Voluntary Conservation Measures for the Rusty Patched Bumble Bee (*Bombus affinis*)

U.S. Fish and Wildlife Service

Minnesota -Wisconsin Ecological Services Field Office

June 30, 2026

Conservation Measures

The following voluntary conservation measures are applicable to where rusty patched bumble bee (RPBB, *Bombus affinis*) is assumed to be present within the action area (presence is assumed within the rusty patched bumble bee high potential zones). For additional information, visit the section 7 (a)(2) voluntary technical assistance (available online at https://www.fws.gov/media/esa-section-7a2-voluntary-

Tables 1a-1k. Conservation measures for the rusty patched bumble bee (*Bombus affinis*, RPBB), the habitat in which the conservation measure applies and the time of the year of when to consider the conservation measure depending on the latitude of the action (north or south of 42° latitude).

Table 1a. **General conservation measures** and/or research studies.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Ensure compliance with state and local laws and regulations	All	All year	All year
Run the Assisted Determination Key in IPaC	All	All year	All year
Monitor species occupancy. Coordinate with the FWS species lead for specific protocols. Share detection and non-detection data with FWS.	Contact FWS	Flight season	Flight season
Support (fund or conduct) studies to advance recovery progress and increase scientific knowledge of the species health and needs (e.g., genetic health studies, pathogen studies, pesticide studies). Coordinate with the FWS species lead for key research needs and specific protocols.	Contact FWS	All year	All year
Support (fund or conduct) population management recovery efforts (e.g., captive rearing and releases) Coordinate with the FWS species lead for key research needs and specific protocols.	Contact FWS	All year	All year
Train personnel about bumble bee conservation and species identification.	N/A	All year	All year
Counteract any remaining impacts of incidental take that were not avoided. For example, conservation measures could include (but are not limited to) restoring or protecting known foraging, nesting, or overwintering habitat for the rusty patched bumble bee.	Natural areas, gardens	All year	All year

Increase habitat connectivity. Habitat corridors enable range shifts by providing habitat for species to move through to find new habitat. Additionally, increased connectivity allows for larger populations, increased gene flow, and therefore increased genetic variability among populations.	Natural areas, gardens	All year	All year
Use a variety of climate adapted native plants during restoration projects to buffer against the potential impacts of shifting phenology. Native plants are also more likely to adapt to climate variability.	Natural areas, gardens	All year	All year

Table 1b. Conservation measures for **nesting and overwintering** rusty patched bumble bees.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Avoid and protect discovered RPBB nests	All, Contact FWS	April 15 – October 10	April 1 - October 10
Avoid ground disturbing and ground compacting activities that may crush or dig up overwintering queens.	Forest interior, forest edge	October 11- April 14	October 11- March 31
Avoid ground disturbing and ground compaction activities that may crush or dig up nesting colonies	Upland Grassland & Shrublands, Open Woodlands, Glades, Barrens, and Early Successional (0-19 years old), forest edge	April 15 – October 10	April 1 - October 10
Leave potential nesting sites intact whenever possible (e.g., rodent holes, pre-existing cavities).	Natural areas	All year	All year
Avoid flooding suitable nesting habitat.	Natural areas	April 15 – October 10	April 1 - October 10

Table 1c. Conservation measures for **foraging** rusty patched bumble bees.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Avoid removing over 2 acres of flowering plants.	Upland Grassland & Shrublands, Open Woodlands, Glades, Barrens, and Early Successional (0-19 years old)	April 15 – October 10	April 1 - October 10
Increase the abundance and diversity of native wildflowers by direct seeding to establish a new cover type (e.g., conversion of cropland, intensively managed pasture or range, or intensively managed hayland to native floral and grassland habitat).	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Remove and control invasive plants (e.g., garlic mustard, *Allaria petiolata;* buckthorn, *Rhamnus cathartica*) in habitats that may be used for overwintering, foraging, and or nesting.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Establish native trees and shrubs [e.g., willows, serviceberry (*Amelanchie*r)], whose flowers are often good early season pollen and nectar sources.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Avoid or minimize forest management that may destroy spring blooming flowers during their bloom periods.	Forest interior, forest edge	March 1 - senescence	March 1 - senescence

