



Inventory and Design Opportunities for Pollinator Habitat on Working Lands

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Farm photo: Chris Taliga

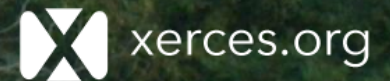
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emerald bee on
butterfly milkweed

Photo: Nancy Lee Adamson

Inventory & Design Opportunities for Pollinator Habitat Establishment

Habitat Needs

- Food, shelter, protection from pesticides

Habitat Assessment Tools

Habitat Placement in the Landscape

- Habitat opportunities on farmlands, in woodlands, and in pasture/grazing lands
 - Key practices pollinators and other beneficial insects
 - Other wildlife or buffer practices for habitat
 - Managing existing areas to improve habitat

Additional Resources

Replay, copies of slides, additional resources, & answers to questions will be posted within 1 week.

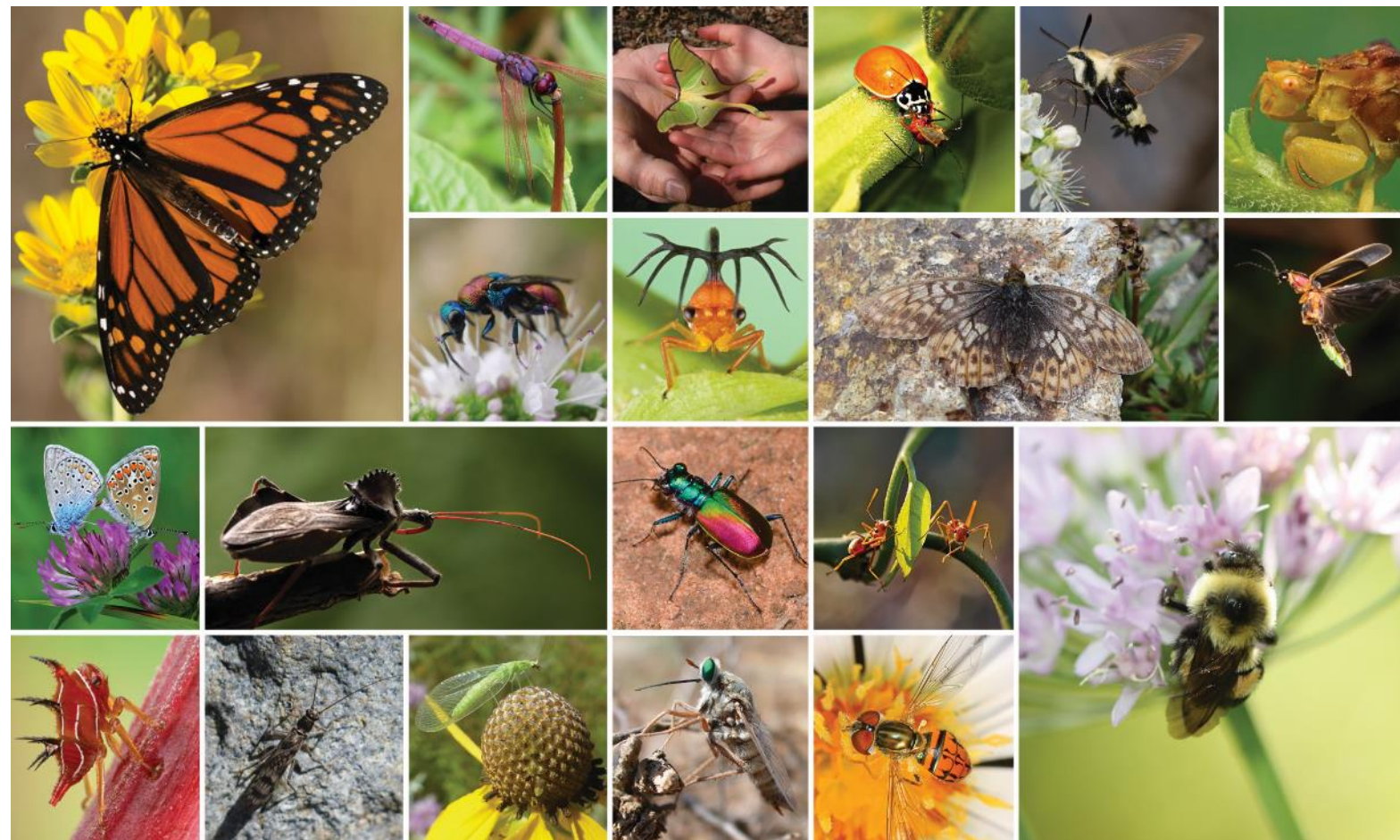
Oct 27 webinar “Pollinator Habitat Implementation: Contracting and Maintenance” (conservationwebinars.org)



Declining Insect Diversity and Abundance

An increasing number of studies are showing declines in insects around the world.

The work you are doing supporting Farm Bill Conservation Practices on the ground is important!



Forister et al. 2019, Hallmann et al. 2017, Lister and Garcia 2018, Sánchez-Bayo and Wyckhuys 2019, Saunders 2019, Thomas et al. 2019

Habitat Needs for Pollinators & Other Beneficials



Whether you are working on a large farm or in an urban area, pollinators need:

- **Food & Water**
 - Nectar, pollen, host plants
- **Shelter**
 - Nest sites, overwintering sites
- **Safe haven from pesticides**

Photo: Jennifer Hopwood

Other Beneficial Insects* That Eat Insects & Weed Seeds

“Beneficial Insects”

- AKA
 - ★ “Natural Enemies”
 - ★ “Biocontrol Agents”
- Support our ecosystems
- Regulate insect pests

Many are also pollinators:

Flies, wasps, beetles



Photo: Nancy Lee Adamson

Syrphid fly on willow, *Salix* sp. Their larvae are voracious predators of aphids, white flies, and other small crop pests.

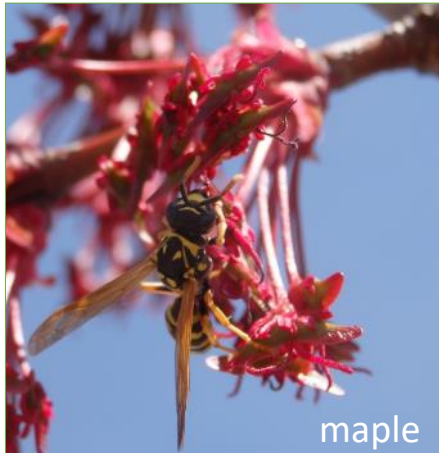
Adults depend on nectar and pollen.

*We use the term to refer to all arthropods that are beneficial for agricultural—pollinators, predators, & parasitoids—not just true insects.

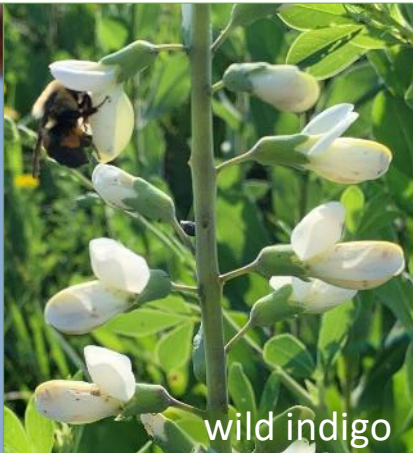


Habitat through the growing season—native trees, shrubs, wildflowers & grasses

Pollinators, predators, & parasitoids need food (nectar, pollen, or prey) & refuge*



maple



wild indigo



beardtongue



buttonbush



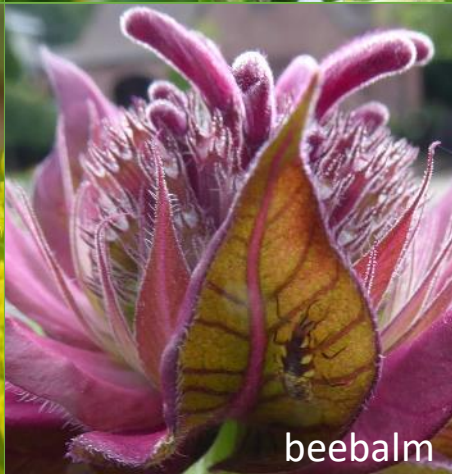
goldenrod



willow



golden Alexanders



beebalm



mountain mint



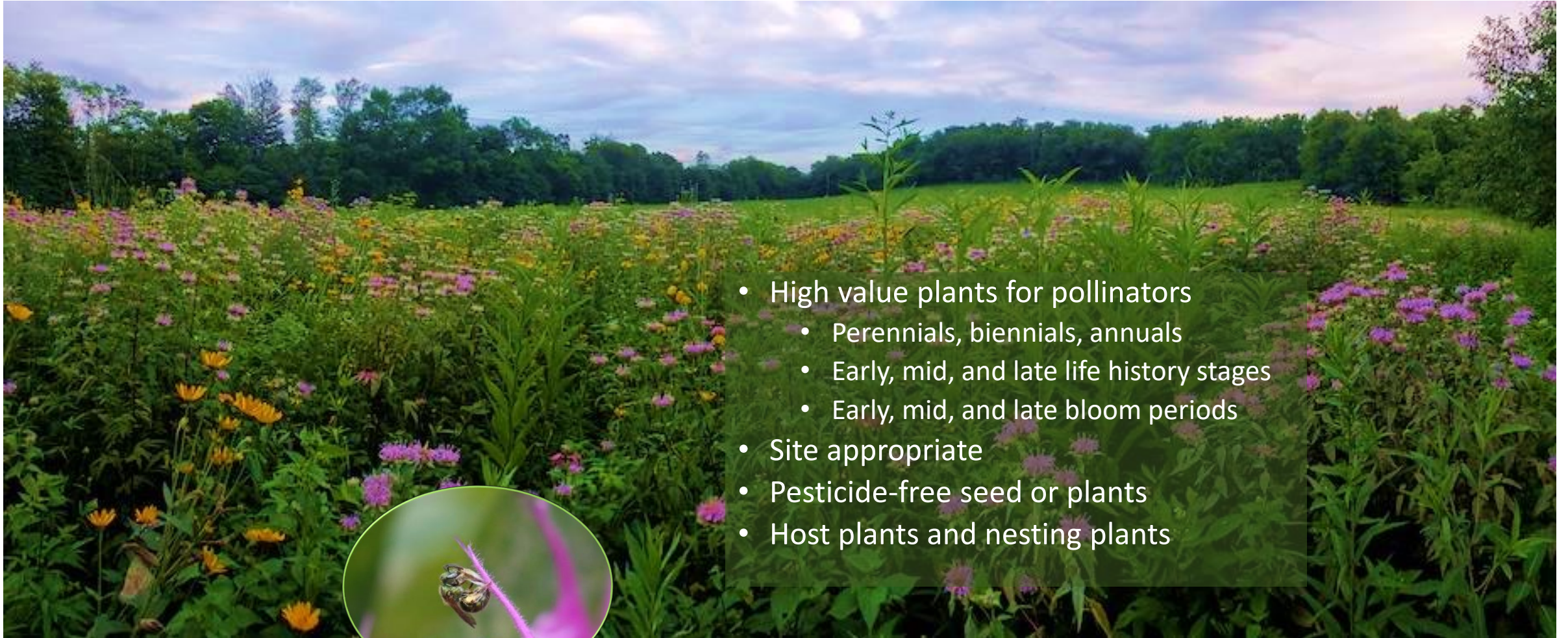
blazingstar

*refuge when crops are harvested or pesticides used

Photos: Wild indigo by Christine Taliga, buttonbush and goldenrod by Dennis Burnette, others by Nancy Lee Adamson



Plant Selection



- High value plants for pollinators
 - Perennials, biennials, annuals
 - Early, mid, and late life history stages
 - Early, mid, and late bloom periods
- Site appropriate
- Pesticide-free seed or plants
- Host plants and nesting plants

Photos: Brooks Bolyard, Ohio;
inset Barbara Driscoll



Nesting

In the ground, in cavities/twigs/snags, below lodged grasses

Within nests, use mud, leaves, resins, oils, pebbles...



