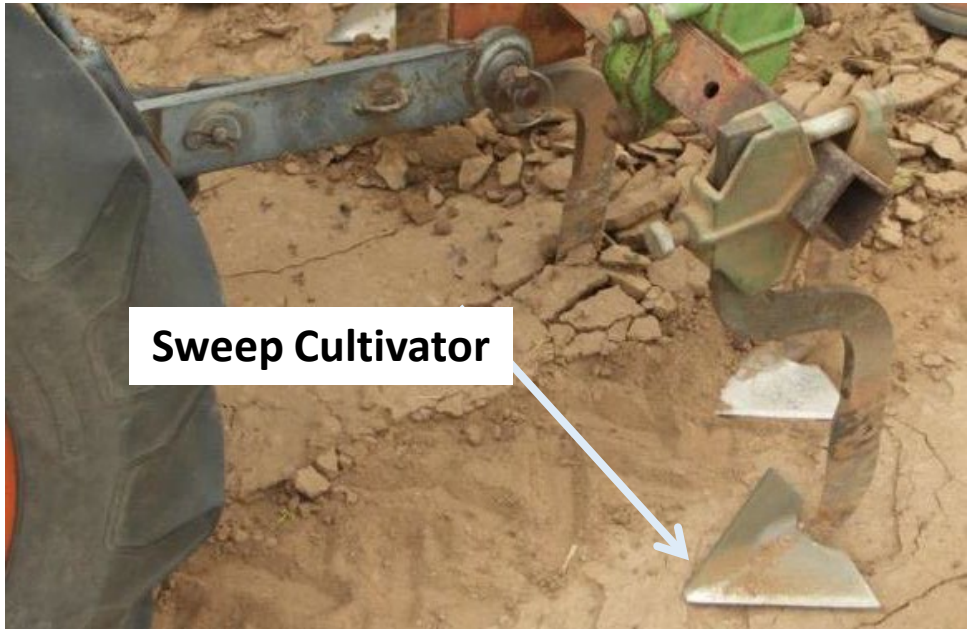
Repeat Cultivation: mechanical disturbance to reduce weeds & seed bank

- Use implements with shallow depth
- Repeated throughout season
- Timing is critical
- Results variable
- Best success when weed pressure is low



Photos: Eric Mader, Alex Stone (OSU)

Repeat Cultivation: Open Hands Farm, Northfield, MN

Spring 2015

Summer 2016

Photos: Sarah Foltz Jordan

Solarization vs. Repeat Tillage

Stonecreek Farm, Taylor's Falls, MN

Starting conditions: mostly non-native cool season grasses & Canada goldenrod

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Photo: Sarah Foltz Jordan

Solarization vs. Repeat Tillage

Stonecreek Farm, Taylor's Falls, MN

Photo: Sarah Foltz Jordan

Solarization vs. Repeat Tillage

Stonecreek Farm, Taylor's Falls, MN

Photo: Sarah Foltz Jordan

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Adaptive Weed Management

PRE-PLANTING weed control (site prep):

- Tailor approach to best target weeds on site
- Focus on invasive, persistent perennial weeds
- May require multiple seasons, multiple methods

PLANTING

- Choose aggressive species
- Fill as many niches as possible
- Use a high seeding rate
- Consider container plants/ bare root plants if needed

POST-SEEDING weed control:

- Regular mowing for at least one growing season
- Ongoing, rapid spot-treatment of any problematic weeds

Photos Sarah Foltz Jordan

Mowing for Weed Management During Establishment

Planting in Year 2 of Growth **Planting in Year 1 of Growth**

Heidel Family Dairy Farm, Random Lake, WI

Photo: Thelma Heidel-Baker

Insectary Strips: Side-by-Side Comparison Plugs vs. Seeds

Scattergood Farm, West Branch, Iowa

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Insectary Strips: Side-by-Side Comparison Plugs vs. Seeds

Scattergood Farm, West Branch, Iowa

Insectary Strips with Plugs (rather than seed)

Prairie Drifter Farm, Litchfield, MN; Uproot Farm, Princeton, MN; Melon Patch Herbs, Princeton, MN

Photos: Sarah Foltz Jordan

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June 2016

Insectary Strips with Plugs (rather than seed)

Prairie Drifter Farm, Litchfield, MN

Rapid Restoration!

- Dense & diverse wildflowers just ONE YEAR after planting
- Very little weed management needed
- Low Cost if growers propagate some of the natives

August 2017

Photo: Sarah Foltz Jordan / Xerces Society

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Insectary Strips with Plugs (rather than seed)

Uproot Farm, Princeton, MN

Photos: Sarah Foltz Jordan

Insectary Strips with Plugs (rather than seed)

Scattergood Farm, West Branch, IA

Rapid Restoration!