Table 1d. Conservation measures for **pesticide and herbicide use.**

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Across all land use types, take steps to minimize pesticide use, particularly pesticides known to be harmful to bees and other pollinators.	Natural areas, gardens	All year	All year
Ensure that all pesticide applications will be conducted by qualified, trained applicators, comply with label instructions and regulations, and use minimal the number of applications to achieve vegetation objectives.	Natural areas, gardens	All year	All year
Implement preventative strategies to avoid or minimize the need for chemical intervention for insects, diseases and weeds.	Natural areas, gardens	All year	All year

Use the principals of integrated pest management to ensure that management actions are targeted and appropriate for the specific pest based on scouting, monitoring, and a solid understand of the life history and ecology of the pest, disease, or weed species. The principles of Integrated Pest Management (IPM) which includes the use of multiple practices to control pests or invasive plant species, which lower pesticide use, including insecticides. Use the services of certified crop advisors such as Natural Resources Conservation Service (NRCS) or your local extension office to help implement an IPM program. NRCS has various programs that offer financial incentives for certain IPM practices, please contact a local NRCS representative for a list of these opportunities. Consider the FWS guidelines on protecting pollinators from insecticides.[1]	Natural areas, gardens	All year	All year
Apply herbicides as locally and directly as possible (cut-stem application, hand applications, spraying directly on the target plant).	Natural areas, gardens	All year	All year
If feasible, only apply herbicides and pesticides in the late fall or winter, when bumble bees are not active[2].	Natural areas, gardens	Late fall and winter	Late fall and winter
Ensure that pesticide and herbicide application is supervised by a certified pesticide applicator. Workers who apply pesticides are trained to ensure minimum impacts and maximum effectiveness. Only those methods that assure proper application of pesticides are used.	Natural areas, gardens	All year	All year
Within High Potential Zone(s) (HPZ), limit herbicides to basal bark, stem injection and cut-stump applications for woody plants. When spraying herbicides, use low volume techniques that target undesired plant species and that avoid spraying blooming plants when rusty patched bumble bees are likely to be foraging on them. If foraging rusty patched bumble bees would likely be exposed to sprayed herbicide, use hand-pulling or other non-chemical methods of non-native invasive species control	Natural areas	April 15 – October 10	April 1 - October 10
Read the label on the insecticide container and look for information on use and potential effects on bees and other pollinators. Product labels are legally binding and must be followed exactly, including specific pollinator protection language.	All	All year	All year
Consider the full range of management options (e.g., mechanical, cultural, biological, and chemical) to select the	All	All year	All year

[1] https://www.fws.gov/media/reducing-risks-pollinators-insect-and-plant-pest-control-using-integrated-pest-management-0; https://www.fws.gov/media/reducing-risks-pollinators-insect-and-plant-pest-control-using-integrated-pest-management

[2] Note that, unlike honeybees (*Apis mellifera*), bumble bees are often active in cool temperatures, in the morning and/or evening, and males typically do not return to the nests and instead stay on flowers overnight.

