Pollinators Habitat Assessment Tool / Healthy and Pollinator-Friendly Community

Authors:

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Envr St. 600 Pollinator's Project Final Paper Creating Sustainability in an Unsustainable World: The Role of Systems Thinking in Sustainability

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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

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- 2. "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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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

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 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					
Assessment Tool is designed for landowners (urban, suburban and rural), NGOs who own	specific features, attributed to the habitat, is listed to be determined by the participant with a following assigned score.				
properties (such as Catholic Multicultural Center,	Possible score: For each question, if the site meets the stated character, the attributed possible score is assigned. If the site do	oes not meet	Cells with dark		
Community Groundworks), and Governmental	the stated character, the score of 0 is assigned.		green background color are to be		
Units who wish to be good stewards (such as			filled		
Town and Village Halls and their open spaces/parks, school grounds, city parks).	Come For each about which a maximum total come of 10 would be given to the best amount of the minimum total come	of O would be	Cells with dark red		
spaces, partes, sensor grounds, etcy partes.	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		background color		
	implemented		are to be evaluated		
	on site. Highest score in each characteristic means a better habitat feature for pollinators.		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	>75% cover	5			
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	60% to 75% cover	4			
assessed. Ideal land characteristics include prairie	40% to 60% cover	3			
shrub lands, woodlands, grasslands, wetlands, and	40% to 00% cover	3			
riparian zones. Areas that should not be included	25% to 40% cover	2			
in this evaluation include lawn grass, cropland, or overgrazed pasture.					
8 F	10% to 25% cover	1			
	<10% cover	0			
b) This section focuses on what is the dominant	Native plants are dominant	5			
type of flora and plant species are on the assessed	There is a mix of native and naturalized plants on site (not including invasive species)	4			
land and the surrounding land within ½ mile. For examples of native plant genera that are good	Naturalized flowering plants are dominant	3			
sources of nectar and pollen, see additional		,			
information (I & II).	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	Invasive species, crops, or sod-forming grasses are dominant	Ů	0		
Characteristic 1: Total Score Characteristic 2: Site Features;	Invasive species, crops, or sod-forming grasses are dominant Land characeristics have a significant influence on pollinators abundance and diversity.	0	0		
		Ů	0 Score		
Characteristic 2: Site Features:		10	0 Score		
<u>Characteristic 2: Site Features:</u> Select all that apply	Land characeristics have a significant influence on pollinators abundance and diversity.	10	Score		
Characteristic 2: Site Features:		10	Score		
Characteristic 2: Site Features: Select all that apply This section focuses on several land features that	Land characeristics have a significant influence on pollinators abundance and diversity. Land includes meadows, prairies, and/or open areas for flowers to bloom	10	0 Score		
Characteristic 2: Site Features: Select all that apply This section focuses on several land features that	Land characeristics have a significant influence on pollinators abundance and diversity.	10	0 Score		