Photos (clockwise from top left: small carpenter bee and wild senna leaves with leafcutter holes by Nancy Adamson; bumble bee nest by Sarah Foltz Jordan; full ground nest by Betsy Betros, close-up pollen ball and larva by Rollin Coville; green sweat bee emerging from ground-nest by Drew Marold; scoliid wasp gathering mud and rose mallow bee peaking out of ground-nest by Nancy Adamson; and green sweat bee entering wood cavity by Colleen Satyshur.

Bumble bee nesting and overwintering sites



Photo by Daniel Murdiyaso for Center for International Forestry Research (CIFOR). (Creative Commons)



Photo: Kelly Gill / Xerces Society



Photos: Sarah Foltz Jordan / Xerces Society





Nesting and Overwintering Habitat

Try to avoid disturbing more than 1/3 of a habitat at any one time



Photos: Beatriz Moisset; Christine Liloia/NC Botanical Garden; Sarah Foltz Jordan; Flickr/orangeaurochs

Many native bees are pollen specialists

They collect pollen only from one species, genus, or family



mining bee on willow by Nancy Adamson



hibiscus bee by Annette Meredith, NCNPS and
<http://www.natureonourdoorstep.com/>

- asters (various genera)
- *Cirsium*, native thistles
- *Chrysopsis*, goldenaster
- *Cucurbita*, squash
- *Helianthus*, sunflowers
- *Hibiscus*, rose mallow
- *Ipomoea*, wild potato vine
- *Oenothera*, primroses
- *Physalis*, ground cherry
- *Pityopsis*, silkgrass
- *Salix*, willows
- *Strophostyles*, fuzzy bean
- *Vaccinium*, blueberry
- *Vernonia*, ironweed
- *Viola*, violet

...many more

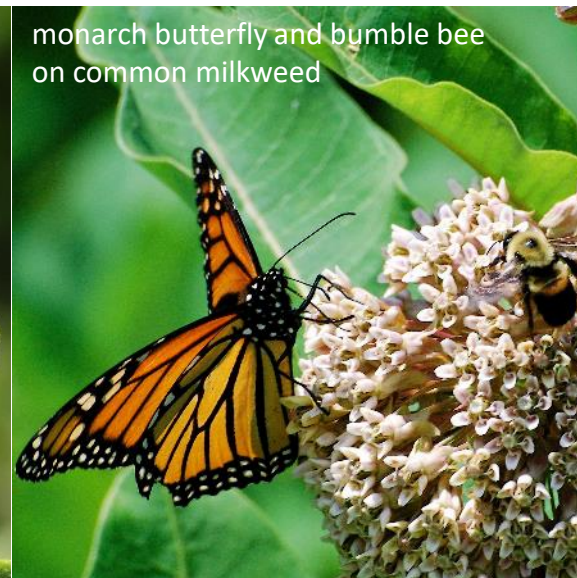
Pollen specialist bees: http://www.illinoiswildflowers.info/flower_insects/,
http://jarrodowler.com/specialist_bees.html



Host Plants for Butterfly Larvae

Include host plants for butterflies like **native** milkweeds (*Asclepias* spp.)

- Obligate host plants for monarch caterpillars. Nearly an 80% decline in monarch butterflies in last 20 years
- High quality nectar source for pollinators and other beneficial insects (lady beetles, parasitic wasps, pirate bugs, syrphid flies...)



Photos (left to right): Barbara Driscoll, Dennis Burnette, Annette Meredith, Nancy Lee Adamson

Assessing habitat and designing improvements



Photo: Anne Stine / Xerces Society

Habitat planning process:

1. Recognize existing habitat
2. Identify habitat deficiencies
3. Prioritize habitat improvements

NRCS Pollinator Habitat Assessment Tools

State Wildlife Habitat Evaluation Guides (WHEGs)*

Habitat assessment tools are in each state's Field Office Technical Guide

<https://efotg.sc.egov.usda.gov/>

Regional Monarch Butterfly WHEGs

<http://nrcs.usda.gov/monarchs>

AutoSave ON | WWHEG - Excel | Adamson, Nancy - NRCS, Greensboro, NC

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B3

WEST VIRGINIA WILDLIFE HABITAT EVALUATION GUIDE					
CROP					
1					
2					
3	Name:	Farm/Tract:			
4					
5	Address:	Tax Map and Parcel:			
6					
7	Date:	Field No.:			
8	Evaluated by:	Acres:			
9	HABITAT EVALUATION FACTORS		VALUE	BENCHMARK	PLANNED
10	A. Crop Rotation				
11	Row crops or small grain with hay meadow		20		
12	Row crops - Fallow		15		
13	Row crops - small grain		10		
14	Continuous row crops		1		
15	B. Over-Winter Cover/Crop Residue Management				
16	Percentage of crop residue				
17	No-till or minimal tillage with 60% of residue remaining over winter		20		
18	Cover crop or minimal tillage with less than 60% cover remaining at the end of winter		15		
19	No fall tillage		8		
20	Fall tillage without a cover crop		1		
21	C. Crop Management				
22	Percentage of unharvested crops or food plots				
23	10% or more of field left unharvested		10		
24	5% to 9% of field left unharvested		7		
25	1% to 4% of field left unharvested		4		
26	Entirely harvested - no standing crops remaining		0		
27	D. Non-Cropped Vegetative Cover				
28	Percentage of the field perimeter that has a "wildlife-friendly" (see Notes below) field edge				
29	75%-100%		20		
30	50%-74%		15		
31	15%-49%		5		
32	< 15% or lacking a border		1		
33	E. Plant Composition of Non-Cropped Vegetative Cover				
34	Quality of adjacent habitat				
35	100% of adjacent habitat is native plant cover of grasses, forbs, shrubs, or woodlands		10		
36	At least 50% of adjacent habitat is native plant cover and less than 5% infested by invasives		8		
37	Less than 50% of the adjacent habitat is native cover and less than 15% invasive cover		6		
38	Plant cover includes native or introduced species with less than 40% invasive cover		4		
39	More than 40% invasive plant cover		2		
40	F. Distance to Nesting and/or Protective Cover				
41	Average distance, measured from the center of the field, to the nearest wildlife cover habitat				
42	< 150 feet		15		
43	Between 150 and 300 feet		11		
44	Between 300 and 600 feet		7		
45	More than 600 feet		0		
46	G. Distance to water				
47	Distance to nearest water source within 1500 feet				
48	< 150 feet		5		


Instructions | Pasture | Crop | Shrub-Other | Forest | Sum Wkst | Cerulean Warbler | Golden-winged Warbler

Transfer Client Information to All Other Worksheets

Clear Client Information from this Worksheet

Print Worksheet

Clear Evaluation Factors and Field #s



USDA NRCS MONARCH BUTTERFLY HABITAT EVALUATION GUIDE (WHEG), AND DECISION SUPPORT TOOL: GREATER APPALACHIAN MOUNTAINS REGION EDITION 1.0 (SEPTEMBER 2018)

Greater Appalachian Mountains Region Monarch Butterfly WHEG: Version 1.0

ABSTRACT
The Greater Appalachian Mountains region of the U.S. is a mosaic of forest, pasture, cropland and old-field habitats. Many of these habitats lack the forb species richness and abundance required by breeding and foraging monarch butterflies. This monarch wildlife habitat evaluation guide is applied by conservation planners when monarch butterfly habitat is identified as a resource concern. This planning guide includes a quality assessment protocol that rates the habitat as either poor, fair, good, or excellent.

USDA
NRCS; Lee.Davis@ftw.usda.gov
Developed by NRCS Central National Technology Support Center (CNTSC), Fort Worth, TX with the assistance of the NRCS Biologists in Kentucky, Maryland, New York, Pennsylvania, and West Virginia. Contact Lee.Davis@ftw.usda.gov.



Other tools for assessing habitat, designing improvements, & educating landowners

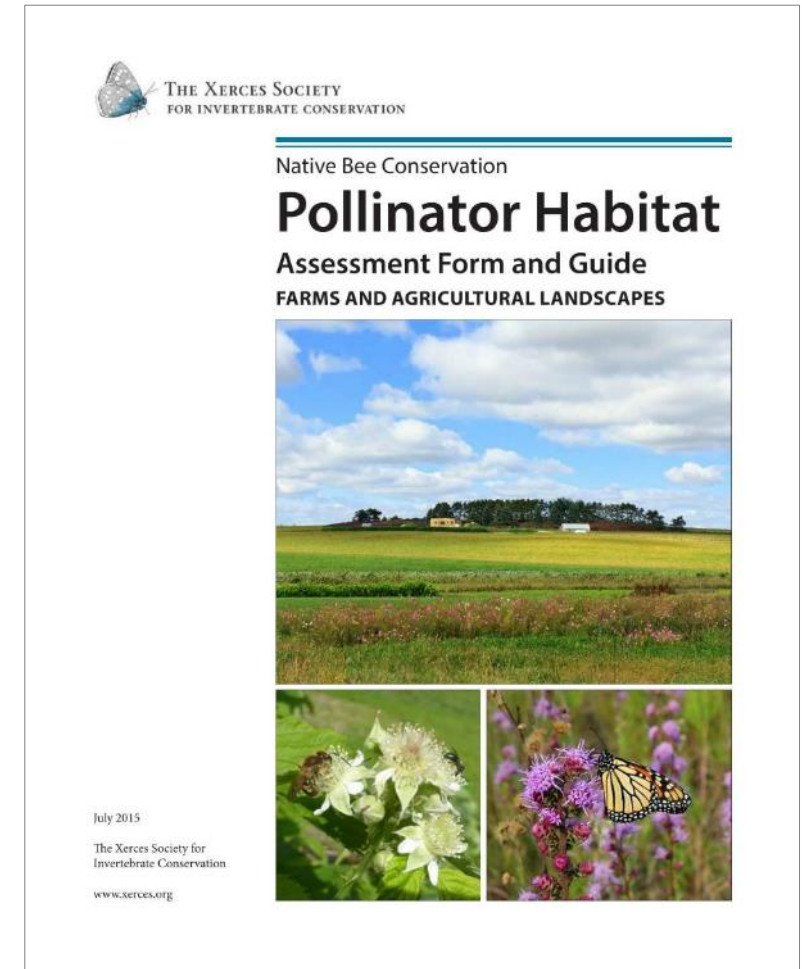
- Xerces' Pollinator Habitat Assessment Form and Guide for Farms and Agricultural Landscapes*
- Quantify habitat characteristics
 - Landscape-level
 - Site-level

Total Score for Habitat Assessment

The figures entered into this summary table will be calculated during completion of the assessment.

