



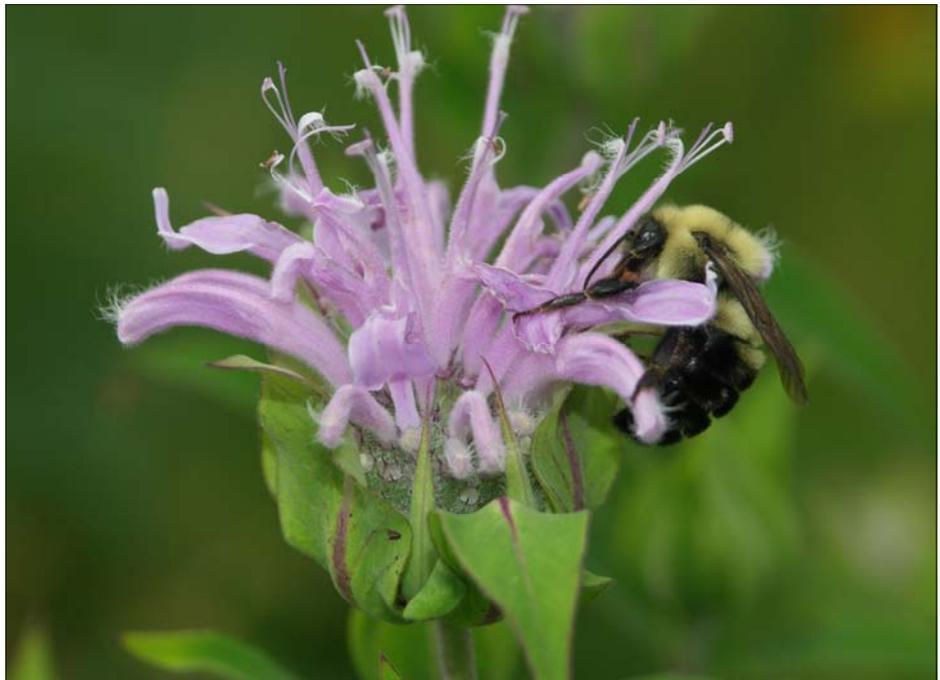
THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION



Pennsylvania

Pollinator Habitat

Assessment Form and Guide



October 2014

The Xerces Society for
Invertebrate Conservation

www.xerces.org

Native Bee Conservation

Pollinator Habitat Assessment Form and Guide

Purpose

This tool is meant to help educate conservation planners and landowners, prioritize conservation actions, and quantify habitat or farm management improvements on a single farm. The goal of this tool is not to compare one farm with another. Rather, it is intended to help incorporate pollinator conservation into a whole farm plan and then document improvements in pollinator habitat resulting from specific actions and management practices. As with any tool of this nature, the evaluation and scoring practice can be a subjective process, and the usefulness of the tool is dependent upon the consistency of the evaluator. While the goal is to implement changes that will result in an increased final score, there may not always be a viable treatment for individual variables. The scoring goals outlined below in the instructions are general guidelines, but the capacity to reach or exceed these goals varies widely in different landscapes and may be refined by state NRCS offices for a more regionally specific pollinator habitat assessment guide.

Instructions

- This pollinator habitat assessment guide can be used in both orchard and field crop settings.
- The accompanying photos and notes will help you identify and assess some specific habitat features.
- An assessment should be done twice, once during the conservation planning process (before project implementation) and once after the plan has been implemented.
- Prior to conducting an assessment, print out aerial photos to help with site and landscape questions.
- Each item in the assessment should be given a score of 0 (not present) or the appropriate value from the “Score” column.
- Add up the scores to calculate a subtotal for each subsection (e.g., 4a. Sites for ground-nesting bees).
- In addition, add up subsection subtotals to get a total for each section. Transfer these figures into the summary table on page 3 to generate the overall score for each assessment.
- Landowners should strive to achieve a minimum score of at least 0.5, and as much improvement as possible. If this is not possible for your region or cropping system, talk to your area biologist or planner for guidance.

Copyright © 2014 The Xerces Society for Invertebrate Conservation

628 NE Broadway, Ste. 200 Portland, OR 97232 ◦ (855) 232-6639 ◦ www.xerces.org

The Xerces Society is a nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. Established in 1971, the Society is at the forefront of invertebrate protection worldwide.

The Xerces Society is an equal opportunity employer.

ACKNOWLEDGEMENTS

Authors Staff of the Xerces Society’s Pollinator Conservation Program and Pennsylvania NRCS staff.

Editing and layout Jessa Guisse, Matthew Shepherd, Ashley Minnerath, and Hailey Walls.

