

# Using Green Infrastructure to Create Wildlife Habitat: Part 2 - How to Develop Habitats for Pollinators



**NEAL O'REILLY, PH.D.**  
EMERITUS DIRECTOR CONSERVATION &  
ENVIRONMENTAL PROGRAM  
University of Wisconsin- Milwaukee







GREEN INFRASTRUCTURE AS  
WILDLIFE HABITAT

## Definition of Green Infrastructure

*"the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters."*

- 2019 Federal Water Infrastructure Improvement Act

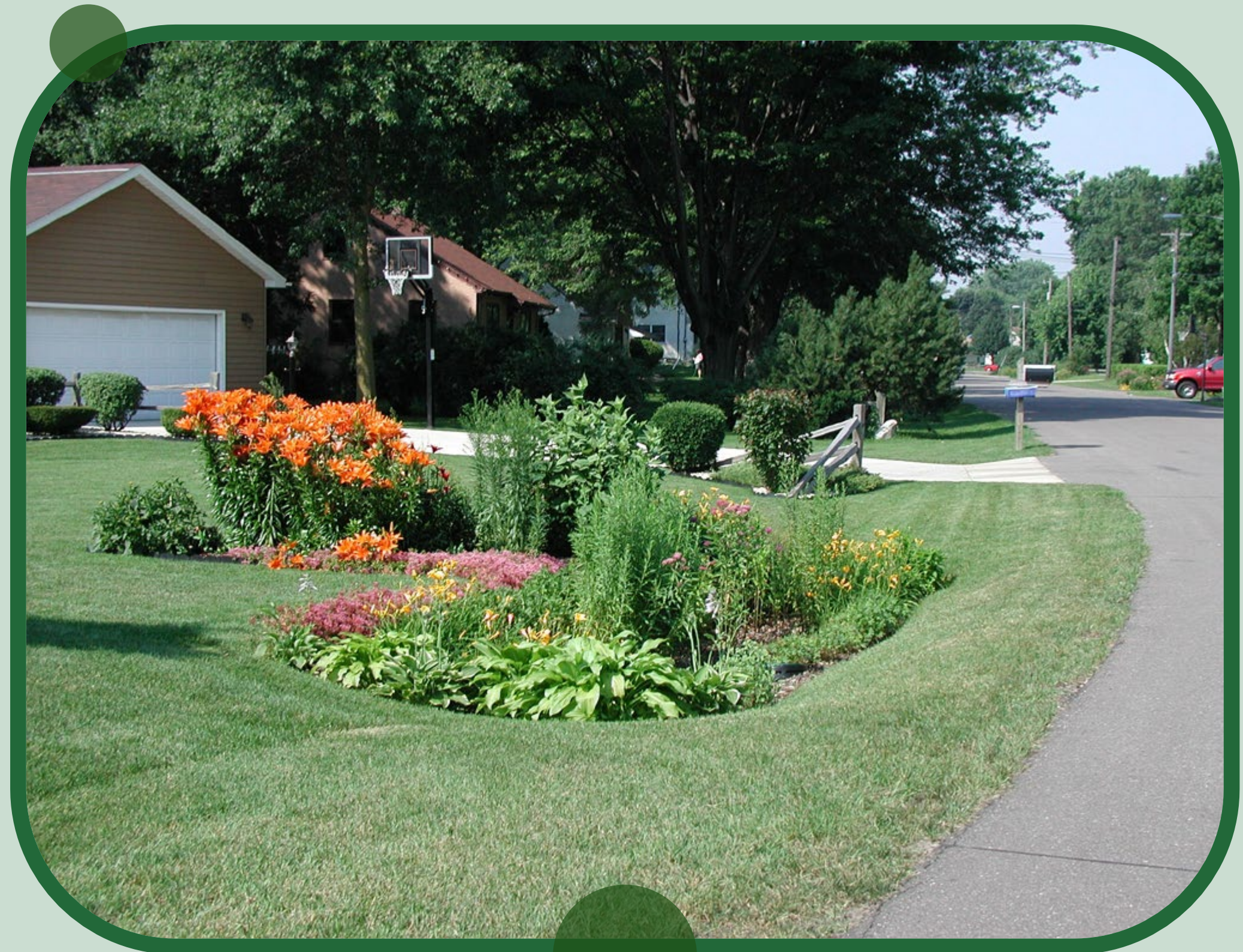




GREEN INFRASTRUCTURE AS  
WILDLIFE HABITAT

**Green infrastructure can provide many benefits including:**

- Stormwater storage
- Water quality treatment
- Improved neighborhood aesthetics
- Wildlife habitat