	BEFORE	AFTER
Section 1: Landscape Features (<i>max score 20</i>)		
Section 2: Farmscape Features (<i>max score 45</i>)		
Section 3: Foraging Habitat (<i>max score 40</i>)		
Section 4: Native Bee Nesting Habitat (<i>max score 45</i>)		
Section 5: Farm Management Practices (<i>max score 105</i>)		
OVERALL SCORE		

*Also available for **Natural Areas and Rangelands**, as well as **Yards, Gardens, and Parks**
<https://xerces.org/pollinator-conservation/habitat-assessment-guides/>



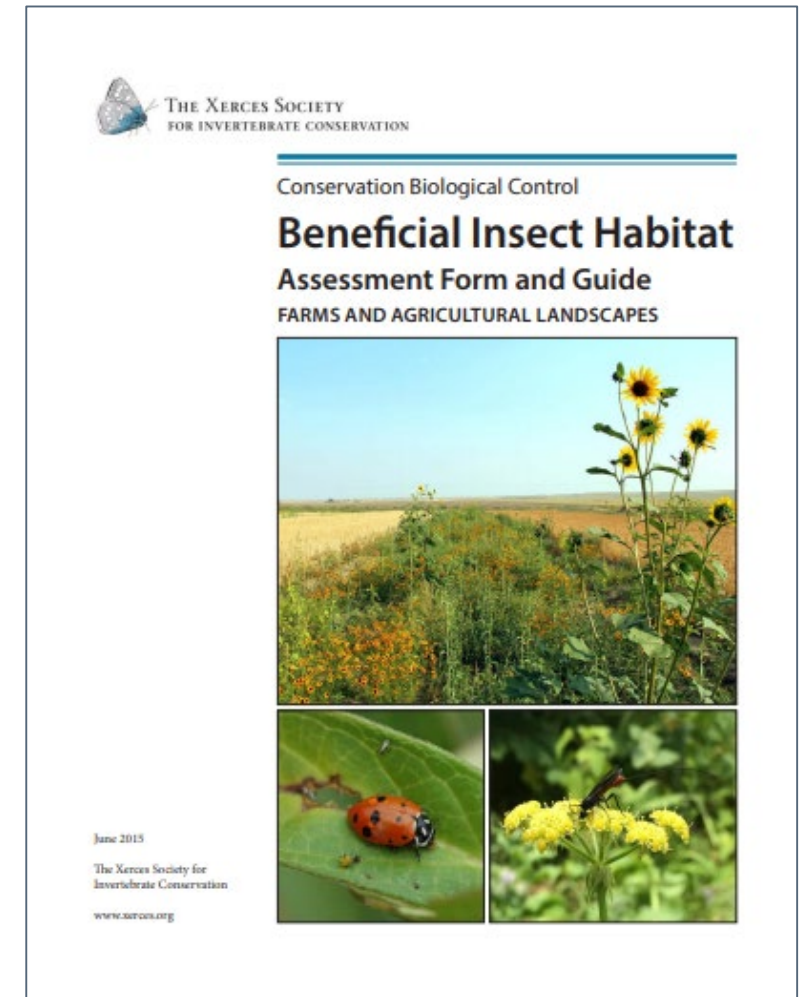
Other tools for assessing habitat, designing improvements, & educating landowners

- Xerces' Beneficial Insect Habitat Assessment Form and Guide for Farms and Agricultural Landscapes (pollinator forms also available)
- Quantify habitat characteristics
 - Landscape-level
 - Site-level

Total Score for Habitat Assessment

The figures entered into this summary table will be calculated during completion of the assessment.

	BEFORE	AFTER
Section 1: Landscape Features (<i>max score 20</i>)		
Section 2: Farmscape Features (<i>max score 40</i>)		
Section 3: Foraging Habitat (<i>max score 40</i>)		
Section 4: Shelter & Overwintering Habitat (<i>max score 40</i>)		
Section 5: Management Practices (<i>max score 80</i>)		
OVERALL SCORE (<i>max score 220</i>)		



<https://xerces.org/pollinator-conservation/habitat-assessment-guides/>

Site History: Is planting appropriate?

What is the history of the site?

Was it previously cultivated?

If not, the **existing seed bank** may be the best seed source.

For help determining if planting is appropriate, see Norman Melvin's "decision sequence keys" in *Wetlands Restoration, Enhancement, and Management*

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010838.pdf



Cut stump of eastern red cedar with high quality native prairie uphill

Design and Planning Habitat in the Landscape



Pollinator Habitat Examples

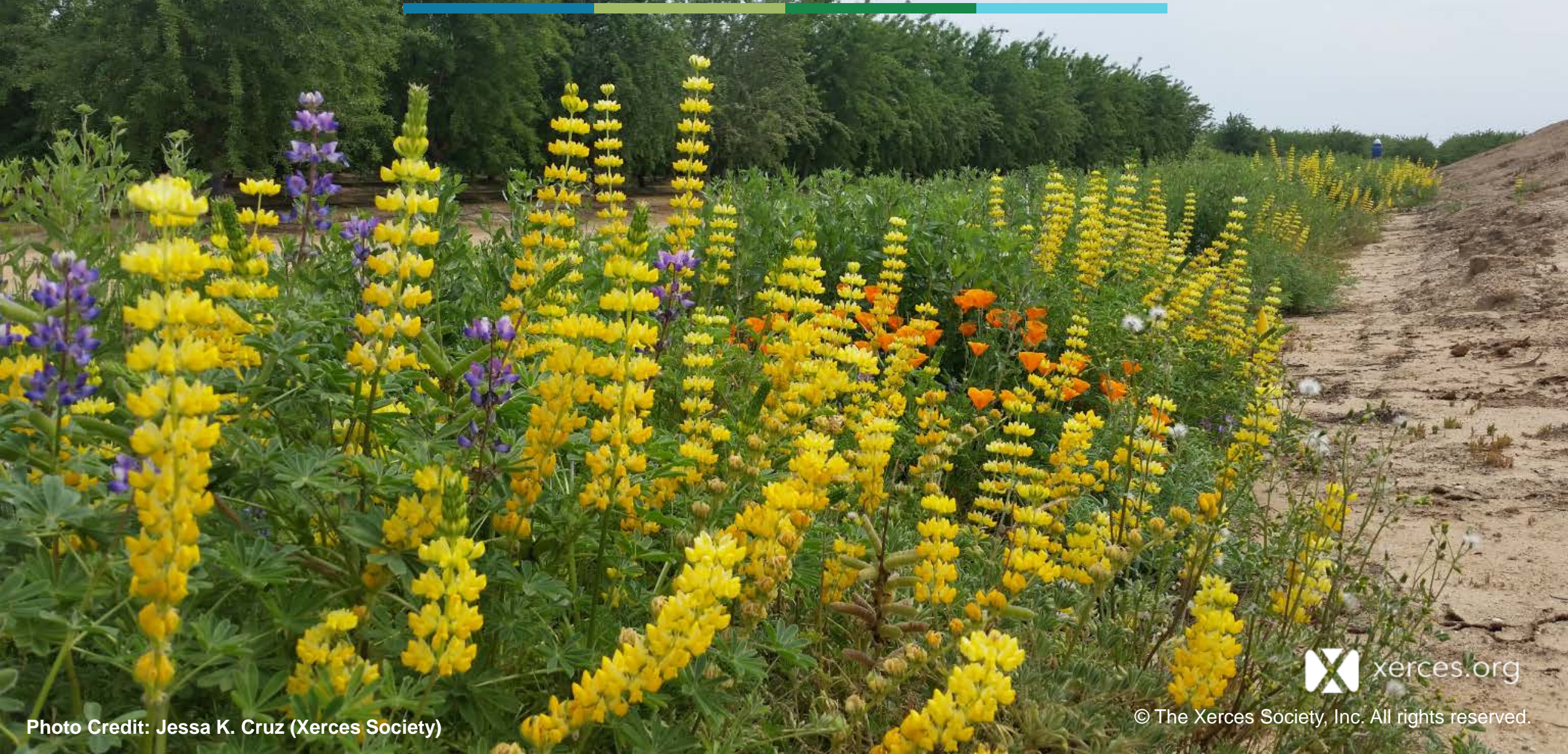
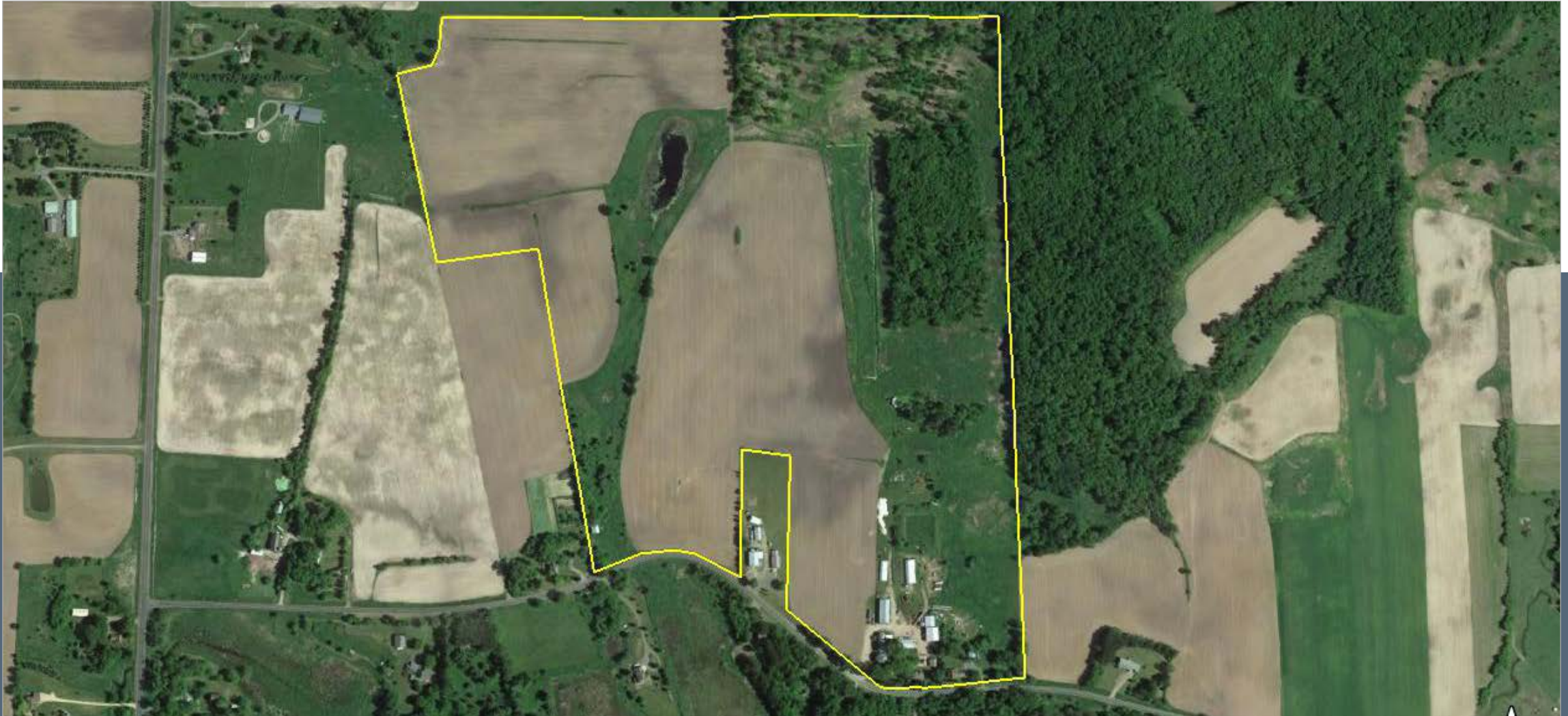


Photo Credit: Jessa K. Cruz (Xerces Society)