Photo: Sarah Foltz Jordan / Xerces Society

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Insectary Strips with Plugs (rather than seed)

River Root Farm, Decorah, IA

Photo: Sarah Foltz Jordan / Xerces Society

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Native Perennial Insectary Strip Sample Seed Mix

Species/Variety	Bloom (Early Mid Late)	Percent of mix (by seed count)	Total number seed/ft^2	Target bulk seed/ft^2	number seeds/lb	number seeds/oz	Baseline seeding rate (lbs seed/ac)	Number acres	total pounds seed	Price per lb	Price per species
Zizia aptera (Heart-leaf Golden Alexanders)	Early	3.0%	50	1.50	192,000	12,000	0.34	1.00	0.34	$225.00	$76.57
Coreopsis lanceolata (Lance-leaf Coreopsis)	Early-Mid	7.0%	50	3.50	320,000	20,000	0.48	1.00	0.48	$75.00	$35.73
Apocynum cannabinum (Dogbane)	Early-Mid	1.0%	50	0.50	320,000	20,000	0.07	1.00	0.07	$320.00	$21.78
Achillea millefolium (Common Yarrow)	Mid	6.0%	50	3.0							
Agastche foeniculum (Purple Giant Hyssop)	Mid	4.0%	50	2.0							
Asclepias incarnata (Showy milkweed)	Mid	0.5%	50	0.2							
Asclepias syriaca (Common milkweed)	Mid	0.5%	50	0.2							
Asclepias tuberosa (Butterfly Milkweed)	Mid	1.0%	50	0.5							
Asclepias verticillata (Whorled milkweed)	Mid	3.0%	50	1.5							
Chamaecrista fasciculata (Partridge Pea)	Mid	2.0%	50	1.0							
Dalea candida (White Prairie Clover)	Mid	3.0%	50	1.5							
Dalea purpurea (Purple Prairie Clover)	Mid	3.0%	50	1.5							
Echinacea angustifolia (Narrow-leaved Coneflower)	Mid	1.0%	50	0.5							
Eryngium yuccifolium (Rattlesnake Master)	Mid	2.0%	50	1.0							
Mentha arvensis (Wild Mint)	Mid	1.0%	50	0.5							
Monarda fistulosa (Wild Bergamot)	Mid	2.0%	50	1.0							
Monarda punctata (Dotted Mint)	Mid	3.0%	50	1.5							
Potentilla arguta (Prairie Cinquefoil)	Mid	3.0%	50	1.5							
Pycnanthemum virginianum (Virginia Mountain Mint)	Mid	7.0%	50	3.5							
Rudbeckia hirta (Black eyed susan)	Mid	1.0%	50	0.5							
Verbena stricta (Hoary vervain)	Mid	3.0%	50	1.5							
Heliopsis helianthoides (Early Sunflower)	Mid-late	3.0%	50	1.5							
Helianthus maximilliani (Maximillian Sunflower)	Mid-Late	3.0%	50	1.5							
Liatris ligulystylis (Rough Blazingstar)	Mid-Late	1.0%	50	0.5							
Aster novae-angliae (New England Aster)	Late	3.0%	50	1.5							
Aster ericoides (Heath Aster)	Late	2.0%	50	1.0							
Solidago (Oligoneuron) rigida (Rigid goldenrod)	Late	3.0%	50	1.5							
Solidago speciosa (Showy Goldenrod)	Late	3.0%	50	1.5							
Koeleria macrantha (Prairie junegrass)		5.0%	50	2.5							
Schizachyrium scoparium (Little Bluestem)		15.0%	50	7.50	240,000		1.36	1.00	1.36	$18.00	$24.50
Sporobolus heterolepis (Prairie Dropseed)		5.0%	50	2.50	256,000		0.43	1.00	0.43	$220.00	$93.59
TOTALS:		100.00%	50	50.00			7.95	1.00	7.95	Total price est	$687.31

- Species are native to your county
- Species are appropriate for your soils
- Mix provides bloom spring through fall
- Includes diverse, high-quality bee plants
- Includes shallow-nectary flowers
- Includes milkweeds
- Includes bunch grasses & sedges
- Forb to grass ratio 40:60, 50:50, 60:40
- Seeds per Square Foot: 45+
- Cost: ~$800/acre+

The Habitat Restoration Process: Seeding

- Timing: Dormant season is best
- Mix the seed with an inert carrier
    - Sawdust
    - Peat moss

Photos: Sarah Foltz Jordan, Xerces Society

The Habitat Restoration Process: Seeding Methods

Photos: Sarah Foltz Jordan, Jessa Guisse, Don Keirstead, Kelly Gill

The Habitat Restoration Process

Photo: Sarah Foltz Jordan, Xerces Society

www.xerces.org

Xerces-NRCS Conservation Partnership

- Xerces-NRCS Farm Bill Biologists
- Technical assistance for Farm Bill programs
- Developing / enhancing on-farm pollinator habitat
- Financial support for conservation
- Find out more at: www.nrcs.usda.gov

Photo Practical Farmers of Iowa

United States Department of Agriculture NRCS Natural Resources Conservation Service

xerces.org

Special thanks to PFI, our farm partners, Xerces members, and supporters

OUR FARMERS:

Agua Gorda Cooperative
Blue Gate Farm
Casey Bailey Farm
Del's Orchard
Grinnell Heritage Farm
Genuine Faux Farm
Mustard Seed Community Farm
Helgelson Farm
Heidel Family Dairy Farm
Longdale Farm
Little Hill Berry Farm
Johnson County Historic Farm
Melon Patch Herbs
Nelson Family Farm
Open Hands Farm
Prairie Drifter Farm
Paul Mugge Farm
Rabinowitz Farms
Scattergood Farm
Stone Creek Farm
Sogn Valley Farm
Spring Winds Farm
Taproot Farm
Uproot Farm
Vilicus Farms
Waxwing Farm
York Farm
AND MANY MORE.....

XERCES SUPPORT FROM:

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