most effective, feasible, and low-impact management method for the target pest.			
Use insecticide only when scouting and monitoring suggest that an insect pest outbreak on crops, rangeland, or forested areas will have economic impacts.	Farmland, rangeland, forested areas	April 15 – October 10	April 1 - October 10
When a pesticide application is deemed necessary, select the least toxic pesticide to bumble bees among the available options. Pesticides can be screened for toxicity to bees using the UC IPM Bee Precaution Pesticide Ratings Tool, http://www2.ipm.ucanr.edu/beeprecaution/.	All	April 15 – October 10	April 1 - October 10
Do not apply tank mixed of pesticides that jointly increase toxicity to bees. For example, demethylation inhibitor fungicides can greatly increase the toxicity of pyrethroid and neonicotinoid insecticides to bees.	All	April 15 – October 10	April 1 - October 10
Where pesticides are used, minimize potential exposure to bumble bees and their habitats. Take all available steps to avoid off-site movement from pesticide applications: Do not apply pesticides when pollinators are present and avoid applying pesticides to or allowing them to drift onto flowering plants. Use targeted applications, such as spot sprays, to reduce pesticide inputs and potential drift. Avoid aerial applications whenever possible. Avoid applications when conditions are more likely to lead to off-site movement of particle or vapor drift, such as high winds or temperature inversions. Calibrate spray equipment annually, and adjust pressure, droplet size, and release height to minimize drift.	All	April 15 – October 10	April 1 - October 10
Evaluate and reduce impacts from systemic pesticides: Do not use seed treated with systemic insecticides and avoid applications of systemic insecticides near bumble bee habitat, as these insecticides are highly mobile and can be taken up into the pollen and nectar of flowering plants. Do not plant pollinator habitat in locations where long-lived systemic insecticides (such as neonicotinoids) or persistent herbicides were applied in the previous two years.	All	Timing depends on habitat type	Timing depends on habitat type
Prioritize sites for habitat restoration that are protected from pesticide drift, runoff, and leaching. Implement spatial or vegetative buffers between pollinator habitat and areas that receive pesticide applications or are planted with pesticide coated seeds.	All	Timing depends on habitat type	Timing depends on habitat type

Table 1e. Conservation measures for **forestry and timber management** in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Implement your state's best management practices (BMPs), especially those that serve to minimize the spread of invasive species and to avoid or minimize soil compaction. Visit (https://stateforesters.org/action-issues-and-policy/state-forestry-BMPs-map-o-o) for up-to-date information about BMP recommendations by state.	Forest and forest edge	All year	All year
Avoid or minimize forest management that may destroy spring blooming flowers, particularly during their bloom periods.	Forest and forest edge	March 1 - senescence	March 1 - senescence
Consider thinning or single tree selection and dense invasive shrub removal that may improve overwintering and spring foraging habitat.	Forest and forest edge	All year	All year
Include measures to avoid and minimize spread of non-native or invasive species.	Natural areas	All year	All year
Ensure that timber management activities do not affect more than 25% of forested habitat in the portion of the HPZ that is under your (or entity you represent) ownership in any single year to ensure that a sufficient extent of foraging and overwintering habitat remains available within the HPZ and to minimize direct adverse effects to RPBBs.	Forest and forest edge	April 15 – October 10	April 1 - October 10
Seed decommissioned log landings, retired skid trails, and decommissioned temporary roads with approved seed mix that will maximize forage for RPBBs after site restoration	Forest and forest edge	All year	All year
Install cut-back borders to enhance value of decommissioned log landings to the RPBB.	Forest and forest edge	April 15 – October 10	April 1 - October 10
Avoid or minimize forest management that may destroy spring blooming flowers during their bloom periods.	Forest and forest edge	March 1 - senescence	March 1 - senescence

Table 1f. Conservation measures for **prescribed fire** in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	Habitat Type	Time of Year North of 42°	Time of Year South of 42°
Prescribed Fire			
Avoid high intensity fires. High fuel levels increase the likelihood that fires may destroy nesting habitat for rusty patched bumble bees. Therefore, consider reducing fuel levels (e.g., by haying the previous late fall) before conducting burns where fuel levels seem to be high – if that would not interfere with the burn objectives.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Burn no more than one-third of the suitable habitat within your management area each year. Units should contain approximately equal amounts of rusty patched bumble bee habitat to ensure that the bees are not disproportionately affected by any single burn. Consider the landscape context of the burns and include in your assessment the land within 1km (0.6 mi) of your area.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Use existing barriers, e.g. streams, lakes, wetlands, roads, and trails, whenever possible to reduce the need for fire line construction and to minimize resource impacts	Natural areas	All year	All year
Seed decommissioned fire lines with RPBB forage species.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Within RPBB HPZs, conduct prescribed burns in in a mosaic pattern that leaves patches of unburned habitat within the burn block. If feasible to achieve management objectives, allow fires to burn in a patchy pattern within units, do not try to burn ‘every square inch’, and leave fire “skips” unburned. Consider the use of proactive techniques to increase the patchiness of fires.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Within HPZs, conduct prescribed burns when plants are dormant. This includes, for example, burning as part of permanent grassland and shrubland management and for site preparation.	Natural areas	Timing depends on habitat type	Timing depends on habitat type