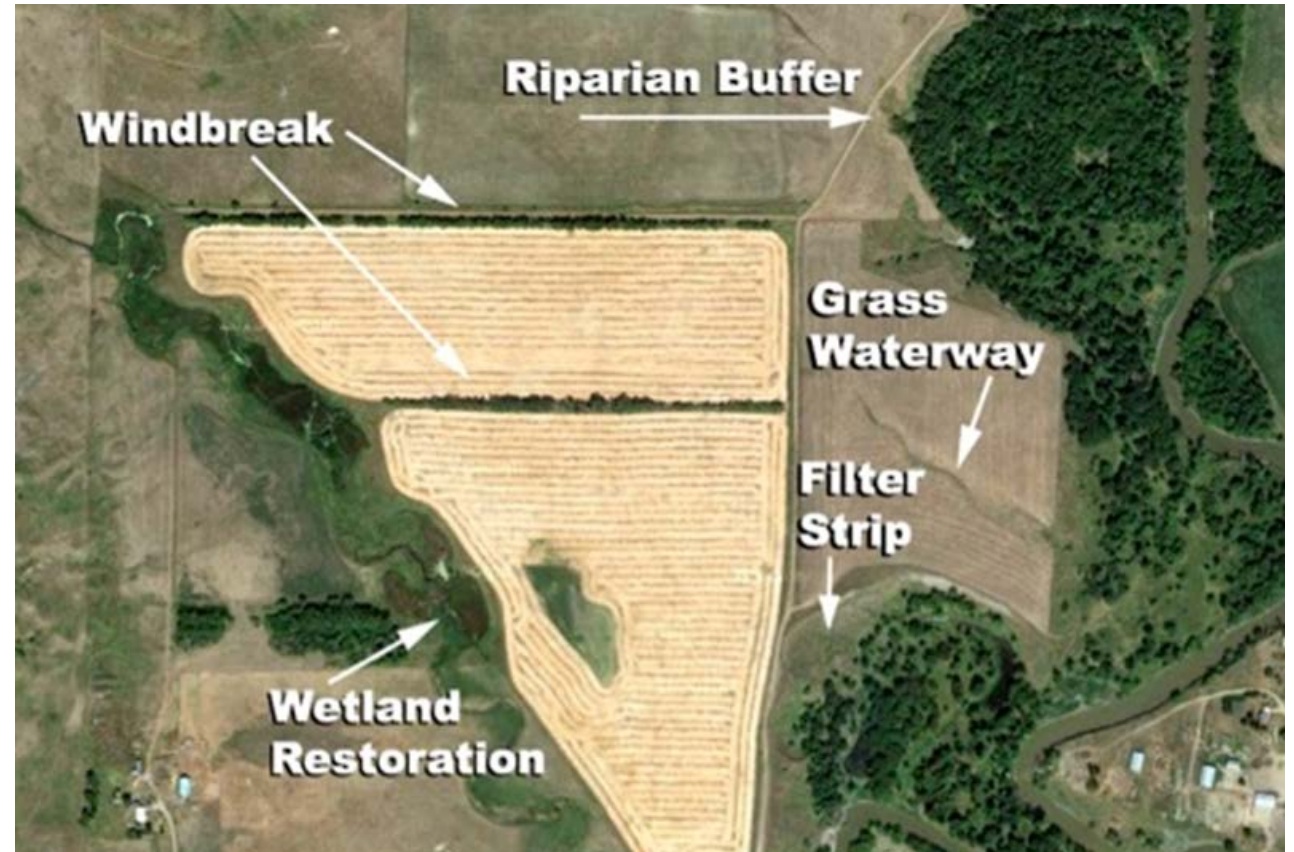
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Many Habitat Options in the Farm Landscape



Design for Multiple Benefits

- Water quality protection
 - Sediment capture
 - Nutrient capture
- Buffer against adjacent pesticide use
- Screening, noise reduction
- Wildlife habitat and corridors
- Weed seed capture
- Increase crop isolation distances
- Beautification



Habitat Examples: Wildlife Habitat Planting (420)



Habitat Examples: Wildlife Habitat Planting (420)



Habitat Examples: Wildlife Habitat Planting (420)



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Photo by Kitty Bolte (Xerces Society), Quincy, WA



July

Habitat Examples: Wildlife Habitat Planting (420)



May

Photos: Eric Mader, Xerces Society



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Photos by Eric Lee-Mader (Xerces Society)

A photograph of a diverse wildflower field. The foreground and middle ground are filled with various species of flowers, including bright yellow daisy-like flowers, clusters of small white flowers, and several blue flowers. The plants are growing in a field of tall green grasses. In the background, there is a line of trees and a cloudy sky. A semi-transparent grey box with a blue and green horizontal bar below it contains the text.

In some states...
Conservation Cover (327)



Habitat Examples: Conservation Cover (327)

Klickitat Canyon Vineyard, Washington



Photos by Eric Lee-Mader (back) and Robin Dobson (inset)



Habitat Examples



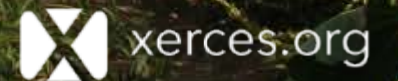
Pivot corner planted with spirea, rose and snowberry



Habitat Example: Field Border (386)



Photo by Jennifer Hopwood (Xerces Society)



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Habitat Example: Field Border (386)



Photo by Karin Jokela (Xerces Society)



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Habitat Example: Filter Strip (393)

Xerces native plant filter strip, California

Captures sediment & excess nutrients, increases infiltration to reduce flooding

Habitat Example: Filter Strip

Filter Strips
(NRCS 393)
Riparian
Herbaceous Cover
(NRCS 390)

Native plant filter strip,
California



Photo: John Anderson (Hedgerow Farms)



Habitat Examples: Hedgerows (422)

California Hedgerow

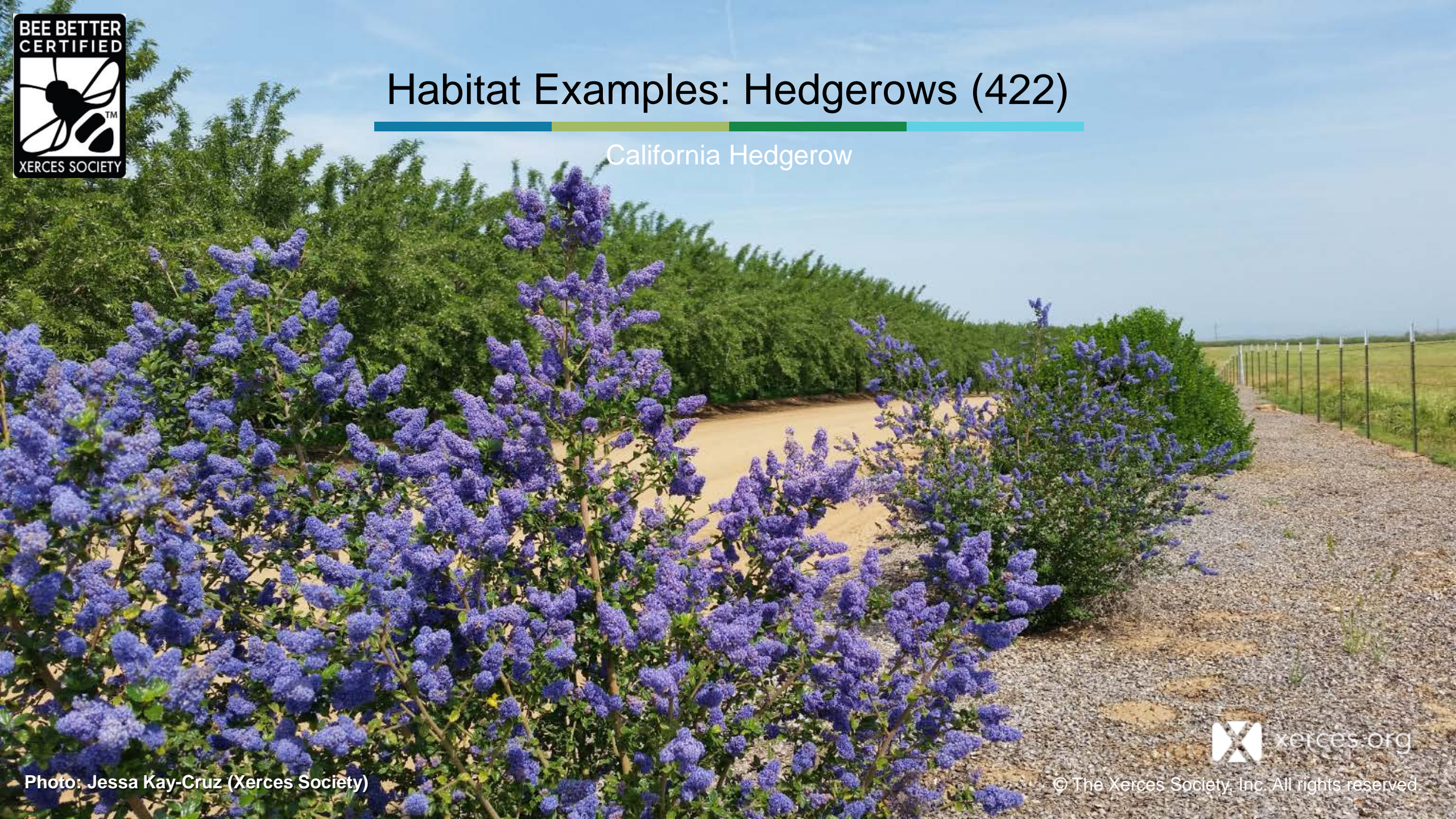


Photo: Jessa Kay-Cruz (Xerces Society)

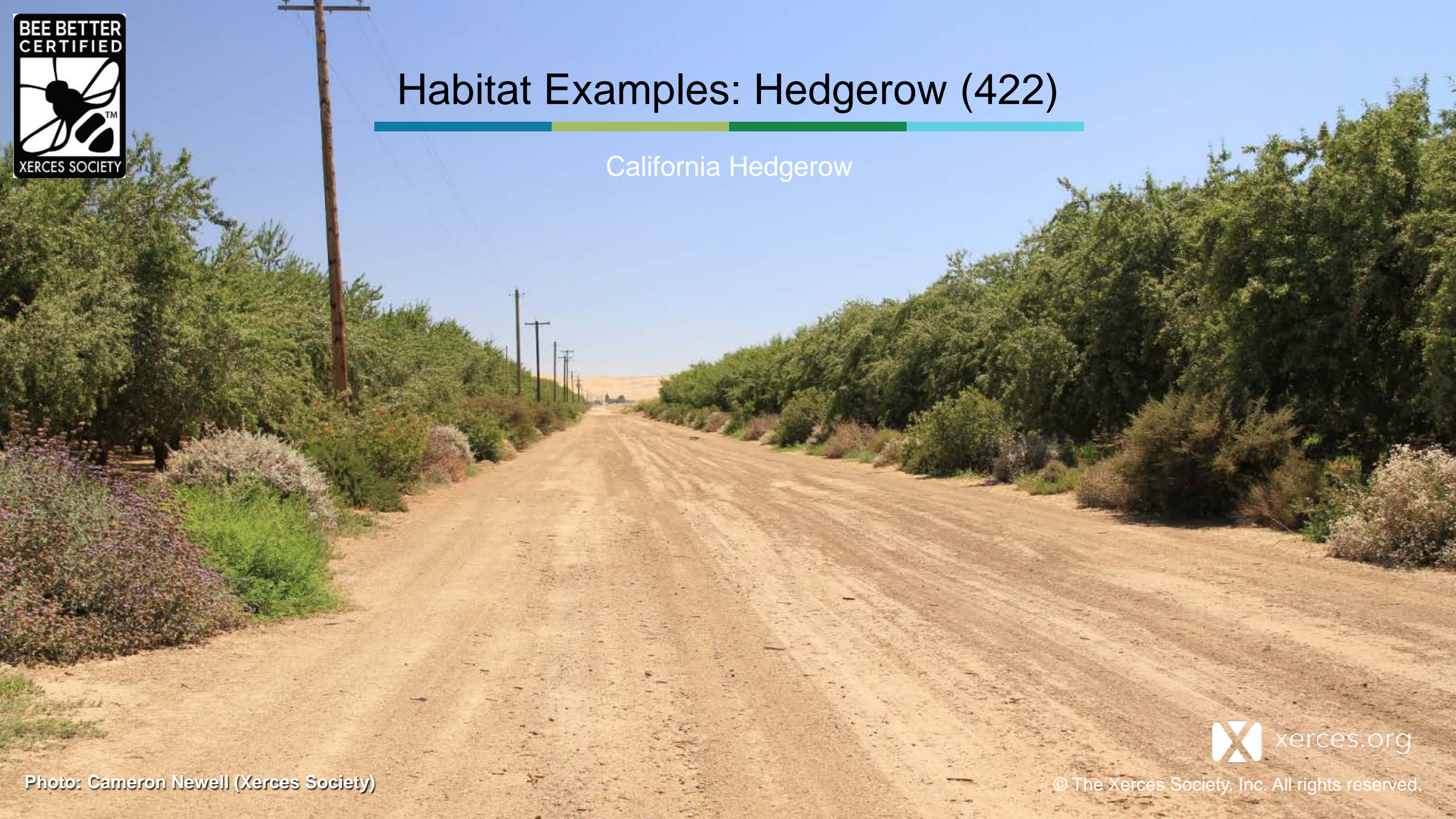


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Habitat Examples: Hedgerow (422)