Funding Customizing this tool for Pennsylvania NRCS was funded by a contribution agreement with Mid-Atlantic NRCS States. Support for the Xerces Society’s Pollinator Conservation Program is provided by USDA Natural Resources Conservation Service, The Ceres Foundation, Cinco, Clif Bar Family Foundation, Columbia Foundation, CS Fund, Disney Worldwide Conservation Fund, The Elizabeth Ordway Dunn Foundation, Gaia Fund, Irwin Andrew Porter Foundation, McCune Charitable Foundation, The Metabolic Studio, Organic Farm Research Foundation, Organic Valley Farmers Advocating for Organics Fund, Panta Rhea Foundation, Sarah K. de Coizart Article TENTH Perpetual Charitable Trust, Sea World Busch Gardens Conservation Fund, Turner Foundation, Whole Foods Market and their vendors, Whole Systems Foundation, and Xerces Society members.

Photo credits © Hannah Gaines: page 4 all. © Jolie Goldenetz Dollar: cover-Br. © Jennifer Hopwood: page 7-c. © Eric Mader: page 6-r; page 5-l, cr, r. © Matthew Shepherd: page 6-l, c; page 7-l. © Katharina Ullmann: page 5-cl. © Mace Vaughan: cover-T, Bl, ; page 7-r.

Site Summary

Owner/Operator:	
County:	
Field Office:	
Planner:	
Date	Assessment Before Implementation (Existing Habitat):
	Assessment After Implementation:
Location Description:	
Sketch of Site:	

Total Score for Habitat Assessment

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

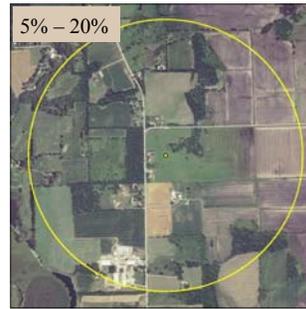
	Existing	Planned
Section 1: Landscape Features (max score 2.0)		
Section 2: Farmscape Features (max score 4.0)		
Section 3: Foraging Habitat (max score 4.0)		
Section 4: Nesting Habitat (max score 3.8)		
Section 5: Farm Practices (max score 8.0)		
SUMMARY SCORE		
Final Assessment SCORE = Summary SCORES ÷ 21.8		

Section 1: Landscape Features

1a. Percent of natural or semi-natural vegetation within ½ mile of project area (whether on or off farm). This land use cover includes, prairie, shrub lands, woodlands or old fields, riparian habitat and wetlands, suburban wooded areas, non-invasive weedy areas. It does NOT include lawn grass, or over-grazed pasture.

Max score of 1.0. The photos below illustrate the different percent covers.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score (no treatment if off farm)
>30%	1.0			
20% – 30%	0.7			
5% – 20%	0.3			
< 5%	0			
<i>Subtotal (1a)</i>				



1b. Dominant vegetation in non-cropped area within ½ mile of project area (whether on or off farm).

Max score of 1.0.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score (no treatment if off farm)
Native plants	1.0			
Mix of native and naturalized (non-invasive) plants	0.7			
Naturalized flowering species (e.g., alfalfa)	0.5			
Invasive flowering weeds	0			
Sod-forming grasses	0			
<i>Subtotal (1b)</i>				

Landscape Features Total

(1a + 1b)

Section 2

2a. Percentage of farm that is in natural or semi-natural habitat (see 1a for examples)

Max score of 1.0.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
10% or more	1.0			
6% – 9%	0.7			
3% – 5%	0.5			
1% – 2%	0.3			
0%	0			
<i>Subtotal (2a)</i>				

Go to top of page 5

Section 2: Farmscape Features

2b. Additional farmscape features.

Max score of 3.0.

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
Permanent meadows with diverse wildflowers	1.0			
Buffers: 1 point for every 20% of area within 25 feet of water features (e.g. stream, irrigation ditch, pond, etc.) that is vegetated, ideally including preferred pollinator plants	0 - 0.5			
Hedgerows, windbreaks, or fencerows of diverse tree/shrub species for pollinators	0.5			
Annual flowering cover crops allowed to bloom, annual bee pasture, bolting crops	0.5			
Source of clean surface water (non-contaminated) during growing season	0.5			
<i>Sum all scores above for subtotal (2b)</i>				

Farmscape Features Total

(2a + 2b)

Section 3: Foraging Habitat

3a. Percentage of vegetative cover (non-crop area) that is forbs or flowering shrubs* on farm.

Max score of 1.0. The photos below illustrate some categories. See regional technical notes (listed on page 8) for lists of preferred pollinator plants and other information. *Excluding invasive or noxious species (e.g., knapweed, purple loosestrife, yellow star thistle, etc.).