Table 1g. Conservation measures for **mowing habitat** in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Mow at the highest cutting height possible, ideally 12-16 inches (30 - 40 cm), or a minimum of 8-10 inches (20 - 25cm) if possible. Mowing at this height will reduce disturbance of established nests.	Natural areas	Timing depends on habitat type	Timing depends on habitat type
Mow outside of the active season, if possible, in areas that provide summer foraging habitat. If mowing must occur during the active flight season, attempt to create a mosaic of structurally different habitat patches or ensure that the extent of the area mowed is not likely to affect more than one-third of the foraging habitat that is available on site or within the larger landscape [within 1 km (0.6mi)] of the site boundary	Natural areas	April 15 – October 10	April 1 - October 10
During the active season, mow at reduced speeds (< 8mph), if possible, to allow time for bees to avoid mowing equipment	Natural areas	April 15 – October 10	April 1 - October 10
Map the extent of mowed areas in rusty patched bumble bee habitat to ensure that future mowing planning is based on an accurate understanding of prior mowing history.	Natural areas	All year	All year
Mow no more than 25% of foraging habitat within your management area per year, if possible. Leave patches of un-mowed habitat for the entire year. Consider the habitat availability in the larger landscape context [within 1 km (0.6mi) of your area].	Natural areas	April 15 – October 10	April 1 - October 10
When carrying out roadside mowing and brushing in HPZs, avoid removing foraging resources when they are flowering, especially during spring when queens are foraging and establishing nests.	Natural areas	April 15 – October 10	April 1 - October 10
Mow non-forested areas during the overwintering period.	Natural areas	October 11- April 14	October 11- March 31
Mow in HPZs when plants are dormant.	Natural areas	October 11- spring emergence	October 11- spring emergence

Table 1h. Conservation measures for **grazing** in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	Habitat Type	Time of Year North of 42°	Time of Year South of 42°
Design and conduct prescribed grazing practices that encourage wildflower diversity and abundance, such as low intensity grazing and/or short duration grazing with long recovery periods	Natural areas and pastures	Timing depends on habitat type	Timing depends on habitat type
Do not exceed moderate stocking rates (e.g., such that the forage harvested by grazing animals does not exceed one-third of the current available forage).	Natural areas and pastures	Timing depends on habitat type	Timing depends on habitat type
Divide the rusty patched bumble bee habitat where grazing is proposed into as many grazing units as is feasible and graze no more than one unit in any single year. Allow the vegetation to recover by rotating grazing areas and establishing ex-closures. Units should contain approximately equal amounts of rusty patched bumble bee habitat to ensure that the colony(ies) is not disproportionately affected by any single graze unit.	Natural areas and pastures	Timing depends on habitat type	Timing depends on habitat type
Complete grazing strategy according to the site characteristics and the type of grazing animals. We recommend that the grazing plan includes prescribed grazing practices that encourage wildflower diversity and abundance to help reach the rusty patched bumble bee	Natural areas and pastures	Timing depends on habitat type	Timing depends on habitat type
Limit grazing in high quality foraging habitat during active season	Natural areas and pastures	April 15 – October 10	April 1 - October 10
Map the extent of grazing in rusty patched bumble bee habitat to ensure future planning is based on accurate understanding of prior grazing history.	Natural areas and pastures	All year	All year