California Hedgerow



Habitat Examples: Hedgerow (422)



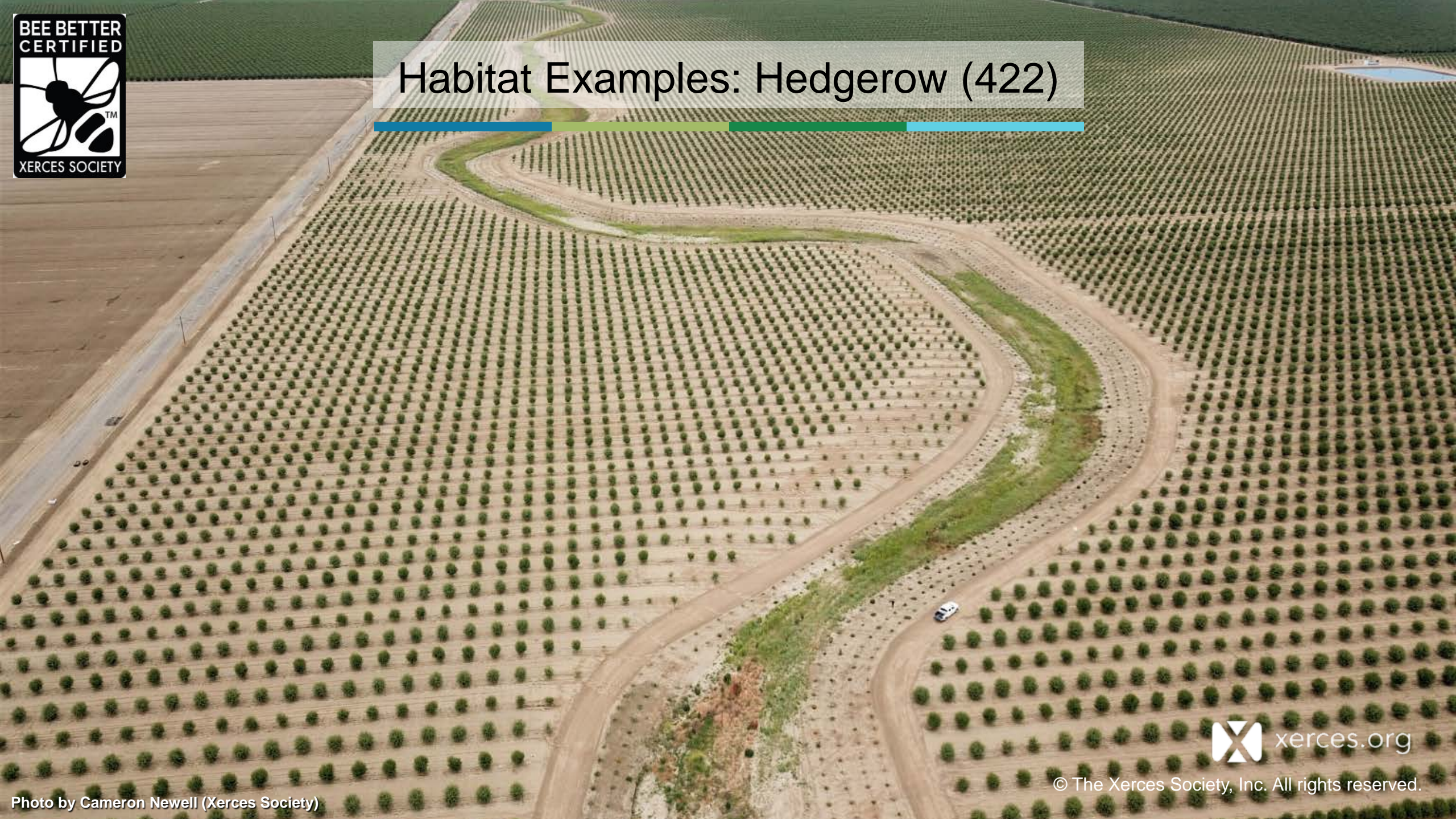
Habitat Examples: Hedgerow (422)

Eastern Oregon hedgerow between cherry orchard and road.





Habitat Examples: Hedgerow (422)



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Photo by Cameron Newell (Xerces Society)

Habitat Examples: Hedgerow (422)



Habitat Examples: Hedgerow (422)





Riparian Cover (390, 391, or 580)



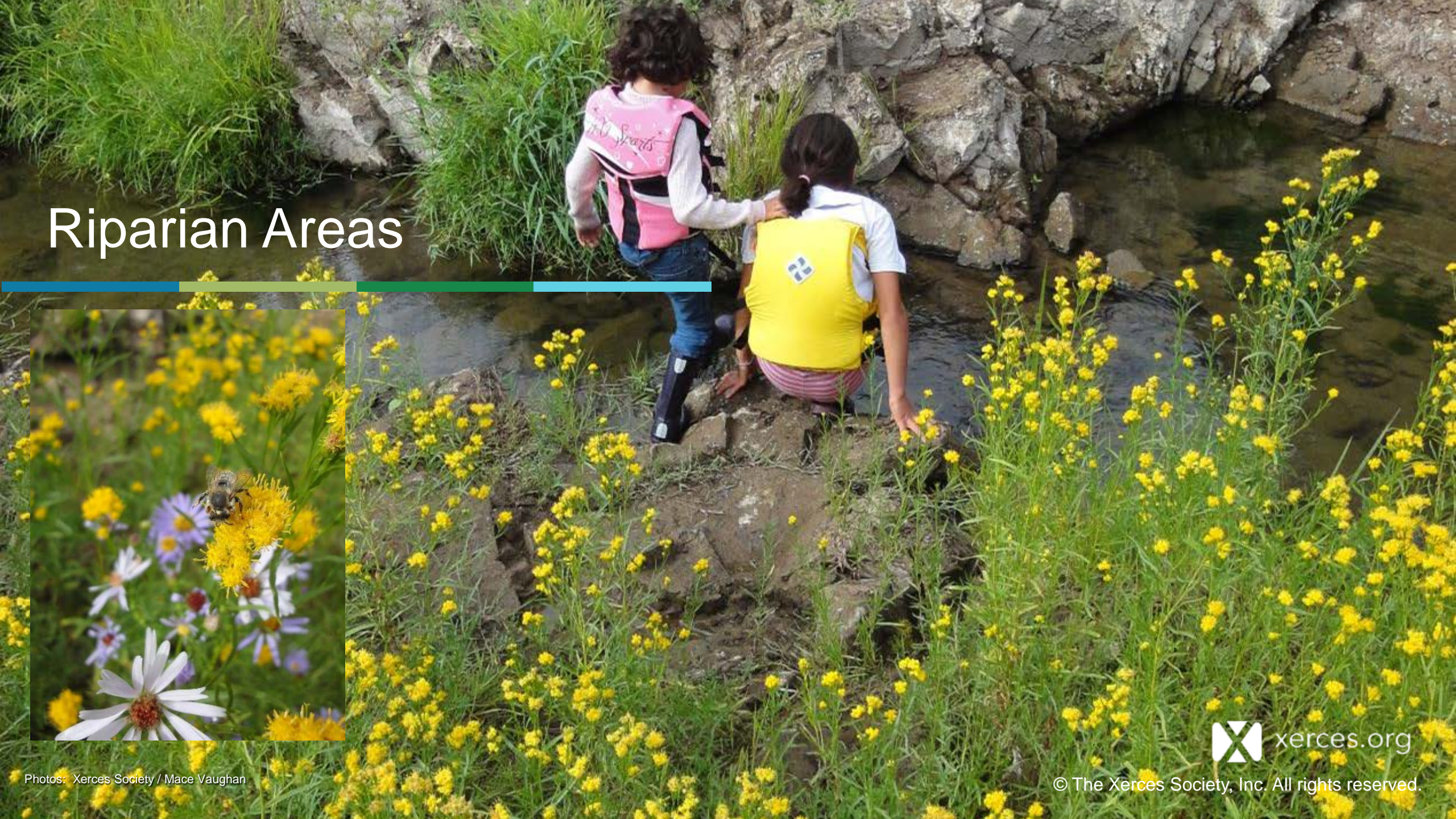
Riparian Cover (390, 391, or 580)



Male willow plants!

Photo: USDA, Nancy Lee Adamson (inset photos of willow)

Riparian Areas



Habitat Example: Wetlands



Photo by Jessa Kay Cruz

Seasonal Wetland Shoshone, ID

- Organic Farm
- Planted with grasses and showy milkweed

Habitat Example: Wetlands

Opportunities in the surrounding uplands as well as the wetlands themselves

- Often helps with late bloom!



Habitat Example: Cover Crops (340)

Cover Crop (340) – Can include a mixture of flowering forbs such as clover, mustard, buckwheat, phacelia, or sunflower.

Cover Cropping for Pollinators and Beneficial Insects



Using cover crops can bring yields to levels the Midwest has not known. Photo courtesy of USDA Natural Resources Conservation Service. Photo credit: USDA

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SOIL AND WATER QUALITY BENEFITS FROM COVER CROPS
 As soon as they learn about cover crops in northern Indiana, and in a number of other cover crop regions, the benefits of pollinator and beneficial insect management. Like many farmers, their approach to cover cropping began with an interest in soil health and quality given the ever-growing search for better yields as they recognized the additional benefits cover crops could provide.

"The need to improve pollinator concentrations at the field level is," Doug says. "I agree that using a small, well-timed crop, like an early crop, can avoid concentration areas that would cause the cover operation."

While the Indiana has established permanent cover with cover crops around many of their fields to provide a habitat of habitat throughout the farm, other cover crops are being used in the fields that make their operation a rich landscape for bees and other beneficial insects.

The commitment to cover cropping is having about a 100% positive impact. Plus, no-till and no-till are just a few of the Indiana regular crop that other regions or enough benefit from being pollinated. And, because of their commitment to integrating habitat for wild pollinators throughout their landscape, the Indiana have even needed to bring heavy bee hives into the farm for pollination. Instead, a walk through their fields quickly reveals an abundance of wild pollinators, including bees, wasps and more—all supported by the farm's habitat. A farm's ability to support the most pollinator community provides security, especially if managed farms has been become more or expensive.

In addition to supporting the pollinator community, cover crops have many benefits and uses on a farm. These crops have growing season and wintering and benefit to managing weeds and serving as an additional source of income when part of a double crop system. With cover



Habitat Example: Cover Crops (340)

Clover cover crop under young orchard.

