U.S. Fish & Wildlife Service

Rusty Patched Bumble Bee Habitat Assessment Form & Guide

Rusty Patched Bumble Bee

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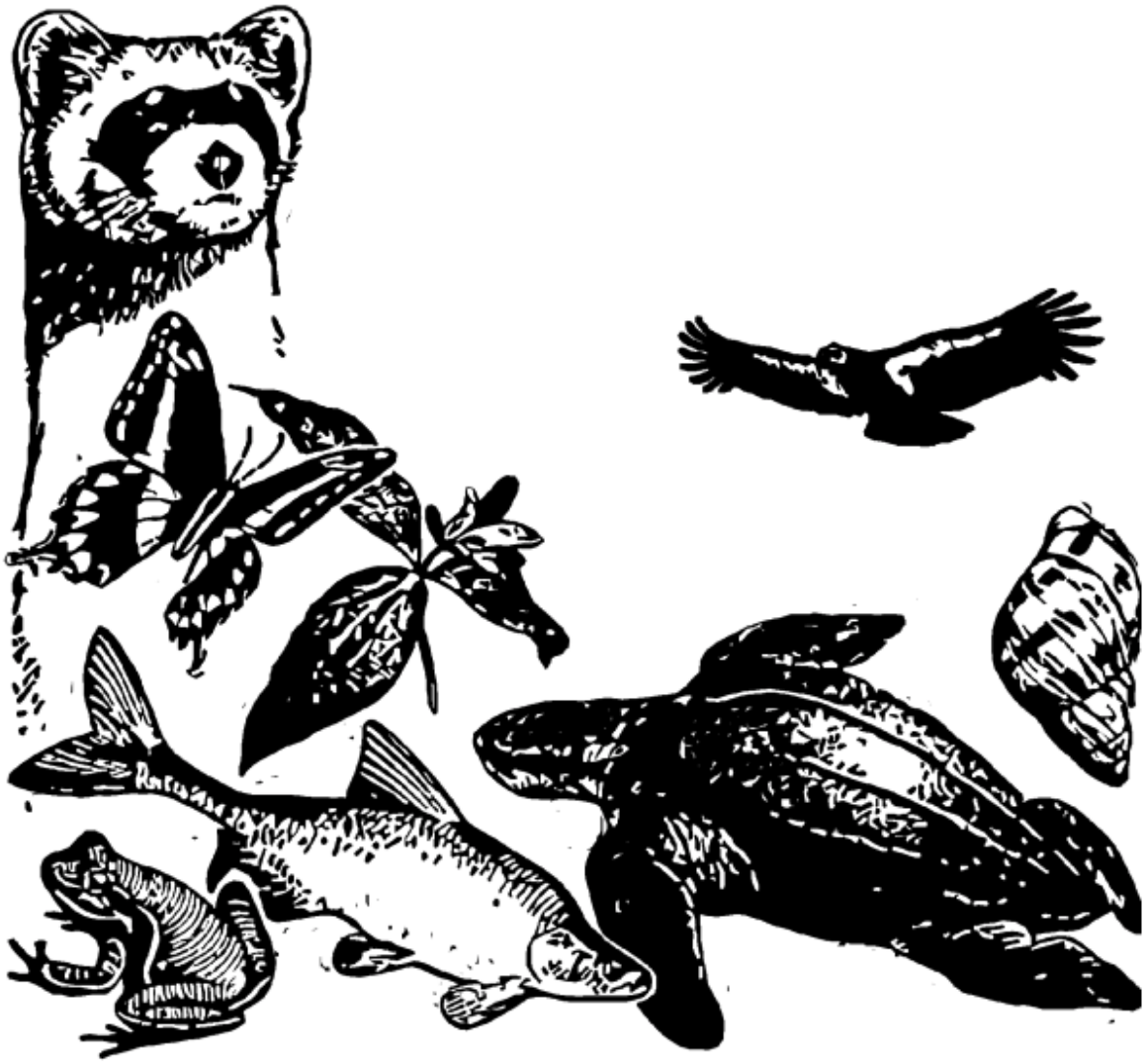

IPaC - Information for Planning and Consultation (https://ipac.ecosphere.fws.gov/): A project planning tool to help streamline the U.S. Fish and Wildlife Service environmental review process.