# Green Roofs

*University of Wisconsin – Milwaukee  
Sandburg Resident Hall*







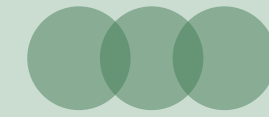
# Green Roofs

Traditional sedum plantings

*University of Wisconsin – Milwaukee  
School of Freshwater Science*







# Green Roofs

Enhanced green roofs with trees, shrubs, and even water features

*Kaiser Center Roof Garden  
Oakland, CA  
built in the 1960s*



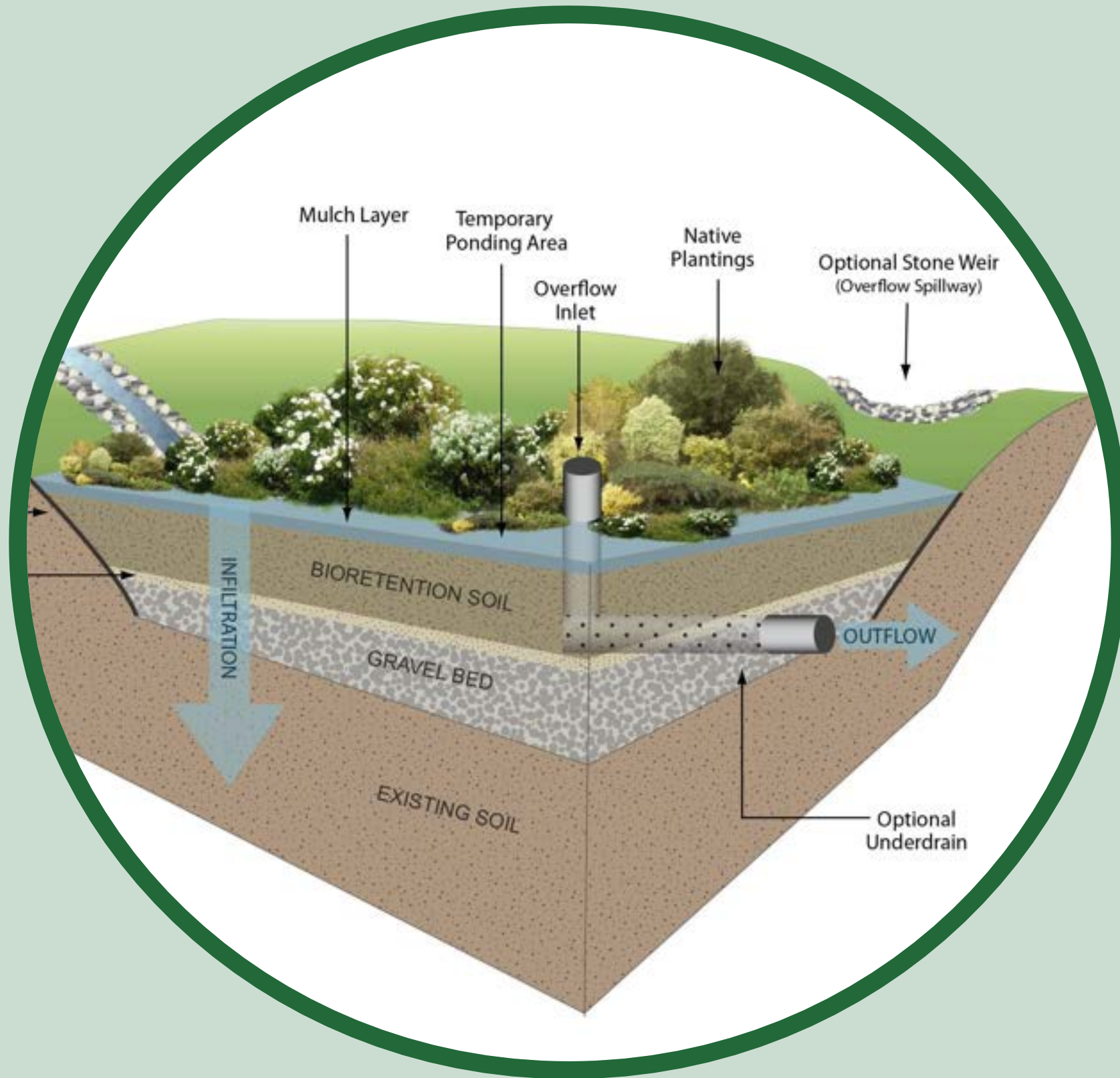




# Rain Gardens







# Rain Gardens

Systems that infiltrate stormwater through an engineered soil and discharge directly into the ground or through an underdrain system.