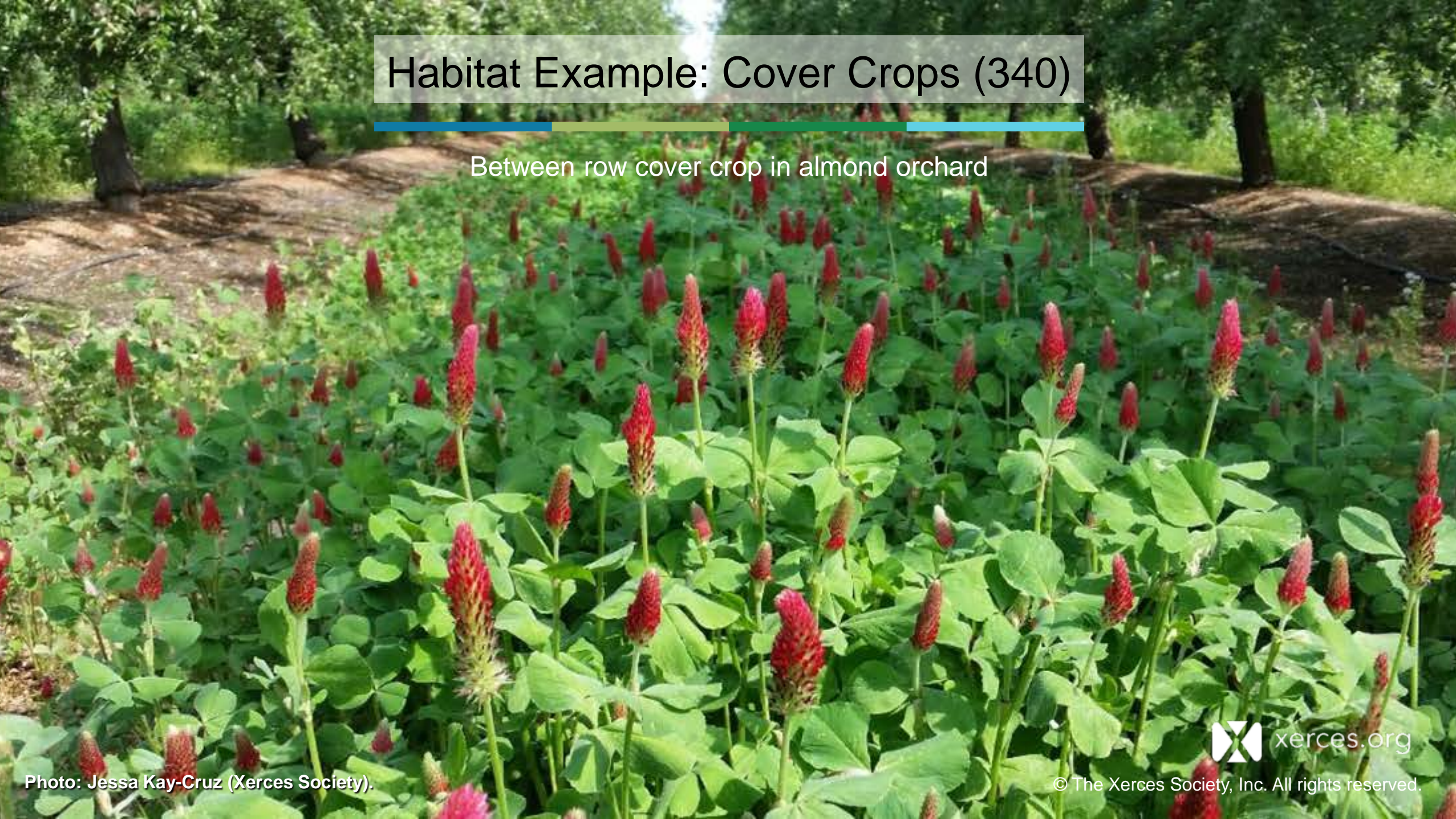


Photo courtesy of USDA Natural Resources Conservation Service. / Public Domain

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Habitat Example: Cover Crops (340)

Between row cover crop in almond orchard



Habitat Example: Insectary Strips

Cover Crops and
Insectary Strips
(NRCS: 340)

Crimson clover inter-
cropping with
vegetables, North
Carolina



Photo: Debbie Roos (North Carolina State University)

Habitat Example: Insectary Strips

Cover Crops and
Insectary Strips
(NRCS: 340)

Annual Insectary Strips

- Temporary mass wildflower plantings between row crops
- Low cost, quick-growing flowers



Photo: Jessa Cruz (Xerces Society)

Habitat Example: Insectary Strips

Insectary Strips and harvestable flowers

Annual Insectary Strips

- Insectary plants can be used in cut flower plots



Photo: Sarah Foltz-Jordan (Xerces Society)

Habitat Example: Alley Cropping (311)

- Diverse forbs and shrubs may be planted in rows for cut flowers, berry production, or the nursery market.
- A legume forage crop between rows will fix N and provide nectar and pollen.



Early Successional Habitat: Edge Feathering

Photo by Mace Vaughan (Xerces Society)

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Early Successional Habitat: “Daylight” the seed bank


Associated NRCS practices:

- 314 Brush Management
- 315 Herbaceous Weed Trmt
- 338 Prescribed Burning]*
- 409 Prescribed Forestry
- 528 Prescribed Grazing
- 643 Restoration and Management of Rare and Declining Habitats
- 647 Early Successional Habitat Development or Management
- 659 Wetland Enhancement
- 657 Wetland Restoration
- 644 Wetland Wildlife Habitat Management
- 381 Silvopasture Establishment

Carolina Bay in NC restored
with thinning & burning




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Early Successional Habitat:
“Daylight” the seed bank

Associated NRCS practice:
314 Brush Management



Early Successional Habitat: “Daylight” the seed bank

Associated NRCS practice:
314 Brush Management

Oklahoma invasive eastern red
cedar removal



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Habitat Examples: Silvopasture



Photo: Mack Evans

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Habitat Examples: Grazing Management (native range)



Photo: Anne Stine (Xerces Society)

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Habitat Examples: Grazing Management (pasture)

Photo: Thelma Heidel-Baker (Xerces Society)

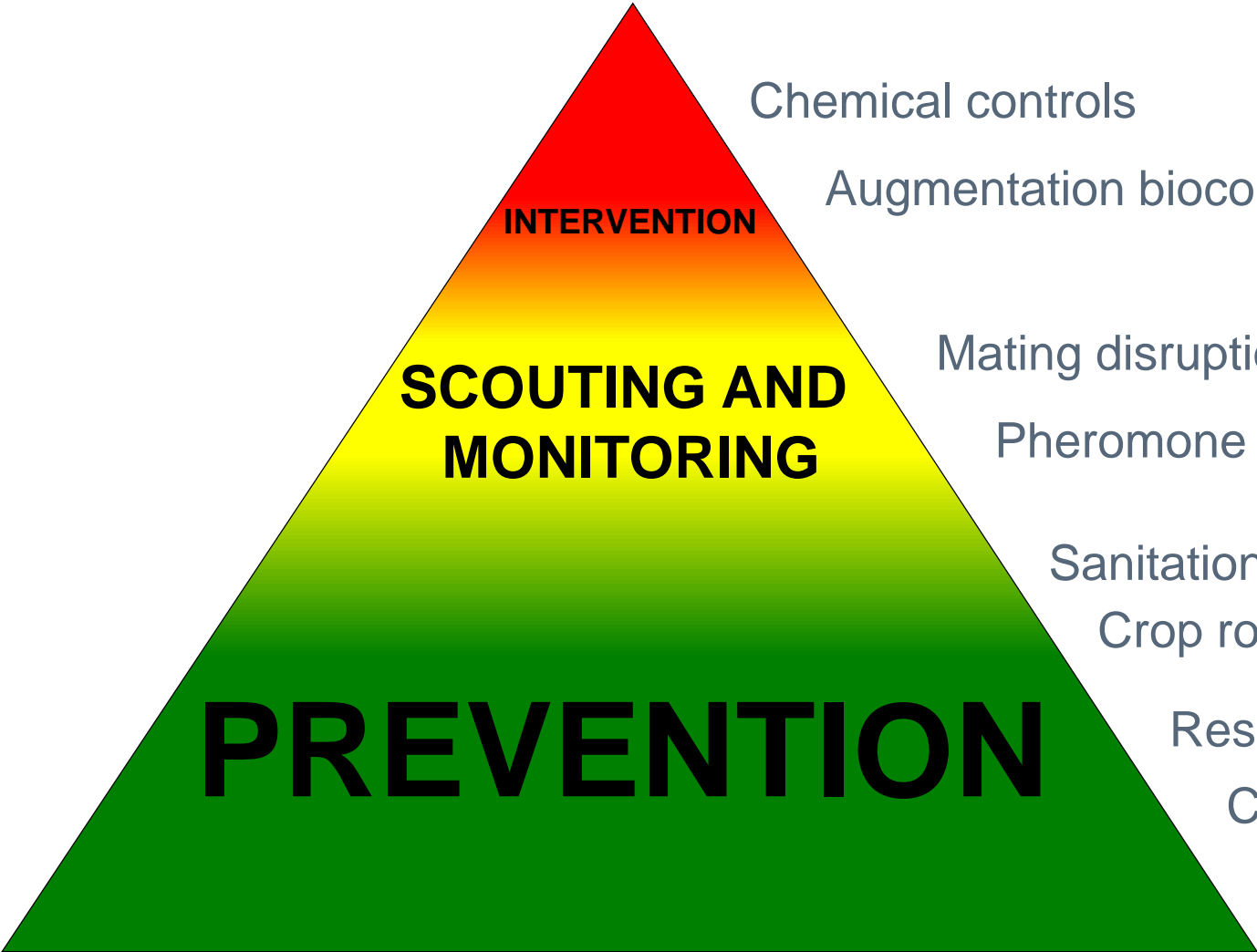
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Habitat Examples: Protect or Manage Quality Habitat

Integrated Pest and Pollinator Management (IPPM via 595)



Chemical controls

Augmentation biocontrol

INTERVENTION

SCOUTING AND MONITORING

Mating disruption

Pheromone traps

Sanitation

Crop rotation

PREVENTION

Resistant varieties

Conservation biocontrol

Optimum plant health



Managing Pesticide Risks: Protect Habitat Areas

Establish buffers or setbacks

- Unsprayed area (30' to 60')

Pesticide drift barriers

- 'Non-habitat' vegetative barriers (eg. conifers; dwarf Italian cypress)

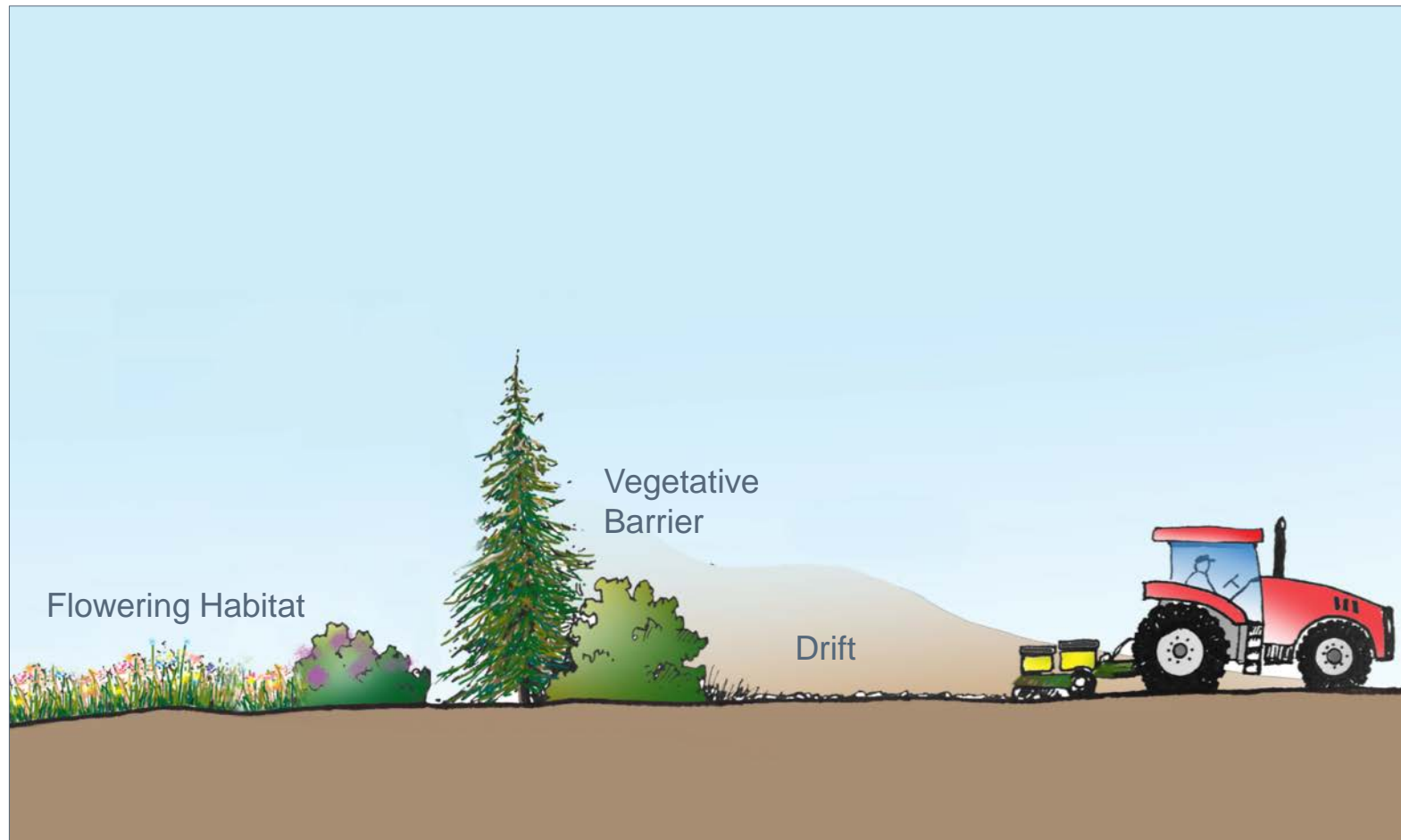
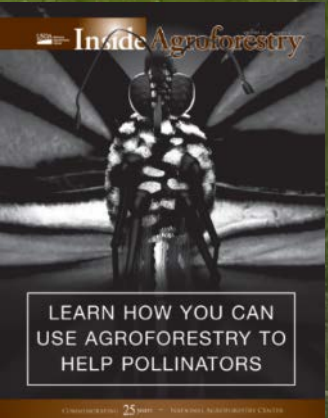