XERCES SOCIETY
for Invertebrate Conservation

Rusty Patched Bumble Bee Habitat

Assessment Form & Guide

May 2017

The Xerces Society for Invertebrate Conservation

www.xerces.org

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Editing and layout

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Cover Photographs

Cover main: A wooded bluff and streamside prairie in the Driftless Area of Wisconsin (photograph by Susan Carpenter, UW-Madison Arboretum); left: *Bombus affinis* (rusty patched bumble bee) on joe pye weed, *Eutrochium purpureum* (photograph by Rich Hatfield, The Xerces Society); right: eastern woodland with pollinator-friendly understory (photograph by Jennifer Hopwood, The Xerces Society).

Photographs

We are grateful to the photographers for allowing us to use their wonderful photographs. Susan Carpenter, UW-Madison Arboretum: 2, 3, 10a, 10c. Sarah Foltz Jordan, the Xerces Society: 7a, 7b. Eric Lee-Mäder, The Xerces Society: 7c, 7d. Johanna James: 9. Dustin Blakey, Flickr: 10b. Jennifer Hopwood, The Xerces Society: 10d. Scott Seigfreid: 12. The copyright for all photographs is retained by the photographers. None of the photographs may be reproduced without permission from the photographer. If you wish to contact a photographer, please contact the Xerces Society at the address below.

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The Xerces Society for Invertebrate Conservation 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, harnessing the knowledge of scientists and enthusiasm of citizens to implement conservation programs worldwide. The Society uses advocacy, education, and applied research to promote invertebrate conservation.

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Rusty Patched Bumble Bee Conservation

Habitat Assessment Form and Guide

Purpose

The rusty patched bumble bee (*Bombus affinis*) is listed as an endangered species by the U.S. Fish and Wildlife Service. This species has specific habitat requirements, including high quality foraging resources, nesting sites, overwintering sites, and protection from pesticides, introduced diseases, and other disturbances. This tool is meant to help educate conservation planners and landowners, prioritize conservation actions, and quantify habitat or land management improvements for the rusty patched bumble bee on a single site. As existing conditions and degree of habitat management at any given site are different the goal of this tool is not to compare one site with another. Rather, it is intended to help incorporate conservation efforts for the rusty patched bumble bee into a landscape management plan and then identify specific actions for habitat improvement and/or management practices to help protect the rusty patched bumble bee from potential threats. 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 and skills of the evaluator. While the goal is to implement changes that will result in improved habitat, 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 conservation planners for a more regionally specific pollinator habitat assessment guide. This guide was developed with the purpose of assessing sites where the rusty patched bumble bee has been recently detected, but can also be employed by anyone seeking to improve their land for bumble bees.

Instructions

- This rusty patched bumble bee habitat assessment guide is designed for natural areas on public and private lands. If you are working in a farm landscape, please consider using our *Pollinator Habitat Assessment Form and Guide: Farms and Agricultural Landscapes* (available as a free download at: www.xerces.org/habitat-assessment-guides/; Note: this assessment form is not specific to the rusty patched bumble bee).
- The accompanying photos and notes will help you identify and assess some specific habitat features.
- An assessment would ideally be done twice, once during the habitat evaluation process (before project implementation) and once after any changes have been implemented.
- Each item in the assessment should be given a score of 0 if not present or the appropriate value from the "Score" column.
- If you are conducting an assessment for the USFWS, obtain the 10 x 10 km grid ID and sighting ID directly from the Service (contact your local field office: https://www.fws.gov/midwest/es/fld_off.html). Use the 10 x 10 km grid cell to address question 1a.
- If this is not an official USFWS assessment, address question 1a using an online mapping program with a satellite view. Assess the habitat within a 5 km radius of your location.
- Prior to conducting an assessment, print aerial photos to help with site and landscape questions.
- Add up the scores to calculate a subtotal for each subsection.
- Next, 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.
- Ideally, landowners/managers 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 land management plan, talk to your area biologist, regional ecologist, or planner for guidance.