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
> 85% cover	1.0			
45% – 85% cover	0.7			
30% – 45% cover	0.5			
20% – 30% cover	0.3			
< 20% cover	0.1			
<i>Subtotal (3a)</i>				



3b. Number of species of pollinator-friendly forbs, shrubs or trees on farm that bloom in spring and support bees. This includes some crops and cover crops (see references section for examples).

Max score of 1.0. Excluding invasive or noxious species (e.g., knapweed, purple loosestrife, yellow star thistle, etc.).

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
5+ species	1.0			
3 – 4 species	0.5			
1 – 2 species	0.3			
0 species	0			
<i>Subtotal (3b)</i>				

Section 3: Foraging Habitat (cont.)

3c. Number of species of pollinator-friendly forbs and shrubs or trees on farm that bloom in summer and support bees. This includes some crops and cover crops (see references section for examples).

Max score of 1.0. Excluding invasive or noxious species (e.g., knapweed, purple loosestrife, yellow star thistle, etc.).

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
5+ species	1.0			
3 – 4 species	0.5			
1 – 2 species	0.3			
0 species	0			
Subtotal (3c)				

3d. Number of species of pollinator-friendly forbs and shrubs or trees on farm that bloom in fall and support bees. This includes some crops and cover crops (see references section for examples).

Max score of 1.0. Excluding invasive or noxious species (e.g., knapweed, purple loosestrife, yellow star thistle, etc.).

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
5+ species	1.0			
3 – 4 species	0.5			
1 – 2 species	0.3			
0 species	0			
Subtotal (3d)				

Foraging Habitat Total

$(3a + 3b + 3c + 3d)$

Section 4: Native Bee Nesting Habitat

4a. Sites for ground-nesting bees.

Max score of 2.3. Ground nests are often marked by a small mound of excavated soil, but may also be nothing more than a small hole in the ground. Nests may be dug in bare soil, areas of patchy vegetation, or hidden among plants, including at the base of crop plants such as squash. They are usually in marginal areas such as ditch banks or track sides, and frequently can be found close to buildings or other structures. (Photos below illustrate some nest sites.)

SCORE ALL OPTIONS THAT APPLY A = abundant, M = moderate, S = scarce	Score	Before	After	Treatment to increase score
Areas of farm with untilled, well-drained bare ground, or with sparse vegetation (A = > 20%, M = 20%-5%, S = < 5%)	A = 0.5 M = 0.3 S = 0.1			
Areas with sandy to sandy loam soil (A = > 20%, M = 20%-5%, S = < 5%)	A = 0.5 M = 0.3 S = 0.1			
0.1 point for every 10% of area untilled on farm or ranch	0 – 1.0			
Areas with bare but compacted soil, or excavated soil (absent = 0, present = 0.3)	0.3			
Sum all scores above for subtotal (4a)				



Section 4: Native Bee Nesting Habitat (cont.)

4b. Sites for wood- and cavity-nesting bees.

Max score of 1.5. The great majority of wood- or cavity-nesting bees do not excavate their own nest; they occupy pre-existing tunnels or cavities in snags, the center of pithy-stemmed shrubs, and in brush piles. Bumble bees frequently nest in abandoned rodent burrows or under clump-forming bunch grasses. (Photos below illustrate some nest sites.)

SCORE ALL OPTIONS THAT APPLY A = abundant, M = moderate, S = scarce	Score	Before	After	Treatment to increase score
Dead wood, brush piles, snags present, or piles of field stones (A = 5 or more, M = 2 to 4, S = 0 to 1)	A = 0.5 M = 0.3 S = 0			
Shrubs or trees with pithy twigs (elderberry, cane fruit, sumac, etc.) (A = > 20 plants, M = 20-5, S = < 5 plants)	A = 0.5 M = 0.3 S = 0			
Areas of undisturbed native bunch grasses (clump-forming) (A = > 20%, M = 20%-5%, S = < 5%)	A = 0.5 M = 0.3 S = 0			
<i>Sum all scores above for subtotal (4b)</i>				



Native Bee Nesting Habitat Total

--	--

(4a + 4b) 

Section 5: Farm Practices

5a. Use of pollinator-toxic pesticides

Max score of 5.5.

