Pollinators Habitat Assessment Tool / Healthy and Pollinator-Friendly Community

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For this project we seek to raise awareness for habitat characteristics and properties for pollinators native to Southern Wisconsin such as bees, butterflies, moths, bats, wasps, hummingbirds, and others. Landowners will assess their land based on different site characteristic and features to determine how suitable their land is for native pollinators. Consequently, suggestions will be provided to evaluate landscape features in order to enhance habitat characteristics for pollinators. The goal for this project is to increase awareness for local citizens so that they can provide better habitats for native pollinators.

Successful pollinator habitats are made up of many diverse qualities. Good areas for pollinator habitats often occur on land with less disturbance including edge habitats, but can also include untilled areas where the soil is loose and well-drained (such as sandy or loamy soils) (1). Habitats should also include the presence of many native plants, a diverse mix of early and late flowering plants, and even some weed species such as dandelions and clover (2). Pollinator species also need nesting and overwintering sites, which include ground nesting habitats, wood nesting habitats, cavity nesting and egg-laying sites for butterflies; additionally, foraging and nesting resources should ideally occur near each other (3). Ultimately, the presence of native and flowering plants and an undisturbed area featuring well-drained soils are key attributes of habitat properties.

In recent years, the use of insecticides, increased land development, and a changing climate have drastically limited the amount of suitable habitats for pollinator species. Pollinators have specialized skills and are crucial to maintaining the health of natural environments in Southern Wisconsin as they aid in plant pollination processes that often promote crucial ecosystem functions and agricultural production of fruits and vegetables. Therefore, consistent conservation efforts and awareness for the magnitude of challenges these species face in the wake of a changing climate are now more crucial than ever. Evaluating pollinator habitats on local land sites is one such way to improve pollinator conservation efforts.

Using landowners whether citizens with acreage of land or a small footprint in the city to provide food, water and possibly other resources for pollinators is essential. Citizens that own land and want to help pollinators need to be aware of; foods they can provide, habitats they can cultivate and practices that will safeguard the pollinators. We recommend providing information to the everyday citizen, business owner or school in the form of a survey and possibly website that can help illuminate the protection of these animals.

People who are not already interested need to be compelled to help pollinators. Help can be anything from putting out food, to making habitat or protecting pollinators homes. Protecting pollinators is not just for the amature bee keeper. Citizens and organizations can make bird or bat houses, put out nectar for butterflies, hummingbirds and types of bees, even just differentiating helpful wasps and bees from destructive ones.

Pollinators help keep our food system going, as well as keeping native plants alive and happy. Spreading awareness about supporting pollinators is essential, and thus prominent businesses or municipal locations that have pollinator gardens should be recognized in some fashion. Including them as important habitat providers on a website or even printing off a

laminated sign with their score to them to put in their garden. Citizens may be motivated or interested to do more research about helping pollinators if they encounter educational materials out in the world.

We recommend working with a horticulturist to design several easy to plant gardens with the plants listed in the survey. Having an easy resource that illustrates what a pollinator garden looks like would be ideal. Citizens with a small footprint might want a guide to help them plant pollinator habitat. For larger plots of land it might be useful to know where is the best places to get seed, or how to cultivate wildflowers. Lastly, businesses might want to advertise to their clients or patrons that they have worked hard to help pollinators, and what that means. Word of mouth and educational materials are powerful tools for making any community more aware of important projects.

Turning the survey into something that can also double as an educational advertisement for pollinator gardens would be nice. Maybe, they recieve a laminated picture on a wooden stake with their score, the website for the survey and what the pollinator project is. Or a place where they can print those material themselves and then laminate and put out in their garden. It might be nice to also just have a web page of businesses and farms that are participating. Ultimately the survey and its information is intended to be a educational resource but figuring out a way to bring awareness to the survey it could double as an advertisement to help pollinators.

This survey is intended to be used by landowners, NGOs, and governmental organizations who wish to evaluate their property to determine how satisfactory their land is for native pollinators. The assessment should be completed by evaluating the land according to the survey found in the appendix. Each item on the survey should be given a score of 0 if it is not present or does not meet the criteria. After following the instructions to complete the evaluation, the scores should be added to create a subtotal for each section. Following that, these subtotals should be added to create an overall habitat score.

The survey tool is evaluated out of 50 points, with 50 being the highest attainable score. The closer your score is to 50, the better suited your habitat is for pollinators. Landowners should attempt to reach at least 25 points for an acceptable habitat. If a score is below 25 points, or you would like to continue to improve your score to attract more pollinators, it is recommended that you review the survey again and evaluate the areas where you score low. From there you can work to improve your land to increase your points.