A southern Wisconsin planting of diverse native prairie forbs that provides floral resources throughout the growing season.

Site Summary

Obtain the Grid ID and RPBB sighting ID from the USFWS. If this is not an official assessment leave blank.

Owner/ Operator:		Planner:
10 km x 10 km Grid ID:		Associated RPBB sighting ID:
Survey locality/address:		
Dates	Existing condition assessment:	
	Assessment after implementation:	
Define and describe the project area (attach annotated maps; include Ecological Classification System information, if known):		

Total Score for Habitat Assessment

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

	BEFORE	AFTER
Section 1: Regional and Landscape Features *(max score 20)*		
Section 2: Site Features *(max score 35)*		
Section 3: Foraging Habitat *(max score 50)*		
Section 4: Nesting and Overwintering Habitat *(max score 30)*		
Section 5a: Pesticide Practices *(max score 40)*		
Section 5b: Management Practices *(max score 40)*		
OVERALL SCORE		

Section 1: Regional and Landscape Features

The characteristics of regional and landscape features have a significant impact on the rusty patched bumble bee and its ability to successfully find a mate and reproduce. The landscape characteristics at this scale may not be changeable, but will help determine the scale at which local habitat management matters.

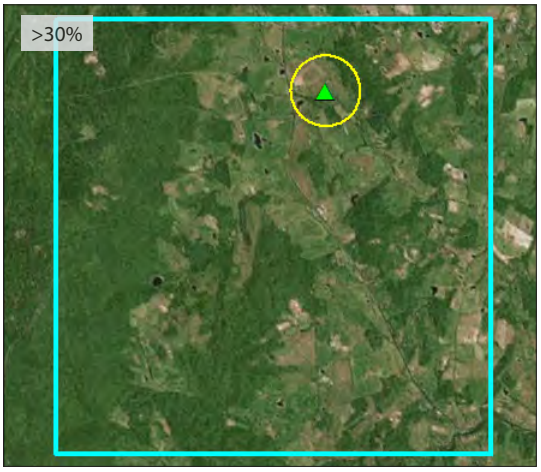
1a. Percentage of the grid cell that is natural habitat. This land use cover includes prairie, shrub lands, woodlands, grasslands, riparian habitat, wetlands, and non-invasive weedy areas. It does NOT include lawn grass, cropland, or overgrazed pasture. Using the 10 x 10 km grid cells provided by the USFWS, or area within a 5 km radius of your location, analyze the proportion of the habitat that is natural. See photos below for guidance (blue area is at the scale of 10 x 10 km).

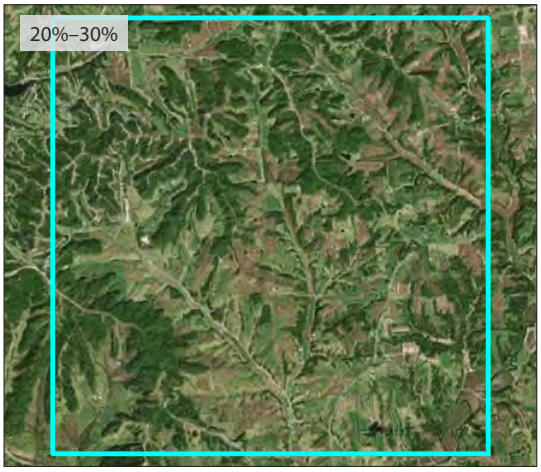
Max score of 10.