# Rain Gardens

Systems that do not filter water through the soil but store water on the surface and act as stormwater detention systems and *loose water predominantly through evapotranspiration*







# Bio-Swa les





# Treatment Wetlands







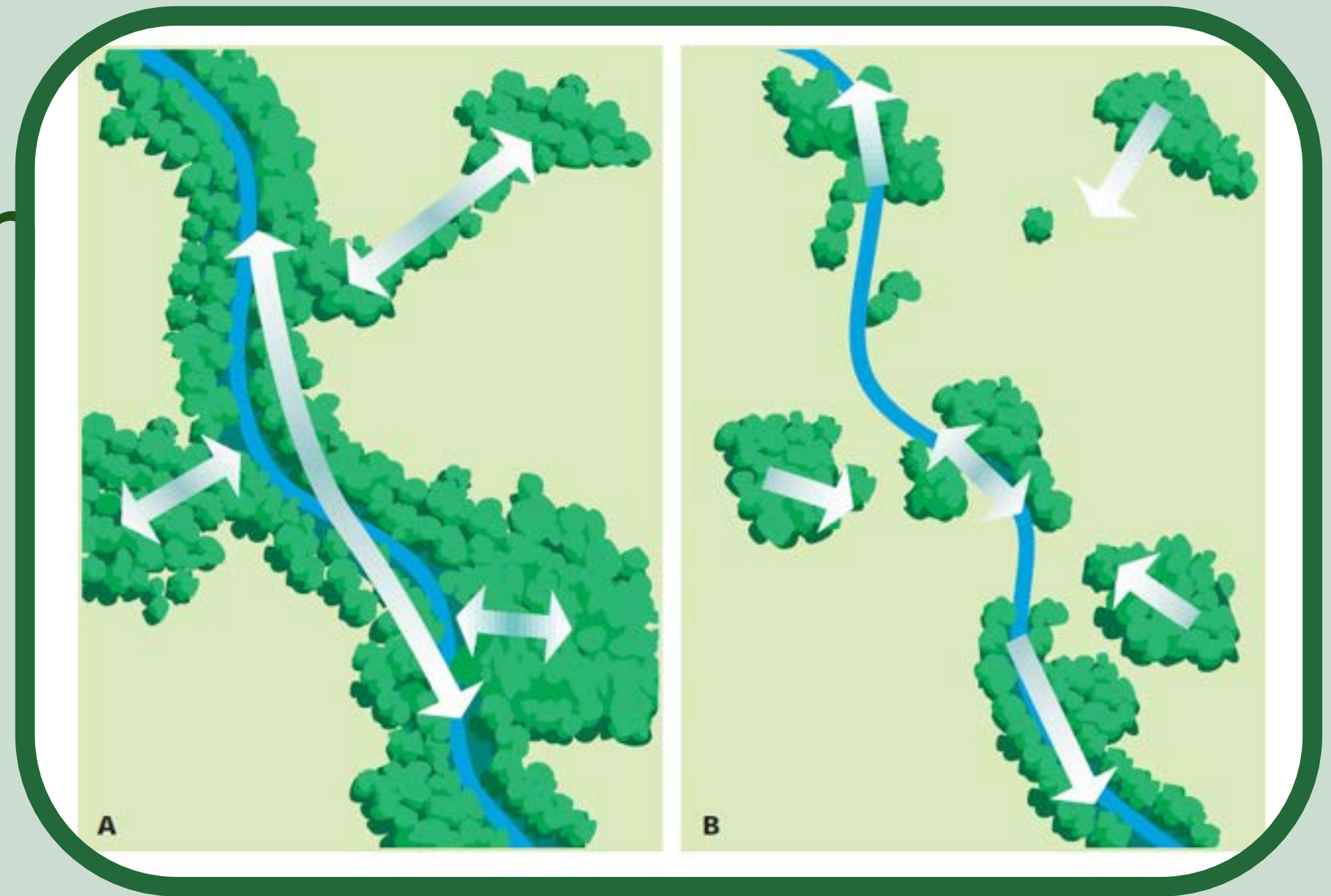
So Why Design Green  
Infrastructure for  
Wild life ?