In conclusion, the goal for this survey tool is to raise awareness for local citizens in the hopes of strengthening local pollinator habitats in order to further protect these species. After conducting research on preferable habitat qualities in five areas (site features, nesting and overwintering features, pesticide use, regional and landscape features, and foraging features), we structured the survey around each parameter and assigned varying point values. Users can use the survey to evaluate how suitable their land is for a successful pollinator habitat, and can view suggested measures to enhance their land if they score low. We hope that this tool will be utilized as a valid pollinator protection effort and further improve habitats for pollinators in Southern Wisconsin.

References

1. *"Pollinator Biology and Habitat."* Natural Resources Conservation Service. Apr. 2014. efotg.sc.egov.usda.gov/references/public/MI/Biol_TN_20_Pollinator-Biology-and-Habitat_v1-1_honey_bee_preferences.pdf.
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4. *"Rusty Patched Bumble Bee Habitat: Assessment Form and Guide."* Xerces Society. May 2017. https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/HabitatAssessmentFormGuideByXercesForRPBB.pdf
5. *"What's the Buzz about Bees?"* Wisconsin Department of Natural Resources. June 2009. https://dnr.wi.gov/wnrmag/2009/06/bees.htm

Appendix

Appendix I: Pollinators Habitat Assessment Tool

A Copy of the habitat assessment tool is provided here. Target audience can either fill the printed version manually, or use the excell document (provided in the following link).

Link to the assessment tool:

https://uwmadison.box.com/s/sb1aowbsgjyqytv30zzgh7hyki6pp913

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Purpose: This project focuses on pollinator conservation in southern Wisconsin, of critical interest because of declining pollinator populations and threats in a state where agriculture and natural systems depend on
healthy pollinator populations. As the outcome of the project, a tool for pollinators habitat assessment is developed in order to:
1. Increase target audience's awareness about healthy and pollinator-friendly habitat properties
2. Evaluate the suitability of lands for a healthy and pollinator-friendly habitat
3. Provide recommendations on how to improve land use and site properties

Habitat Properties: This project seeks to encourage citizens to create new habitate or continue to grown habitat they already have for pollinators. Habitat, should have a place to live for the pollinators as well as food to eat and water to drink.

Target Audience: The Pollinators Habitat Assessment Tool is designed for landowners (urban, suburban and rural), NGOs who own properties (such as Catholic Multicultural Center, Community Groundworks), and Governmental Units who wish to be good stewards (such as Town and Village Halls and their open spaces/parks, school grounds, city parks).	Using Assessment Tool: For each characteristic that is evaluated here, a brief description and its importance on pollinators habitat is stated. Afterwards, a set of specific features, attributed to the habitat, is listed to be determined by the participant with a following assigned score.	
	Possible score: For each question, if the site meets the stated character, the attributed possible score is assigned . If the site does not meet the stated character, the score of 0 is assigned.	Cells with dark green background color are to be filled
	Score: For each characteristic, a maximum total score of 10 would be given to the best practice and the minimum total score of 0 would be given to the worst practice. Scores between 0-10 would be attributed based on features and land management practices that are implemented on site. Highest score in each characteristic means a better habitat feature for pollinators.	Cells with dark red background color are to be evaluated by the tool

Characteristic 1: Regional & Landscape:	Regional and landscape features play an important role in providing a pollinator with resources for food and habitat.		
Select the one that applies		Possible Score	Score
a) This section focuses on what percentage of your land for pollinators is natural or semi-natural habitat. Good pollinator sites have natural habitat features that take up over 75% of the land being assessed. Ideal land characteristics include prairie, shrub lands, woodlands, grasslands, wetlands, and riparian zones. Areas that should not be included in this evaluation include lawn grass, cropland, or overgrazed pasture.	>75% cover	5	
	60% to 75% cover	4	
	40% to 60% cover	3	
	25% to 40% cover	2	
	10% to 25% cover	1	
	<10% cover	0	
b) This section focuses on what is the dominant type of flora and plant species are on the assessed land and the surrounding land within ½ mile. For examples of native plant genera that are good sources of nectar and pollen, see additional information (I & II).	Native plants are dominant	5	
	There is a mix of native and naturalized plants on site (not including invasive species)	4	
	Naturalized flowering plants are dominant	3	
	There is a mix of native and naturalized plants on site (including invasive species)	2	
	Invasive species, crops, or sod-forming grasses are dominant	0	
Characteristic 1: Total Score		10	0