Table 1i. Conservation measures for **road maintenance** in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	Habitat Type	Time of Year North of 42°	Time of Year South of 42°
In HPZs, use slower speeds (< 8 mph) when grading roads and mowing to allow bees to escape direct injury.	Natural areas	April 15 – October 10	April 1 - October 10
Avoid soil compaction when installing and replacing culverts and bridges in HPZs.	Natural areas	April 15 – October 10	April 1 - October 10

Table 1j. Conservation measures for Managed Bees (*Bombus spp, Osmia spp, Apis mellifera*, others) in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Limit use of commercial bumble bees to closed systems (e.g., greenhouses) and try to avoid use in open fields.	Natural areas	April 15 – October 10	April 1 - October 10
Place screens over openings (e.g., vents, windows, etc.) in greenhouses to minimize escape of the managed bees.	Natural areas	All year	All year
Properly dispose of commercial bees after their use and do not release them into the wild[3].	Natural areas	All year	All year
Do not purchase or use commercial bumble bees outside of the native range of the commercial species.	Natural areas	All year	All year
Discourage placement of domesticated honeybee hives in natural areas with high quality rusty patched bumble bee foraging and nesting habitat such as wilderness or wilderness study areas or nature preserves.	Natural areas	April 15 – October 10	April 1 - October 10
Place honeybee hives as far away as possible from natural areas (at minimum 1 km [0.6 mi]) and away from potential rusty patched bumble bee nesting sites	Natural areas	All year	All year
Keep existing domesticated honeybee hive density below 0.5 hive/ac (0.5 hive/0.4 ha), if possible, particularly in areas that are on or near locations with recent (within the year 2007 or more recent) rusty patched bumble bee observations.	Natural areas	All year	All year
Limit each apiary to 20 or fewer hives.	Natural areas	All year	All year
Separate apiaries by at least four miles	Natural areas	All year	All year
Provide landowners and managers with information about the impact of honeybees and other managed bees, on native bees, including bumble bees.	Natural areas	All year	All year

Table 1k. Conservation measures for coordinated management in areas with rusty patched bumble bees and within their critical habitat.

Conservation Measures	**Habitat Type**	**Time of Year North of 42°**	**Time of Year South of 42°**
Coordinate management activities with property owners and managers of nearby rusty patched bumble bee habitats. For example, plan burns and other temporarily adverse management activities during years when nearby habitats will not be burned.	Natural areas	All year	All year

[3] Destruction by freezing is recommended if sampling for forensic purposes (e.g., disease sampling).

Definitions

Compacted soils are dense and occur when soil particles are pressed together, resulting in few large pores and less total pore volume. Compacted soil has a reduced rate of water infiltration, water drainage, and gas exchange. Use of heavy equipment, for example, may increase soil compaction.

Foraging habitats are areas that contain nectar and pollen resources during rusty patched bumble bee flight season. Rusty patched bumble bees are generalist foragers (meaning they collect nectar and pollen from a wide variety of flowers), but need diverse, abundant, native floral resources for their entire active flight season (North of 42° April 15th until October 10th or when forage senesces; South of 42° April 1st until October 10th, or when forage senesces) to sustain colonies.

Forests are ecosystems where trees are the dominant life form.

Forest interiors are large blocks of unfragmented forest with continuous canopy that shows no detectable edge influences.

Forest edge is the interface between forested and non-forested habitats that extends approximately 25-30 meters into the forest.

Ground disturbance is any activity that compacts or disturbs the ground including, but not limited to, digging, seismic surveys, directional drilling, use of heavy equipment, grading, disturbance related to the construction, alteration, trenching, borrow pits, utility lines, bridges, development, some forestry activities, the placement of fill or spoil dirt, material stockpiling, blasting, or cultivation. A project will cause ground disturbance if it leaves depressions or wheel tracks on the soil, removal of forest floor layers, displaced soil, soil erosion, or soil compaction.

Natural areas are undeveloped or wild lands where natural conditions are maintained, including but not limited to those lands preserved or restored and managed for natural features.

