



THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

Native Bee Conservation

Pollinator Habitat Assessment Form and Guide

FARMS AND AGRICULTURAL LANDSCAPES



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The Xerces Society for
Invertebrate Conservation

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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 is 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 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.
- The post-implementation goal is hard to define for the country as a whole. Ideally, landowners should strive to achieve an overall score of at least 100, and an improvement of at least 40 points. If this is not possible for your region or cropping system, talk to your area biologist or planner for guidance.

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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.

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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.

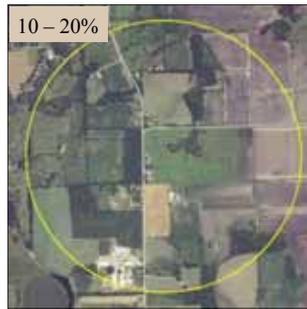
	Before	After
Section 1: Landscape Features (max score 20)		
Section 2: Farmscape Features (max score 35)		
Section 3: Foraging Habitat (max score 40)		
Section 4: Nesting Habitat (max score 38)		
Section 5: Farm Practices (max score 80)		
OVERALL SCORE		

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 grasslands, riparian habitat and wetlands, suburban wooded areas, and non-invasive weedy areas. It does NOT include lawn grass, or over-grazed pasture.

Max score of 10. The photos below illustrate the different percent covers.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score (no treatment if off farm)
>20%	10			
10% – 20%	7			
1% – 10%	3			
0%	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 10.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score (no treatment if off farm)
Native plants	10			
Mix of native and naturalized (non-invasive) plants	7			
Naturalized flowering species (e.g., alfalfa)	5			
Mix of native, naturalized, and weedy species	2			
Invasive flowering weeds and/or 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 10.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
10% or more	10			
6% – 9%	7			
3% – 5%	5			
1% – 2%	3			
0%	0			
<i>Subtotal (2a)</i>				

Go to top of page 5

Section 2: Farmscape Features

2b. Additional farmscape features that are present.

Max score of 25.

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
Permanent meadows with diverse wildflowers	5			
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 - 5			
Hedgerows, windbreaks, or fencerows of diverse tree/shrub species for pollinators	5			
Annual flowering cover crops allowed to bloom, annual bee pasture, bolting crops	5			
Source of clean surface water (non-contaminated) during growing season	5			
<i>Sum all scores above for subtotal (2b)</i>				

Farmscape Features Total

(2a + 2b)

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

Max score of 10. 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	10			
45% – 85% cover	7			
30% – 45% cover	5			
20% – 30% cover	3			
< 20% cover	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 10. Excluding invasive or noxious species (e.g., knapweed, purple loosestrife, yellow star thistle, etc.).

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
7+ species	10			
5 – 6 species	7			
3 – 4 species	5			
1 – 2 species	3			
0 species	0			
<i>Subtotal (3b)</i>				

Section 3: Foraging Habitat

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 10. 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	10			
3 – 4 species	7			
1 – 2 species	5			
0 species	0			
<i>Subtotal (3c)</i>				

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 10. 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	10			
3 – 4 species	7			
1 – 2 species	5			
0 species	0			
<i>Subtotal (3d)</i>				

Foraging Habitat Total

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

Section 4: Native Bee Nesting Habitat

4a. Sites for ground-nesting bees.

Max score of 23. 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 = 5 M = 3 S = 1			
Areas with sandy to sandy loam soil (A = > 20%, M = 20%-5%, S = < 5%)	A = 5 M = 3 S = 1			
1 point for every 10% of area untilled on farm or ranch	0 – 10			
Areas with bare but compacted soil, or excavated soil (absent = 0, present = 3)	3			
<i>Sum all scores above for subtotal (4a)</i>				



Section 4: Native Bee Nesting Habitat (cont.)

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

Max score of 15. 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 = 5 M = 3 S = 0			
Shrubs or trees with pithy twigs (elderberry, cane fruit, sumac, etc.) (A = > 20 plants, M = 20-5, S = < 5 plants)	A = 5 M = 3 S = 0			
Areas of undisturbed native bunch grasses (clump-forming) (A = > 20%, M = 20%-5%, S = < 5%)	A = 5 M = 3 S = 0			
<i>Sum all scores above for subtotal (4b)</i>				



Native Bee Nesting Habitat Total

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(4a + 4b)

5a. Use of pollinator-toxic pesticides

Max score of 55.

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
No use of insecticides (including organic approved products)	40			
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	10			
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

Section 5: Farm Practices	5b. Land management techniques on the farm or in project area				
	<i>Max score of 25.</i>				
	SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
	If farm has natural areas or pollinator habitat, burning, mowing, or haying is limited to < 1/2 of habitat area each year.	10			
	If farm includes rangeland or pasture, grazing plan encourages wildflower diversity/abundance	10			
If farm has orchards, vineyards, or row crops, no disturbance or cultivation of field borders	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:
 Alfalfa, almonds, 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. *(Note: this list is not exhaustive)*

General Pollinator Conservation



Pollinator Conservation Resource Center (Xerces Society website): Regional information about plant lists, habitat conservation guides, and more.
<http://www.xerces.org/pollinator-resource-center/>

Attracting Native Pollinators (Xerces Society Book): Attracting Native Pollinators reflects the latest understanding about creating and managing pollinator habitat. Illustrated with hundreds of color photographs and dozens of specially created illustrations.
<http://www.xerces.org/announcing-the-publication-of-attracting-native-pollinators/>

Pollinator Habitat Installation Guides (Xerces Society Conservation Guidelines): These regional guidelines provide in-depth practical guidance on how to install and maintain nectar and pollen habitat for bees in the form of wildflower meadow plantings or linear rows of native flowering shrubs. Seed mixes and plant recommendations for each region are included in the appendix of each guide.
<http://www.xerces.org/pollinator-conservation/agriculture/pollinator-habitat-installation-guides/>

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/guidelines-farming-for-bees/>

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>

Inside Agroforestry - Windbreaks (NRCS Newsletter): An article about using windbreaks as pollinator habitat or to capture pesticide drift.
<http://nac.unl.edu/documents/insideagroforestry/vol20issue1.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://www.xerces.org/wp-content/uploads/2008/10/agroforestrynotes35-pesticides.pdf>

Native Bee Nest Sites Guidelines

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>

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>

Enhancing Nest Sites for Native Bee Crop Pollinators (USDA National Agroforestry Center Technical Note): An article highlighting how to provide nesting habitat for native bees.
http://www.xerces.org/wp-content/uploads/2011/02/agroforestrynotes34-bee_nests1.pdf