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Characteristic 4: Nesting / Overwintering Features	Successful pollinator habitats always include suitable overwintering and nesting environments. Pollinators nest and		
Characteristic 4. Nesting / Overwintering reatures	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	s a and b]	Possible Score	Score
	Over 75% of your land contains these qualities	5	
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	Over 15% of your faild contains these quanties	3	
	About 60% to 75% of your land contains these qualities	4	
plants and grasses that form in clumps, a variety of flat and sloped areas that maximize exposure to	About 40% to 60% of your land contains these qualities	3	
the sun, and contain loose, well drained soil. For examples of	About 25% to 40% of your land contains these qualities	2	
native plants and grasses to supplement, see	About 10% to 25% of your land contains these qualites	1	
additional information (I and II).			
	>10% of your land contains these qualities	0	
 b) This section focuses on land disturbance for nesting and overwintering habitats. Good nesting 	Your land has little to no trace of excessive raking, mowing, or manicuring and is left almost completely undisturbed	5	
and overwintering habitats occur where there is little to no trace of excessive raking, mowing, or	Your land is only slightly manicured and is mostly left undisturbed	4	
manicuring of the land. Additionally, the best nesting and overwintering habitats will be as	Your land is a mix of mowed, raked, or manircured land and undisturbed areas	3	
undisturbed as possible with fallen leaves, trees,	Your land is mostly mowed, raked, or manicured and only bits and pieces remain undisturbed	2	
and logs left on-site.	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	
	iniowed, taked, and maniculed 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 ad surrounding your site is the best practice. If the use of pesticide is required, make sure the pesticide does not include neonico 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	0	
	- Acetamiprid - Clothianidin - Dinotefuran - Imidacloprid - Nitenpyram - Thiocloprid - Thiochorid - Thioaman		
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	1	
	(discourage pollinators venturing during pesticide use)	1	
	Is the pesticide applied during night time (while bees are not foraging) Is the pesticide used during non-windy or low-windy periods (to minimize drift)	1	
Characteristic 5: Total Score	is the pesticide used during non-windy of low-windy periods (to minimize drift)	10	0
	$0-17 \rightarrow \text{Not Suitable}, 18-36 \rightarrow \text{Fair}, 37-50 \rightarrow \text{Suitable}$	50	0
	can be categorized by the following ranges: - Characteristic 1: Regional & Landscape Total score: 0-4 → Not Suitable Total score: 7-10 → Suitable - Characteristic 2: Site Features Total score: 0-3 → Not Suitable Total score: 6-10 → Suitable Total score: 6-10 → Suitable - Total score: 6-10 → Suitable - Characteristic 3: Foraging Features Total score: 5-6 → Fair Total score: 5-6 → Fair Total score: 7-10 → Suitable - Characteristic 4: Nesting / Overwintering Features Total score: 7-10 → Suitable - Characteristic 4: Nesting / Overwintering Features Total score: 7-10 → Suitable - Characteristic 5: Pesticide Use Total score: 7-10 → Suitable - Characteristic 5: Pesticide Use Total score: 4-3 → Not Suitable Total score: 10 → Suitable - Characteristic 5: Pesticide Use Total score: 10 → Suitable Total score: 10 → Suitable		
	Overal score: $0.17 \rightarrow \text{Not Suitable}$ Overal score: $18.36 \rightarrow \text{Fair}$ Overal score: $37.50 \rightarrow \text{Suitable}$		