Nesting habitat – Upland grasslands, shrublands, savannas, and the forest edge interface between forested and non-forested natural habitats that extends approximately 30 meters (98 feet) into the forest. Rusty patched bumble bees also need abandoned rodent burrows, other mammal burrows, or cavities with ample cover, or similar existing cavities at the soil surface or below to roughly 4 feet underground for nesting. For nesting, rusty patched bumble bees also need well-drained, uncompacted, loose soils sheltered from the elements. In the Central Appalachians (WV, VA, MD), interior forests with these elements are also considered suitable for nesting.

Overwintering habitat - Contiguous upland forest habitat, at least 82 feet (25 meters (m)) from a non-forested edge (i.e., a minimum patch size of 0.75 acres), with herbaceous and woody plants that provide spring pollen and nectar for spring queen foraging immediately after emergence from diapause, leaf litter or duff for burrowing, and without dense invasive plant understory vegetation. For overwintering, rusty patched bumble bees also need well-drained, uncompacted, loose soils sheltered from the elements.

Additional Information

Table 2. Habitats and their typical seasons of use by the rusty patched bumble bee (RPBB). Rusty patched bumble bee habitat is typified by natural or semi-natural vegetation and often contains plants used by the species. The species' use of flower gardens, certain flowering cultivated cropland (e.g., sunflower fields), and similar areas in which forage is concentrated are exceptions to this rule. See above text for additional information on habitat types (nesting, wintering, and foraging). For additional information, visit the section 7 (a)(2) voluntary technical assistance (available online at https://www.fws.gov/media/esa-section-7a2-voluntary-implementation-technical-assistance-rusty-patched-bumble-bee).

Habitat Category	Nesting	Overwintering	Spring Foraging	Summer and Fall Foraging	When RPBB May be Present North of 42º	When RPBB May be Present South of 42º	Comments and Examples
Upland Forest– Interior (at least 25 m from non-forested edge, i.e., a minimum patch size of 0.75 ac)		X			October 11 – April 14	October 11 – March 31	Includes Maple-Basswood; Oak-Hickory and other forests; observations of overwintering bumble bee queens are mostly in shaded areas usually near trees and in banks without dense vegetation.
Upland Forest –Interior (at least25 m from non-forested edge (i.e., a minimum patch size of 0.75 ac)	X (Central Appalachia forests only)		X	(X) Refer to Comments and Examples	April 15 until forage senesces	April 1 until forage senesces	Functions as foraging habitat when forage species are present and blooming. Duration of use varies due to a range in plant species composition and other variables. In some areas of the eastern U.S., for example, the blooming period of understory species may extend well into summer due to local elevation and aspect.
Upland Forest Edge Interface that extends 30 m into the forest	X		X	X	All year	All year	The interface between forested and non-forested habitats (Harper et al. 2005). We assume the edge influence extends 30 meters into the forest.
Upland grasslands, shrublands, and savannas. In Central Appalachia this includes open forests, glades, barrens, and early successional (0-19 years old) forest	X		X	X	April 15 – October 10	April 1- October 10	Native meadows, prairie, etc. – remnants and reconstructed grassland habitats; other examples include oak savanna, pine and oak barrens and old fields.
Palustrine wetlands and seasonally flooded wetlands, and riparian areas			X	X	April 15 – October 10	April 1 – October 10	Marsh, swamp, bog, fen, wet meadow, etc.; forested wetlands (e.g., Silver Maple - Floodplain Forest). RPBB is likely only present if, and when, nectar or pollen are available. Excludes wetland and other areas without flowering emergent vegetation.
Flower gardens, certain flowering cropland (e.g., sunflower, cranberry, and, blueberry fields), and similar areas within 1km of natural or semi-natural vegetation.			X	X	April 15 – October 10	April 1 – October 10	Cultivated vegetation that provides floral resources; accessed by RPBB from nearby natural and semi-natural areas where they may nest or overwinter; RPBB is likely only present if, and when, nectar or pollen are available.