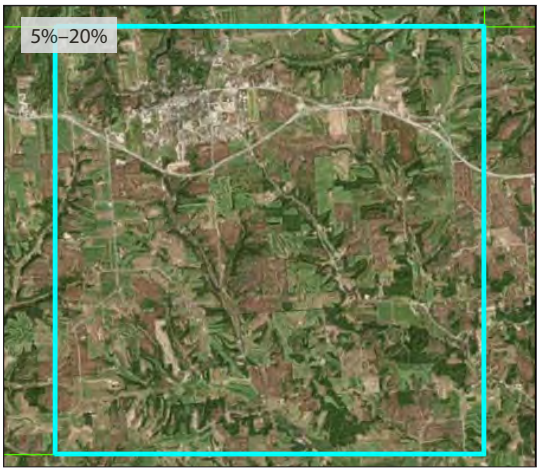
SELECT ONLY ONE	Score	Existing Condition
>30%	10	
20%–30%	7	
5%–20%	3	
<5%	0	
Subtotal (1a)		

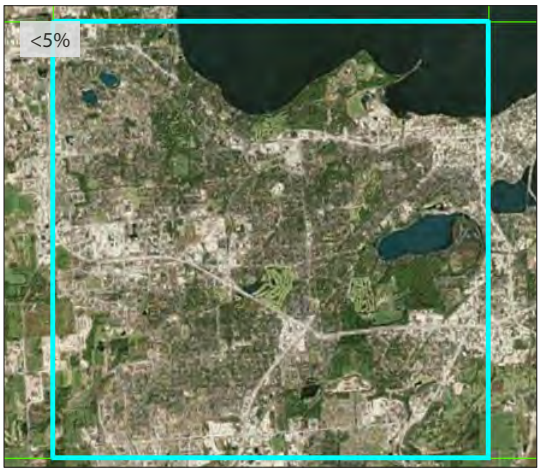
(1a)

The photos below illustrate the different percent covers.









Go to top of page 6

Continue here

Section 1: Regional and Landscape Features *continued*

1b. The assessment area is defined by the unit of land on which management can be implemented to improve habitat for the rusty patched bumble bee. With that in mind, what is the dominant vegetation within ½ mile of assessment area including the assessment area itself. *Max score of 10.*

SELECT ONLY ONE	Score	Before	After	Treatment to increase score (no treatment if off-site)
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/invasive species	3			
Invasive flowering weeds, crops and/or sod-forming grasses	0			
Subtotal (1b)				
Regional and Landscape Features Total				

(1a)

(1b)

(1a + 1b)

Section 2: Site Features

On-site natural areas and other features have a significant influence on bumble bee abundance and diversity.

2a. Percentage of site that is in natural or semi-natural habitat.
Max score of 10.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
>75%	10			
50%–75%	7			
25%–49%	5			
10%–24%	3			
<10%	0			
Subtotal (2a)				

(2a)

2b. Additional site features that are present.
Max score of 25.

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
Permanent meadows or open areas with diverse native wildflowers allowed to bloom	10			
Pasture or hayed land with >30% non-invasive, bee-friendly forage legumes (e.g., red clover, alfalfa, etc.) allowed to bloom	5			
Wooded or wetland areas with diverse flowering trees, shrubs, and/or wildflowers (e.g., maples, basswood, willows, wild plum, spring blooming woodland ephemerals)	5			
Buffers: 2 points for every 20% of area within 25' of water features that is flowered, 1 point for every 20% of area that is grass, 0 points for no buffers	0–5			
Subtotal (2b)				
Site Features Total				

(2b)

(2a + 2b)

Section 2: Site Features

Section 3: Foraging Habitat

High flower abundance and season long bloom positively influence bee abundance and diversity.

3a. Percentage of vegetative cover that is comprised of forbs, flowering shrubs, or pollinator-friendly trees on site. *This does not include invasive or noxious species (e.g., Canada thistle, spotted knapweed, purple loosestrife, crown vetch, buckthorn, etc.).* *Max score of 10.*

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
>50% cover	10			
30%–50% cover	7			
20%–30% cover	5			
10%–20% cover	3			
<10% cover	1			
Subtotal (3a)				

(3a)

The photos below illustrate some categories. See page 12 for lists of preferred pollinator plants and other information.