Characteristic 2: Site Features:	Land characeristics have a significant influence on pollinators abundance and diversity.		
Select all that apply		Possible Score	Score
This section focuses on several land features that attract pollinators.	Land includes meadows, prairies, and/or open areas for flowers to bloom	4	
	Land includes wooded or wetland areas that have flowering trees, shrubs, and/or wildflowers	3	
	Land includes buffers (up to 2 points for every buffer of flowered or grassland within 25' of water- 1 for flowered, 0.5 for grass)	0-2	
	Land includes clumped or clustered flowers (4 or more feet in diameter) outnumber individual blossoms	2	
Characteristic 2: Total Score		10	0

Characteristic 3: Foraging Features:	It is important for pollinators to have access to food and water at all stages of life and through out the year.		
Select all that apply		Possible Score	Score
Features and attributed scores	Do you have Spring blooms in your yard? (See additional information III for types of blooms)	2	
	Do you have Summer blooms in your yard? (See additional information IV for types of blooms)	2	
	Do you have Fall blooms in your yard? (See additional information V for types of blooms)	2	
	Do you have plants that catch water or small water dishes in your yard for pollinators? It cannot be a bird bath. (See additional information VI for water resources)	2	
	Do you have blooms in sunlight and shade? (See additional information VII for types of blooms)	2	
Characteristic 3: Total Score		10	0

Characteristic 4: Nesting / Overwintering Features	Successful pollinator habitats always include suitable overwintering and nesting environments. Pollinators nest and overwinter in many different ways: some nest underground, whereas others nest under leaves or in ground cavities, so it is important to accomadate for this diversity in your landscape. Pollinators that nest in the ground require loosly drained soil with sparse vegetation.		
Select the one that applies [for each of the sections a and b]		Possible Score	Score
a) This section focuses on what percentage of your land is suitable for pollinator nesting and overwintering habitats. Good nesting and overwintering haitats should contain native plants and grasses that form in clumps, a variety of flat and sloped areas that maximize exposure to the sun, and contain loose, well drained soil. For examples of native plants and grasses to supplement, see additional information (I and II).	Over 75% of your land contains these qualities	5	
	About 60% to 75% of your land contains these qualities	4	
	About 40% to 60% of your land contains these qualities	3	
	About 25% to 40% of your land contains these qualities	2	
	About 10% to 25% of your land contains these qualites	1	
	>10% of your land contains these qualities	0	
b) This section focuses on land disturbance for nesting and overwintering habitats. Good nesting and overwintering habitats occur where there is little to no trace of excessive raking, mowing, or manicuring of the land. Additionally, the best nesting and overwintering habitats will be as undisturbed as possible with fallen leaves, trees, and logs left on-site.	Your land has little to no trace of excessive raking, mowing, or manicuring and is left almost completely undisturbed	5	
	Your land is only slightly manicured and is mostly left undisturbed	4	
	Your land is a mix of mowed, raked, or manircured land and undisturbed areas	3	
	Your land is mostly mowed, raked, or manicured and only bits and pieces remain undisturbed	2	
	Your land is excessively mowed, raked, or manicured, and retains little to no undisturbed land	1	
	Mowed, raked, and manicured land is dominant with no undisturbed land	0	
Characteristic 4: Total Score		10	0
Characteristic 5: Pesticide Use	Exposure to pesticide is one of the major stressors that impact pollinator health. Minimizing pesticide use in your site and advocate for less pesticide use in areas surrounding your site is the best practice. If the use of pesticide is required, make sure the pesticide does not include neonicotonoid (NNI) active ingredient (see appendices for more information).		
Choose all that apply		Possible Score	Score
No pesticide use on site		10	
NNI-containing pesticide use on site	Pesticide active ingredients include at least one of the following chemicals (See the pesticide ingredients label) - Acetamiprid - Clothianidin - Dinotefuran - Imidacloprid - Nitenpyram - Thiocloprid - Thiamethoxam	0	
non NNI-containing pesticide use on site	Is the pesticide directly applied directly on target plants (to minimize drift)	1	
	Is the pesticide applied during non-bloomin periods	1	
	Prior to pesticide use, is the side weed-free or mowed (discourage pollinators venturing during pesticide use)	1	
	Is the pesticide applied during night time (while bees are not foraging)	1	
	Is the pesticide used during non-windy or low-windy periods (to minimize drift)	1	
Characteristic 5: Total Score		10	0
Overal Habitat Score	0-17 → Not Suitable, 18-36 → Fair, 37-50 → Suitable	50	0
Scores Interpretation	In order to evaluate the suitability of your land, look at the calculated total scores (red cells) for each habitat characteristic. Your site scores in each characteristic can be categorized by the following ranges: - Characteristic 1: Regional & Landscape Total score: 0-4 → Not Suitable Total score: 5-6 → Fair Total score: 7-10 → Suitable - Characteristic 2: Site Features Total score: 0-3 → Not Suitable Total score: 4-5 → Fair Total score: 6-10 → Suitable - Characteristic 3: Foraging Features Total score: 0-4 → Not Suitable Total score: 5-6 → Fair Total score: 7-10 → Suitable - Characteristic 4: Nesting / Overwintering Features Total score: 0-4 → Not Suitable Total score: 5-6 → Fair Total score: 7-10 → Suitable - Characteristic5: Pesticide Use Total score: 0-3 → Not Suitable Total score: 4-5 → Fair Total score: 10 → Suitable		
	Pollinators require the consideration of all the aforementioned characteristics in their habitat. If your site score for any of the evaluated characteristics are in the "Not Suitable" or "Fair" range, the execution of appropriate practices is recommended in order to be able to gain the lost scores and fall into "Suitable" regions. Considering all the characteristics, your site overall score can be categorized by the following ranges: Overal score: 0-17 → Not Suitable Overal score: 18-36 → Fair Overal score: 37-50 → Suitable		