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Giant bysopy of Agnatode) - Brossment (Vermand) - Longhant (Ameripha) - New Excey for Geomethical) - Obedient plant (Pessonsing) - Partie cloner (Indian) - Partie cloner (Indian) - Partie cloner (Indian) - Rattenands matter (Erugium) - Spielerwort (Tateleramin) - Suegistenand (Spinnera) - Williew (Sality) - Williew (Sality) - Williew (Sality) - Longhant (Pessonsin) - Rattenands matter (Erugium) - Spielerwort (Tateleramin) - Suegistenand (Spinneramin) - Suegistenand (Spinneramin) - Longhant (Pessonsin) - Longhant (Pessonsin) - Longhant (Pessonsin) - Rattenands (Pessonsin) - Longhant
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- Inception Composition - Lapine Composition - Lapine Composition - Lapine Composition - Milkweed (Avelopasa) - New Jersy to (Canadana) - New Jersy to (Canadana) - Perpis controllower (Estimatesa) - Perpis controllower (Estimatesa) - Perpis controllower (Estimatesa) - Perpis controllower (Estimatesa) - Southweet (Tableccanda) - Composition - Revision ages (Provokia) - Southweet (Armanda) - Revision ages (Provokia) - Revision ages (Provok
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- Looking Looking - Looking Looking - District Clayse (Looking) - Orderen plant (Physiologing) - Orderen plant (Physiologing) - Praint clover (Delato) - Project conference (Transcania) - Supple Conference (Transcania) - Lorence (Transcania) - Supple Conference (Transcania) - Suppl
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- Mileword (Accipate) - Now Jensy to the Cocumbrian) - Obtained path (Physical Cocumbrian) - Physica conditioned (Physical Cocumbrian) - Spideword (Tableadans) - Willow (Salts) - Summer Mysical Cocumbrian - Market (Cocumbrian) - Commo (Cocumbrian) - Commo (Cocumbrian) - Cocumbrian (Cocumbrian)
- New Jersey tas Consortius) - Oeckloan plant (Psyconage) - Paties (progr (Mate) - Paties (progr (Mate) - Radienake manuer (Psyngian) - Spickework (Taskesumin) - Spickework (Taskesumin) - Spickework (Taskesumin) - Spickework (Taskesumin) - Willow (Salty) - Willow (Salty) - Willow (Salty) - Willow (Salty) - Radienake manuer (Psyngian)
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- Ratio-State and Company of the Com
- Spide your Of Trads-Carmins) - Seepelebash (Spinzers) - Seeplebash (Spinzers) - Bengar (Konzers) - Bengar (Konzers) - Bengar (Konzers) - Control (Neptests) - Research (Spinzers) - Research (Spinzers) - Spinzers (Mentals) - Spi
- Secophoba (Spinea) - Secombow (Edumn) - Willow (Salas) - Willow (Salas) - Willow (Salas) - Willow (Salas) - Brange (Bonzo) - Camp (Nepeta) - Camp (Second) - Residual (Salas) - Salas (Salas) - Salas (Salas) - Blackery budes - Huke Kery budes - Hugher free - Bentionge - Pany Willow - Salas (Salas) - Salas (Sa
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- Willow (Salia) Additional Information II Some garden plants that are also bee-friendly. Supplement these with native species: - Hasti (Crimmon) - Borgue (Borgue) - Crain (Vergen) - Lavendor Lavandola) - Oregano (Origano) - Rosemary (Rosmarinas) - Rosinia sage (Perva vida) - Special (Salia) - Popular (Salia) - Special (Salia) - Spec
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Broage (Gorge) - Causiny (Oepeta) - Courses (Courson) - Leveroefer (Leverandus) - Designation (Designation) - Russian sage (Perovskita) - Spannint (Mentha) - Hope to the see
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Common Common - Lavender (Lawandia) - Corgent (Origanum) - Rosemany (Storamentos) - Additional Information III
Lavedor (Lavendrella) - Oregano (Organum) - Rousnary (Rounarius) - Rousnary (Rounarius) - Rousnary (Rounarius) - Squilt (Schild) - Squilt (Squilt) - S
- Oregamo (Origamum) - Rosemary (Rosmarius) - Russian sage (Perovikia) - Spermitt (Mentalu) - Resettore (Mentalu) - Res
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- Speamint (Montha) - Squilt (Scilla) Additional Information III Spring Flowers for bees: - Cherry trees - Blackberry bushes - Maple tree - Beardrongue - Pussy Willow - Virginia waterfaet - Sherrian Squill - Brassica - Choke Cherry - Hawthome trees - Wild Indingo - Luptine Spring Flowers for Butterflies: - Blackberry bushes - Spring Flowers for Butterflies: - Spring Flowers for Hummingbirds: - Luptine - Crabapple Trees Additional Information IV Summer Booms: - Asset - Cup plant - Floweed - Goldemod - Giant Hysop - Honweed - Goldemod - Giant Hysop - Howes for Butterflies: - Luptine - Joe py weed - Leekplant - Summer Rowers for Butterflies: - Luptine - Milkweed - New Jersey Te - Luptine
- Speamint (Montha) - Squilt (Scilla) Additional Information III Spring Flowers for bees: - Cherry trees - Blackberry bushes - Maple tree - Beardrongue - Pussy Willow - Virginia waterfaet - Sherrian Squill - Brassica - Choke Cherry - Hawthome trees - Wild Indingo - Luptine Spring Flowers for Butterflies: - Blackberry bushes - Spring Flowers for Butterflies: - Spring Flowers for Hummingbirds: - Luptine - Crabapple Trees Additional Information IV Summer Booms: - Asset - Cup plant - Floweed - Goldemod - Giant Hysop - Honweed - Goldemod - Giant Hysop - Howes for Butterflies: - Luptine - Joe py weed - Leekplant - Summer Rowers for Butterflies: - Luptine - Milkweed - New Jersey Te - Luptine
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- 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 - Milkweed - Lupine - Lupine - Lupine - Lobelia Summer Flowers for Hummingbirds: - New Jersey Tea
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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