Go to top of page 8

Continue here

Section 3: Foraging Habitat *continued*

Section 3: Foraging Habitat

3b. Number of species of forbs, flowering shrubs, or pollinator-friendly trees on site that bloom in **spring** and support bees. *This includes fruit trees and some flowering weeds like dandelions, but does not include invasive or noxious species (see https://plants.usda.gov/java/noxiousDriver for examples).*

Max score of 10.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
10+ species	10			
5–9 species	5			
1–4 species	3			
0 species	0			
Subtotal (3b)				

(3b)

(3a)

3c. Number of species of forbs, flowering shrubs, or pollinator-friendly trees on site that bloom in **summer** and support bees. *This includes some flowering non-native plants, such as red clover, but does not include invasive or noxious species (see https://plants.usda.gov/java/noxiousDriver for examples).*

Max score of 10.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
18+ species	10			
10–17 species	7			
1–9 species	3			
0 species	0			
Subtotal (3c)				

(3c)

3d. Number of species of forbs, flowering shrubs, or pollinator-friendly trees on site that bloom in **fall** and support bees. *This includes some flowering non-native plants, such as red clover, but does not include invasive or noxious species (see https://plants.usda.gov/java/noxiousDriver for examples).*

Max score of 10.

SELECT ONLY ONE	Score	Before	After	Treatment to increase score
10+ species	10			
5–9 species	7			
1–4 species	5			
0 species	0			
Subtotal (3d)				

(3d)

Go to top of page 9

Continue here

Section 3: Foraging Habitat *continued*

Section 3: Foraging Habitat

3e. Rusty patched bumble bee superfoods. The rusty patched bumble bee has been observed most commonly on the following plants. How many of these plants are present on site? Note that some of these species may not be appropriate for every region/site.

Wild bergamot (*Monarda fistulosa*), prairie clover (*Dalea* spp.), hyssop (*Agastache* spp.), goldenrod (*Solidago* spp.), joe pye weed (*Eutrochium* spp.), coneflowers (*Echinacea* spp.), native thistles (*Cirsium* spp.), asters (*Symphyotrichum* spp.), leadplant (*Amorpha canescens*), jewelweed (*Impatiens capensis*), mountain mint (*Pycanthemum* spp.), native spiraea (*Spiraea* spp.), and wild cranberry (*Vaccinum* spp.).

Max score of 7.

SELECT ONLY ONE (how many species of bumble bee superfoods are present on site?)	Score	Before	After	Treatment
9–13 species	7			
5–8 species	5			
1–4 species	2			
0 species	0			
Subtotal (3e)				

(3e)

(3a-d)

3f. In addition to plants that are known to be attractive to the rusty patched bumble bee, the following plants are known to help build bumble bee immune systems. How many of these plants are present on site? Note that some of these species may not be appropriate for every region/site.

Wild bergamot (*Monarda fistulosa*), sunflowers (*Helianthus* spp.), white turtlehead (*Chelone glabra*), penstemon (*Penstemon* spp.), and wild blueberry/cranberry (*Vaccinium* sp.).

Max score of 3.

SCORE THIS OPTION	Score	Before	After	Treatment
Score 1 point, up to 3 for each species present	0–3			
Subtotal (3f)				

(3f)

Foraging Habitat Total		

(3a + 3b + 3c + 3d + 3e + 3f)

The rusty patched bumble bee (*Bombus affinis*) nectars on monarda.

Section 4: Nesting and Overwintering Habitat

Bumble bee colony success is often limited by the availability of suitable nesting and overwintering sites. Diverse habitat features will increase the likelihood of nesting and overwintering success.

4. Bumble bee nesting preferences vary by species and local habitat conditions. Generally, bumble bees nest under ground, often in abandoned rodent nests. They are also known to nest in dry cavities above ground, such as in rock walls or under clump-forming bunch grasses. The nests are often found under woody plants, tall grasses, or hidden among vegetation or plant materials, and can be difficult to detect. Bumble bees often overwinter underneath leaf litter, in the duff layer of forests, or under loose soils.

Max score of 30.