Additional Information I	Some native plant genera that are good sources of pollen and nectar (list is not exclusive)(Consult wildflower guides, nurseries and local experienced gardeners for advice on particular species): - Aster (Aster) - Beardtongue (Penstemon) - Beebalm (Monarda) - Blazing star (Liatris) - Cup plant (Silphium) - Wild indigo (Baptisia) - Fireweed (Chamerion) - Goldenrod (Solidago) - Giant hyssop (Agastache) - Ironweed (Vernonia) - Joe pye weed (Eupatorium) - Leadplant (Amorpha) - Lobelia (Lobelia) - Lupine (Lupinus) - Milkweed (Asclepias) - New Jersey tea (Ceanothus) - Obedient plant (Physostegia) - Prairie clover (Dalea) - Purple coneflower (Echinacea) - Rattlesnake master (Eryngium) - Spiderwort (Tradescantia) - Steeplebush (Spiraea) - Sunflower (Helianthus) - Willow (Salix)
Additional Information II	Some garden plants that are also bee-friendly. Supplement these with native species: - Basil (Ocimum) - Borage (Borago) - Catnip (Nepeta) - Cosmos (Cosmos) - Lavender (Lavandula) - Oregano (Origanum) - Rosemary (Rosmarinus) - Russian sage (Perovskia) - Spearmint (Mentha) - Squill (Scilla)
Additional Information III	Spring Flowers for bees: - Cherry trees - Blackberry bushes - Maple tree - Beardtongue - Pussy Willow - Virginia waterleaf - Siberian Squill - Brassica - Choke Cherry - Hawthorne trees - Wild Indigo - Lupine Spring Flowers for Butterflies: - Lupine - Blackberry bushes Spring Flowers for Hummingbirds: - Lupine - Crabapple Trees
Additional Information IV	Summer blooms: - Aster - Beardtongue - Bee balm - Blazing Star - Cup plant - Fireweed - Goldenrod -Giant Hyssop - Ironweed - Joe pye weed - Leadplant Summer flowers for bees: - Lobelia - Lupine - Milkweed - New Jersey Tea Summer Flowers for butterflies: - Praire clover - New Jersey Tea - Milkweed - Lupine - Lobelia Summer Flowers for Hummingbirds: - New Jersey Tea - Lupine - Lobelia
Additional Information V	Fall blooms and flowers for bees, butterflies, and hummingbirds- Lobelia

Additional Information VI	Water reoiurces for pollinators: - A dish of water with stones or rocks so the insects cant fall in placed outside in a consistent spot. Another way to attract pollinators is to make bee nectar by combining 7 parts water 3 parts sugar placed in your dish. - The Cup Plant is great for pollinators but it also collects water in its leaves for pollinators to drink. - Butterflies love mud! Create a mud dish by taking a shallow plate or dish and spreading a thin layer of dirt on the bottom and add water to make mud. Add a few rocks for the butterflies to land on. It is best placed in a shady area. Place your dish in a consistent place. - Feeders for hummingbirds require nectar, which bees and wasps are also fond of. Hummingbird nectar is 4 parts water and 1 part sugar dissolved in water. Keep your feeder in a consistent place
Additional Information VI	Sun and Shade Full sun: - Lobelia - Lupine - Milkweed - New Jersey tea - Prairie clover - Crabapple trees - Eastern Redbud - Northern Catalpa Part shade: - Lobelia - Lupine - New Jersey tea Full shade: - Astilbe - Fragaria - Mint - Ballon flower - Yarrow - Lemon balm - Blue star amsonia - Jasmine