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
No use of insecticides (including organic approved products)	4.0			
No soil fumigation	.5			
Unsprayed buffer of at least 30' between any insecticide application and habitat areas	.5			
Buffer composed of trees and/or shrubs designed to capture drift and not pollinator attractive	.5			
If insecticides are used, IPM program in place	1.0			
If insecticides are used, IPM program in place that specifically addresses pollinator protection	.5			
If insecticides are used, insecticides sprayed at night	.3			
If insecticides are used, sprayed only outside of crop bloom period	.3			
If insecticides are used, spray drift carefully controlled	.3			
If insecticides are used, annual calibration of spray equipment	.3			
<i>Sum all scores above for subtotal (5a)</i>				

Section 5: Farm Practices	5b. Land management techniques on the farm or in project area				
	<i>Max score of 2.5.</i>				
	SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
	Burning, mowing, or haying is done to < 1/3 of area each year.	1.0			
	Grazing plan that encourages wildflower diversity/abundance	1.0			
	No disturbance or cultivation of field borders	0.5			
<i>Sum all scores above for subtotal (5b)</i>					
Farm Practices Total				 (5a + 5b)	

Habitat Assessment Reference Materials

Crops and cover crops that provide pollen and/or nectar for bees (Note: this list is not exhaustive):
 Alfalfa, almonds, alyssum, apples, avocados, apricots, blueberries, buckwheat, canola, cherries, citrus, clover, corn, cotton, cran-berries, cucumber, eggplant, fava beans, macadamia nuts, melons, mustard, peaches, pears, peas, peppers, phacelia, plums, pumpkins, raspberries, soybean, squash, strawberries, sunflower, tomatoes, vegetable seed, purple vetch, and watermelon.

General Pollinator Conservation

Attracting Native Pollinators (Xerces Society Book)
<http://www.xerces.org/announcing-the-publication-of-attracting-native-pollinators/>

New England Pollinator Biology and Habitat (NRCS Technical Note)
ftp://ftp-fc.sc.egov.usda.gov/NH/WWW/Technical/New_England_NRCS_Pollinator_Tech_Note_FINAL.pdf

Agricultural Pollinator Conservation Guides

Pennsylvania Conservation Cover: Pollinator Job Sheet
<http://eFotg.sc.egov.usda.gov/references/public/PA/PA327PollinatorJobSheetJuly2012.pdf>

Habitat Development for Pollinators in New Jersey (NRCS Technical Note)
http://plants.usda.gov/pollinators/Habitat_Development_for_Pollinators_NJ.pdf

Maryland Conservation Cover Job Sheet and Addendum (Maryland NRCS Technical Note)
http://www.xerces.org/wp-content/uploads/2013/01/JobSheet_MD_CnsrvCvr.pdf

Native Bee Benefits (Bryn Mawr and Rutgers University Guide)
<http://www.xerces.org/wp-content/uploads/2010/02/pa-nj-native-bee-benefits1.pdf>

Wild Pollinators of Eastern Apple Orchards
<http://www.xerces.org/wp-content/uploads/2009/11/Wild-Pollinators-of-Eastern-Apple-Orchards1.pdf>

Program and Practice Standard Guidance for Pollinator Conservation

Using Farm Bill Programs for Pollinator Conservation (NRCS Technical Note): Guidelines on how EQIP, CSP, and other programs can be used to restore or enhance habitat for pollinators.
http://plants.usda.gov/pollinators/Using_Farm_Bill_Programs_for_Pollinator_Conservation.pdf

Farm Management Guidelines for Pollinator Conservation

Farming for Bees (Xerces Society Conservation Guidelines): A guide to adapting farm practices to conserve native crop pollinators and their habitat.
http://www.xerces.org/wp-content/uploads/2008/11/farming_for_bees_guidelines_xerces_society.pdf

How to Reduce Bee Poisoning from Pesticides (Oregon State University Extension Fact Sheet): A publication listing common agricultural pesticides and their known effects on multiple bee species.
<http://extension.oregonstate.edu/catalog/pdf/pnw/pnw591.pdf>

Pesticide Considerations for Native Bees in Agroforestry (USDA National Agroforestry Center Technical Note): An article highlighting how to reduce bee poisoning from pesticides.
http://plants.usda.gov/pollinators/Pesticide_Considerations_For_Native_Bees_In_Agroforestry.pdf

Supplementing Native Bee Nest Sites

Managing Alternative Pollinators: A Handbook for Beekeepers, Growers, and Conservationists (Sustainable Agriculture Research and Education Program Handbook): A full color guide to providing nests sites for bumblebees, mason bees, leafcutter bees, alkali bees, and other native species.
<http://www.sare.org/publications/pollinators/pollinators.pdf>

Tunnel Nest Construction and Management (Xerces Society Fact Sheet): Guidelines on the construction and maintenance of nests for tunnel nesting native bees.
<http://www.xerces.org/wp-content/uploads/2009/11/tunnel-nest-management-xerces-society.pdf>