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
Areas of undisturbed (for example, ungrazed) native bunch grasses (clump-forming)	>20% = 5 ~20% = 3 <5% = 1			
Areas with loose soil with evidence of rodent activity (holes, surface tunnels, etc.) (compacted or hard packed bare ground does not count toward the total)	>20% = 5 ~20% = 3 <5% = 1			
1 point for every 10% of area that is unmowed, ungrazed, and not subject to controlled burning	0–10			
Areas of site with woody cover, or other sheltered areas where bumble bees could build their nest or overwinter (downed wood, rock walls, brush piles, forest duff layer, etc.)	>20% = 5 ~20% = 3 <5% = 1			
Leaf litter left on site in the fall and through the spring (for overwintering queens)	5			
Nesting and Overwintering Habitat Total				

The photos below illustrate some typical nesting and overwintering habitat.

Section 4: Bumble Bee Nesting and Overwintering Habitat

Section 5: Management and Pesticide Practices

Management practices in and adjacent to habitat areas have a significant influence on bumble bee populations.

Section 5: Management and Pesticide Practices

5a. Pesticide use, including pollinator-toxic insecticides. *Max score of 40.*

SCORE ALL OPTIONS THAT APPLY	Score	Before	After	Treatment to increase score
Invasive weed control, if any, carried out with targeted herbicide applications, rather than broadcast (also score 5 if herbicides are not used)	5			
No use of insecticides on site and no suspected use on adjacent lands (If yes, score points and continue to 5b)	35			
No use of fungicides on site (5 pts). The only fungicides used on site are part of an IPM program that specifically addresses pollinator protection, and each use has a documented need to manage an economic or public health pest (2 pts)	0-5			
If any insecticides are used on site they are part of an IPM program that specifically addresses pollinator protection, and are for the management of economic or public health pests (e.g., emerald ash borer or disease transmitting mosquitoes). Also score points if no insecticides are used on site.	8			
Pollinator habitat on site is adequately buffered from insecticide applications including: • Min. 125' buffer from any neonicotinoid use on and/or adjacent to site (including seed treatment) (2 pts) • No aerial (helicopter/airplane) applications on and/or adjacent to site (2 pts) • Min. 60' spatial buffer from any airblast applications of other (non-neonicotinoid) insecticides on and/or adjacent to site (1 pt) • Min. 40' spatial buffer from any non-airblast ground applications of insecticides on and/or adjacent to site (1 pt) • Vegetative buffers, even if they do not meet the distance minimums listed above, include the use of larger-stature non-pollinator attractive vegetation (e.g., coniferous hedge rather than mowed grass) (2 pts)	Score points for each bullet point met			
If insecticides are used spray drift is carefully controlled and spray equipment is calibrated annually, as per state regulations. Also score points if no insecticides are used on site.	2			
Pesticide Practices Total				

5b. Land management techniques used on the site or in adjacent area. *These questions pertain to ongoing site management as opposed to site preparation. Note 'n/a' if option is not applicable to the site.*

Max score of 40.

SCORE ALL OPTIONS THAT APPLY (M = Management Matches Description, S = Somewhat Matches, N = No Match, N/A = Doesn't apply	Score	Before	After	Treatment to increase score
If mowing or haying occurs, then entire disturbed area is limited to ⅓ of habitat per year. Haying or mowing is done patchily, at reduced speeds (<8 mph), with high mower height (12–16"), and in late summer (after peak bloom).	M = 10 S = 5 N = 0 N/A			
If site is grazed, then conservation grazing plan is in place and includes prescribed grazing practices that encourage wildflower diversity/abundance, such as low intensity grazing, or short duration grazing with long recovery periods.	M = 10 S = 5 N = 0 N/A			
If burning occurs, then entire disturbed area is limited to ⅓ of habitat per year, and a patchy burn approach is used leaving numerous skips and unburned patches. A 3–10 year burn rotation period is used, and the time of year when burning occurs is varied. Rare invertebrate species and their specific needs are considered.	M = 10 S = 5 N = 0 N/A			
Managed bees (both honey bees, and commercial bumble bees) are known to both compete with native bumble bees, and have been shown to transmit diseases to wild bumble bees. When the rusty patched bumble bee is near, it is best to avoid the use of managed bees, and honey bees. If honey bees are used they should be kept at low densities. (no managed bees = M, <0.5 Honey bee hive/acre = S, >0.5 Honey bee hive/acre and/or commercial bumble bees present = N).	M = 10 S = 5 N = 0			
Management Practices Total				