Illustration: USDA National Agroforestry Center

Habitat Examples: Protect Quality Habitat



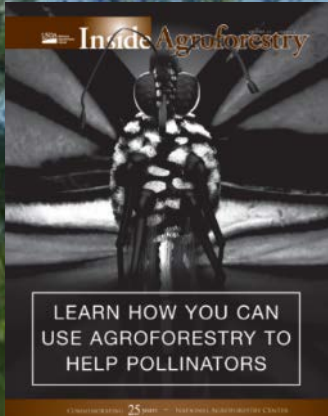
Adamson et al. 2012 . Windbreaks designed with pollinators in mind. Inside Agroforestry 20(1): 8-10. Available at: <http://nac.unl.edu/documents/insideagroforestry/vol20issue1.pdf>



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Photo by Kelly Gill (Xerces Society)

Habitat Examples: Protect Quality Habitat



Introduction: Pesticides are toxic chemicals used to manage weeds, diseases, and crop pests. Pesticide use should be based on the importance of managing health populations of crop pollinators and natural enemies of crop pests that can be harmed by pesticide applications. There will always be some degree of insecticide use, and many of the crop production benefits from pest control provided by pesticides are justifiable. Still, there are many ways to manage populations of native bees and other beneficial insects in field borders and other agroforestry systems. Today's agroforestry systems, with their mix of habitats, can help reduce the use of pesticides and provide a natural habitat for crop pollinators and other beneficial insects. Native bees, however, are important crop pollinators when habitat is available and when they are protected from pesticides, providing the majority of pollination for some crops and insects for crops pollinated primarily by honey bees. Therefore, when allowed to thrive, natural enemies of crop pests help prevent pest numbers from reaching the point of control.

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>



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Habitat Examples: Manage Existing Habitat

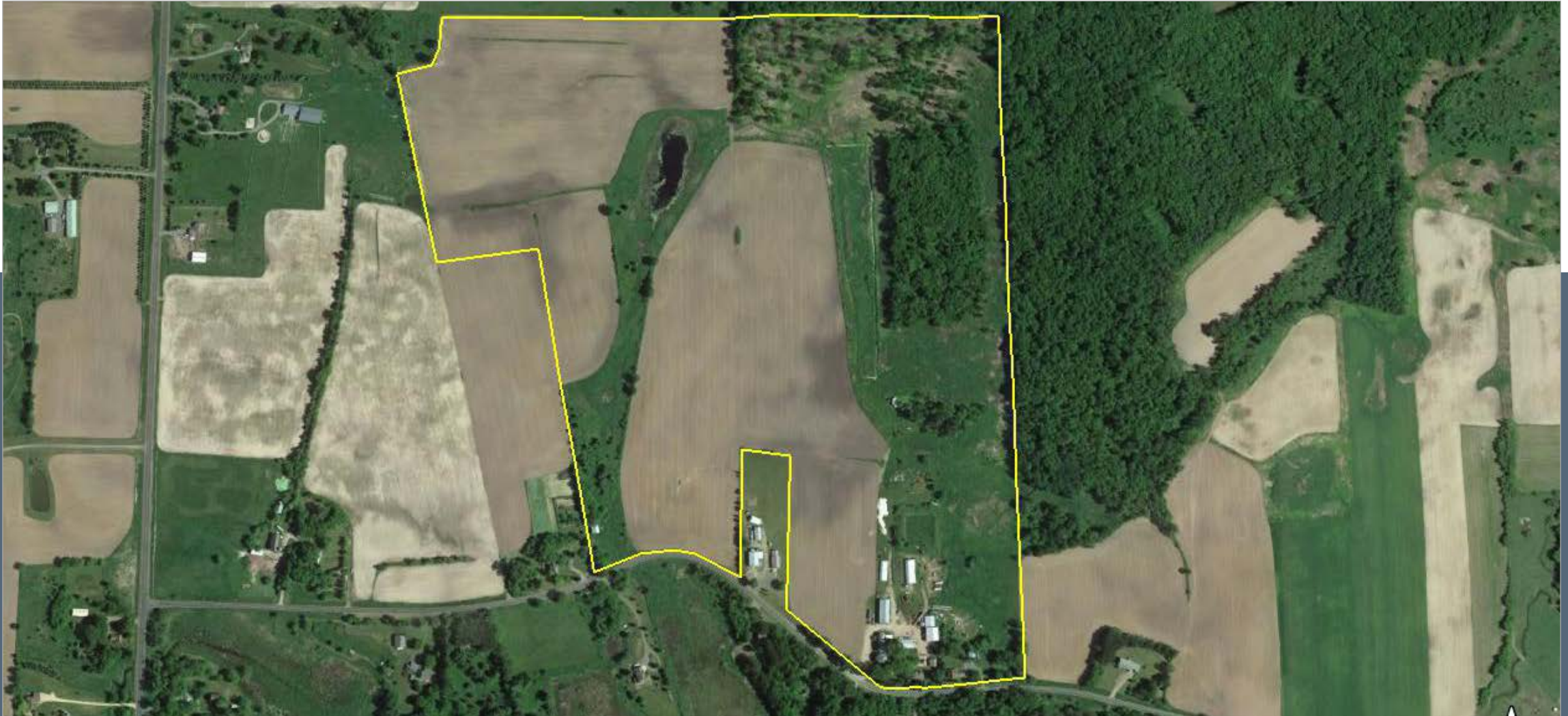


Manage natural areas with pollinators in mind

- Remove invasive species
- Provide intermediate disturbance (fire, grazing, haying), balancing timing and scale with needs of the plant community and pollinators present



Many Habitat Options in the Farm Landscape



What did I forget?

Resources



Photo: Rich Hatfield (Xerces Society)

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Farming for Pollinators (leaflet)

1. Riparian buffers
2. Fallow fields
3. Hedgerows/windbreaks
4. Natural/undeveloped areas
5. Snags
6. Protection from pesticides
7. Gardens
8. Temporary bee pasture
9. Ponds/ditches
10. Field & road edge
11. Cover crops
12. Artificial nests



1 Riparian Buffers
Food and Shelter
Habitat along streams should contain a diversity of plants. Willows, in particular, will nourish bumble bee queens in the spring so that large numbers of workers are available when crops begin to bloom.

2 Fallow Fields
Food and Shelter
Even small areas of fallow or unproductive land, especially when sown with native flowers, can offer important resources for native bees.

3 Hedgerows or Windbreaks
Food and Shelter
Creating hedgerows with a wide variety of plants that have overlapping flowering periods will provide bee habitat throughout the growing season and strengthen populations of natural enemies of crop pests.

4 Natural or Undeveloped Areas
Food and Shelter
Nearby natural habitat may harbor all the native bees needed to pollinate your farm's crops. Consider inviting your neighbors to help with safeguarding these habitats.

5 Snags
Shelter
Keeping dead trees standing provides shelter for native bees. Some solitary bees build nests in abandoned beetle tunnels in snags.

6 Pesticides
Insecticides kill pollinators outright, and herbicides may destroy plants important for both food and shelter. It is preferable to minimize your use of pesticides and to carefully choose products and application methods.

7 Gardens
Food
A vegetable, flower, or herb garden, with a diverse assortment of plants, is a good source of food for pollinators. Be wary of fancy hybrids that may produce little pollen or nectar.

8 Temporary Bee Pasture
Food
Planting fields with canola or other inexpensive seed—or allowing crops such as lettuce, kale, basil, and broccoli to bolt—will supply bees with nectar and pollen.

9 Ponds and Ditches
Food and Shelter
When you create a pond or ditch, leave the pile of excavated soil. Ground-nesting bees may build nests in stable, bare areas of this mounded earth. Planting clumps of native flowers will attract more pollinators.

10 Field and Road Edges
Food and Shelter
Leave areas next to fields untilled and unsprayed to support flowering plants and provide nest sites for ground-nesting bees.

11 Cover Crops
Food
Flowering plants—certain legumes in particular—can be included in cover-crop mixes to supply pollen and nectar.

12 Artificial Nests
Shelter
Building houses for wood-nesting bees is another way to increase the number of native bees in your landscape.

https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_042805.pdf



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Additional Resources: The USDA-NRCS

Natural Resources Conservation Service

- Technical Assistance
- Financial Support for Conservation

Find out more at:

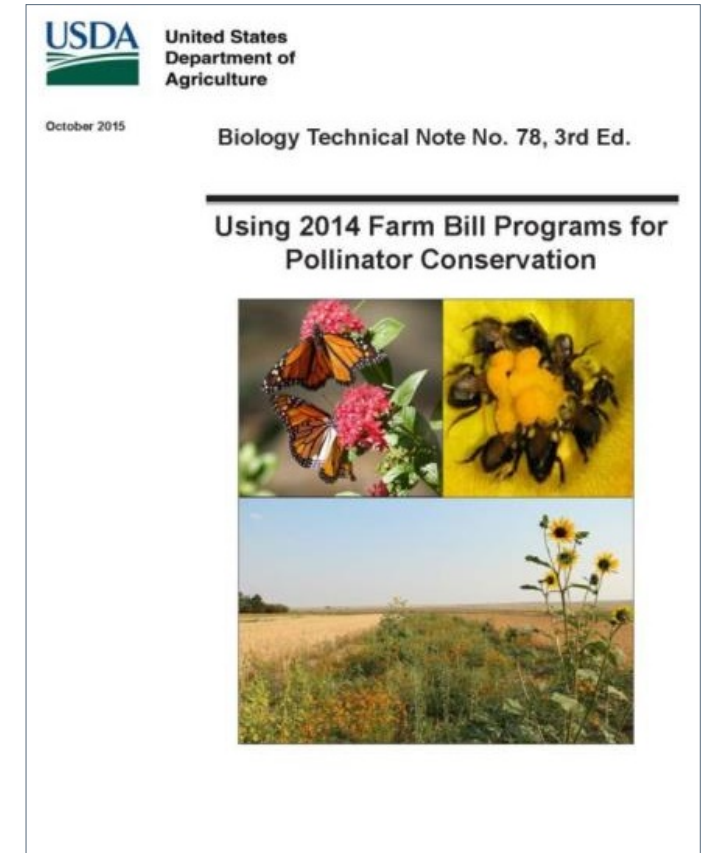
www.nrcs.usda.gov

<http://plants.usda.gov/>

[//plants.usda.gov/pollinators/NRCSdocuments.html](http://plants.usda.gov/pollinators/NRCSdocuments.html)



- **Core Programs for Pollinators**
 - EQIP, CSP, ACEP, CRP
- **Tech Note 78**
 - Using Farm Bill Programs for Pollinator Conservation
- **Practices for Pollinators**
 - Wildlife Habitat Planting
 - Conservation Cover
 - Hedgerow Planting
 - Tree/Shrub Establishment
 - Cover Cropping
 - Forest stand improvement
 - Prescribed burning
 - Prescribed grazing
 - Early Successional Habitat Development/Management
 - And many more...