Habitat Assessment Reference Materials

General Pollinator Conservation

Protecting Habitat From Pesticide Contamination
This guidance document was designed to help land managers safeguard pollinator habitat from harmful pesticide contamination. It includes information on selecting habitat sites, as well as ways to maintain clean habitat by limiting and carefully managing pesticide use.
http://www.xerces.org/wp-content/uploads/2016/10/ProtectingHabitatFromPesticideContamination_oct2016-02.pdf

Pollinator Conservation Resource Center
The Pollinator Conservation Resource Center includes regional information on plants for pollinator habitat enhancement, habitat conservation guides, nest management instructions, bee identification and monitoring resources, and directories of native pollinator plant nurseries.
www.xerces.org/pollinator-resource-center/

Attracting Native Pollinators
A complete guide to the fascinating lives of these vital creatures. The book includes detailed profiles of over 30 commonly encountered bee genera and more than 50 pages of fully-illustrated plant lists that enable you to choose the best plants for your region.
http://xerces.org/announcing-the-publication-of-attracting-native-pollinators/

Upper Midwest Citizen Science Monitoring Guide: Native Bees
Developed by the Xerces Society, this guide provides instructions for assessing pollinator habitat quality and diversity in the Upper Midwest by monitoring native bees. It was developed for conservationists, farmers, land managers, and restoration professionals to document how native bee communities change over time in pollinator habitats.
http://xerces.org/wp-content/uploads/2016/05/UpperMidwestBeeCSMG_May2016_web.pdf

Pollinator Habitat Installation Guides
These regional guidelines provide in-depth practical guidance on how to install and maintain foraging and nesting habitat for pollinators in wildflower meadow plantings or linear rows of native flowering shrubs. Region-specific seed mixes and plant recommendations are included in the appendices of each guide.
http://xerces.org/pollinator-conservation/agriculture/pollinator-habitat-installation-guides/

Pollinators in Natural Areas: A Management Primer
A fact sheet discussing the importance of pollinators in natural areas, as well as their habitat needs. An extensive list of references is also provided.
http://www.xerces.org/wp-content/uploads/2008/11/pollinators_in_natural_areas_xerces_society.pdf

Inside Agroforestry–Windbreaks
An article about using windbreaks to provide pollinator habitat or to capture pesticide drift.
http://nac.unl.edu/documents/insideagroforestry/vol20issue1.pdf

Introduced, Invasive, and Noxious Plants
Federal and state noxious weed lists, invasive plant lists, and introduced plant lists, with links to more information.
https://plants.usda.gov/java/noxiousDriver

An overview of the potential impacts of honey bees to native bees, plant communities, and ecosystems in wild landscapes: Recommendations for land managers
A review of the potential threats that managed bees may pose to native bees, including the rusty patched bumble bee.
http://www.xerces.org/wp-content/uploads/2016/09/Xerces_policy_statement_HB_Final.pdf

Bumble Bee Conservation

Conserving Bumble Bees: Guidelines for Creating and Managing Habitat for America's Declining Pollinators
A publication to help landowners and managers create, protect, and restore habitat for bumble bee populations.
www.xerces.org/wp-content/uploads/2012/06/conserving_bb.pdf

Bumble Bee Watch
A collaborative citizen science effort to track and conserve North America's bumble bees.
www.bumblebeewatch.org

Bumble Bee Pocket Identification Guides
Pocket identification guides are available for the following species: the rusty patched bumble bee (*Bombus affinis*), the western bumble bee (*Bombus occidentalis*), and the yellowbanded bumble bee (*Bombus terricola*).
http://xerces.org/identification-guides/bumble-bee-pocket-id/

Lady Bird Johnson and Xerces Society Plant Database for Bumble Bees
The Xerces Society partnered with the Lady Bird Johnson Wildflower Center to generate a list of plants that are of special value to bumble bees.
www.xerces.org/lbj

This mesic prairie provides both forage and nesting habitat with a mix of native wildflowers and bunch grasses.