<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=37370.wba>

Additional Resources: The USDA-NRCS

Welcome to NRCS Field Office Technical Guide (FOTG)

Select a state for documents.

State:

About FOTG

Technical guides are the primary scientific references for NRCS. They contain technical information about the conservation of soil, water, air, and related plant and animal resources.

Technical guides used in each field office are localized so that they apply specifically to the geographic area for which they are prepared. These documents are referred to as Field Office Technical Guides (FOTGs).

Appropriate parts of the Field Office Technical Guides are automated as databases, computer programs, and other electronic-based materials such as those included in these web based pages.

FOTG Sections

Section I - General References

- General state maps.
- Descriptions of Major Land Resource Areas, watershed information, and links to NRCS reference manuals and handbooks.
- Links to researchers, universities, and agencies we work with.
- Conservation practice costs and agricultural laws and regulations.

Section II - Natural Resources Information

- Detailed information about soil, water, air, plant, and animal resources.
- Cultural resources and information about protected plant and animal species.
- NRCS Soil Surveys, Hydric Soils Interpretations, Ecological Site Descriptions, Forage Suitability Groups, Cropland Production Tables, Wildlife Habitat Evaluation Guides, Water Quality Guides, and other related information can be found here as it becomes available.

Section III - Conservation Management Systems

- NRCS Quality Criteria, which establish standards for resource conditions that help provide sustained use.

Section IV - Practice Standards and Specifications

- NRCS Conservation Practice Standards that define the practice and where it applies. Practice specifications are detailed requirements for installing the practice in the state.

Section V-Conservation Effects

- Background information on how Conservation Practices affect each identified resource concerns in the state.

Field Office Technical Guide (<https://efotg.sc.egov.usda.gov/#/>)

- Select your state and keyword search for pollinators, monarchs, etc.

Habitat Assessment Guides



Our Work Get Involved

Habitat Assessment Guides

These pollinator habitat assessment guides are designed to help educate conservation planners and landowners, prioritize conservation actions, and quantify habitat or land management improvements for pollinators or beneficial insects on a single site.

Pollinator Habitat Assessment



Farms and Agricultural Landscapes

[Download PDF.](#)



Natural Areas and Rangelands

[Download PDF.](#)



Idaho Farms and Agricultural Landscapes

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Pennsylvania Farms and Agricultural Landscapes

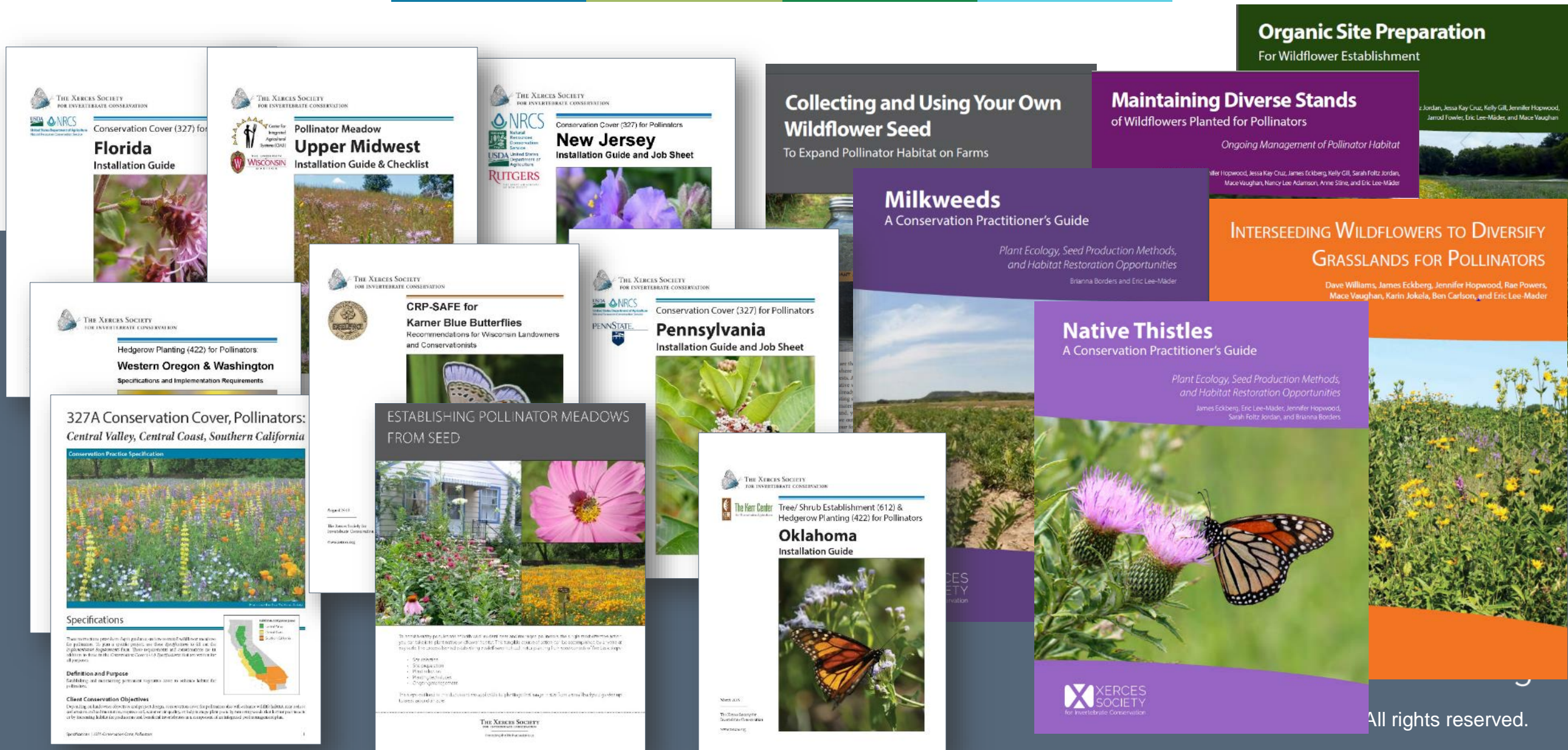
[Download PDF.](#)

<http://www.xerces.org/pollinator-conservation/habitat-assessment-guides/>

The Xerces Society: Resources

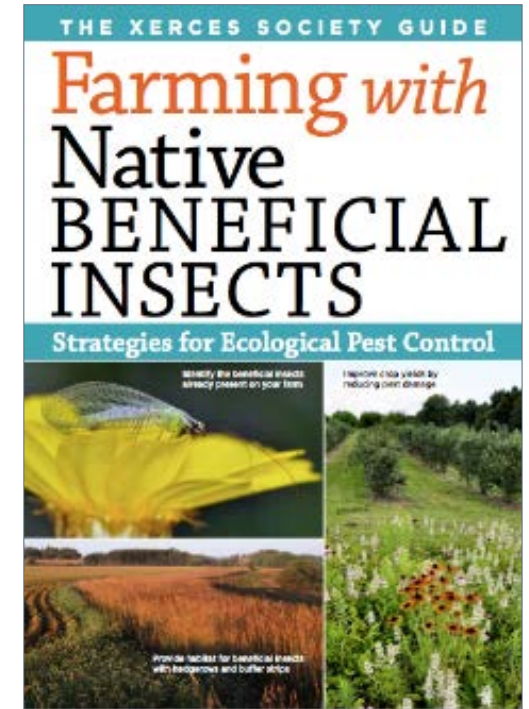
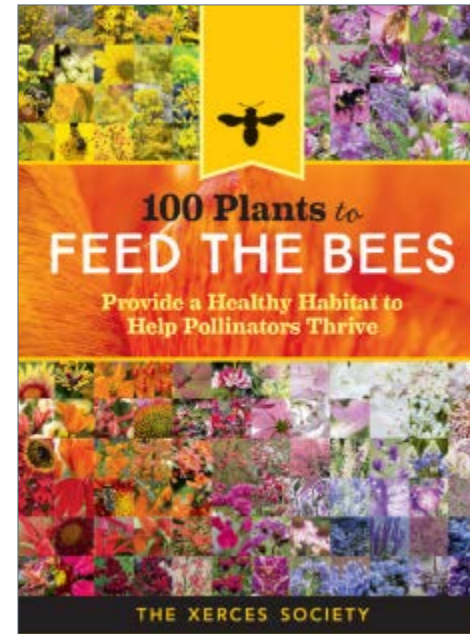
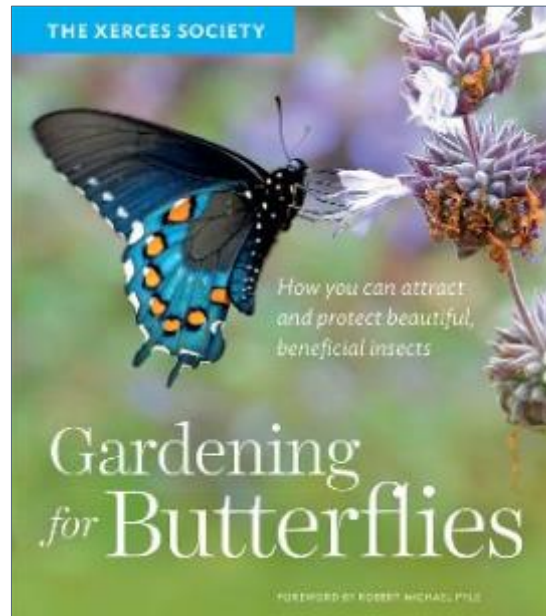
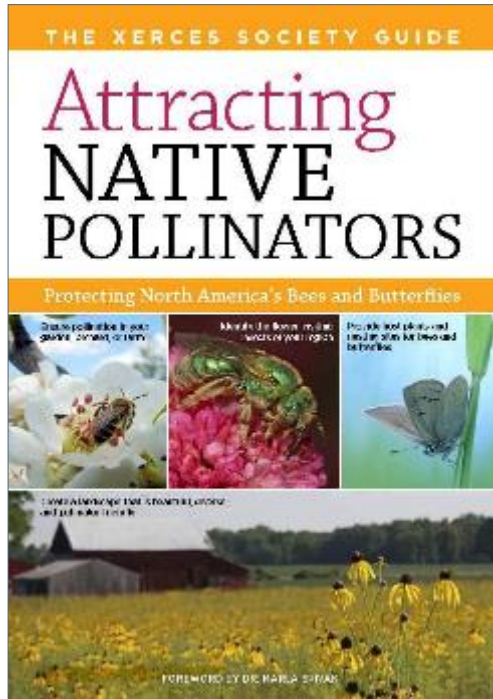


Guidance for planting and maintaining pollinator habitat



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Xerces Society Books



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tortoise beetle,
Delovalia guttata, on
man of the earth (aka
wild sweet potato),
Ipomoea pandurata, a
native morning glory

Questions? Thoughts?
We'd love to hear from you!

NRCS policy & program related questions

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Roadsides

- Corridors and connectivity
- Narrower mowed strips, higher mowing, less-frequent mowing
- Beautification
- Climate change adaptation
- Identify and protect quality habitat areas



Photos: Xerces Society / Matthew Shepherd (left) and Washington DOT (right)

Utility Rights of Ways

- Connectivity and corridors
- Plants of low stature to avoid growing up into lines: grasses, wildflowers, and shrubs
- Allow for overgrown areas and reduced disturbance for duff buildup
- Forest/wood edges as valuable nesting areas



Photo: Xerces Society / Matthew Shepherd

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Photos: Xerces Society / Matthew Shepherd

Bioswales and Catchments

- Many native plants grow well in swales (e.g. spirea, rose, ninebark, cascara, milkweed, etc.)
- City planners could mandate use of well-adapted native plants that benefit pollinators
- Milkweed thrives in these habitats



Photo: Xerces Society / Brianna Borders