# So Why Design Green Infra structure for Wild life ?

Urban areas are unfriendly environments for wildlife in part due to the fragmentation of habitats.







If we could connect isolated wildlife habitats through backyard landscaping, we could reduce the fragmentation in urban environments.







GREEN INFRASTRUCTURE AS  
WILDLIFE HABITAT

## OUR VISION

If everyone reduced their lawn and landscaped with more native plants, we could have more livable cities with:

- Better air quality
- Reduced heat island effects
- Better water quality
- Reduced crime
- Better wildlife habitat



●●●

Today, I want to talk about how green infrastructure can be designed as habitat for pollinators





# ●● Why should we care about pollinators?



75% of our flowering plants, and nearly 75% of our crops require pollination



# Why should we care about pollinators?

## 10 Crops that Would Disappear Without Bees

1. Apples
2. Almonds
3. Blueberries
4. Cherries
5. Avocados
6. Cucumbers
7. Onions
8. Grapefruit
9. Orange
10. Pumpkins





# Who are pollinators?

- Bumble Bees





# Who are pollinators?

- Solitary Bees





# Who are pollinators?

- Butterflies & Moths





# Who are pollinators?

- Wasps





# Who are pollinators?

- Flies





# Who are pollinators?

- Beetles





# ●● Who are pollinators?

- Birds





# Who are pollinators?

- Bats





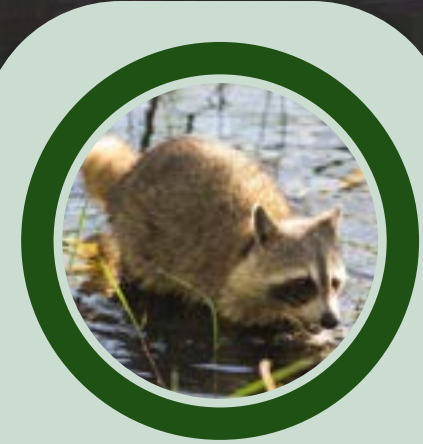


 Green Infrastructure  
as Wildlife Habitat

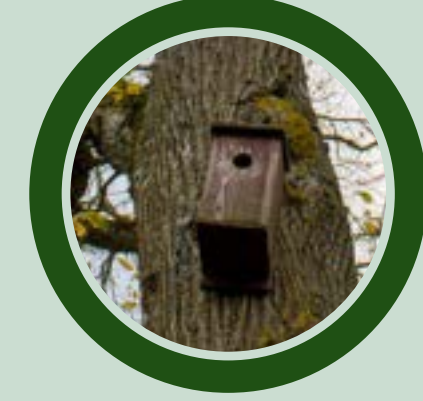
# WHAT DO ALL ANIMALS NEED?



Food

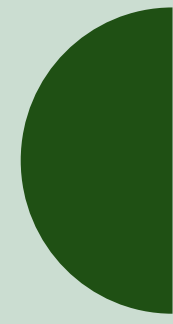


Water



Shelter &  
Breeding  
Sites

Danielle Bell/Native Roots





# What does a healthy pollinator habitat look like?

Blooming flowers to feed on throughout the growing season,



*A foraging bumble bee.*

a safe place to nest,



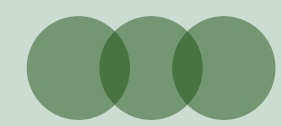
*Ground nesting mining bee*

and a habitat free from toxic chemicals such as insecticides.



*Monarch butterflies foraging in a prairie, by Ellen MacDonald.*





When selecting plants to attract pollinators we have many options:





- Select for color





- Select for general habitat





## Upick Pollinator Kits

Power-up for pollinators! There's no substitute for native plants when it comes to supporting pollinators. These kits are guaranteed to boost the capacity and generate some real humm in your garden. Choose from a list of ultimate pollinator favorites and to create your 16- or 32-plant Custom Kit. And save on the cost of plants, too!



2 items

Sort By Latin Name 



16-Plant Pollinator Patch

\$79.00

[VIEW PRODUCT](#)



32-Plant Pollinator Powerhouse

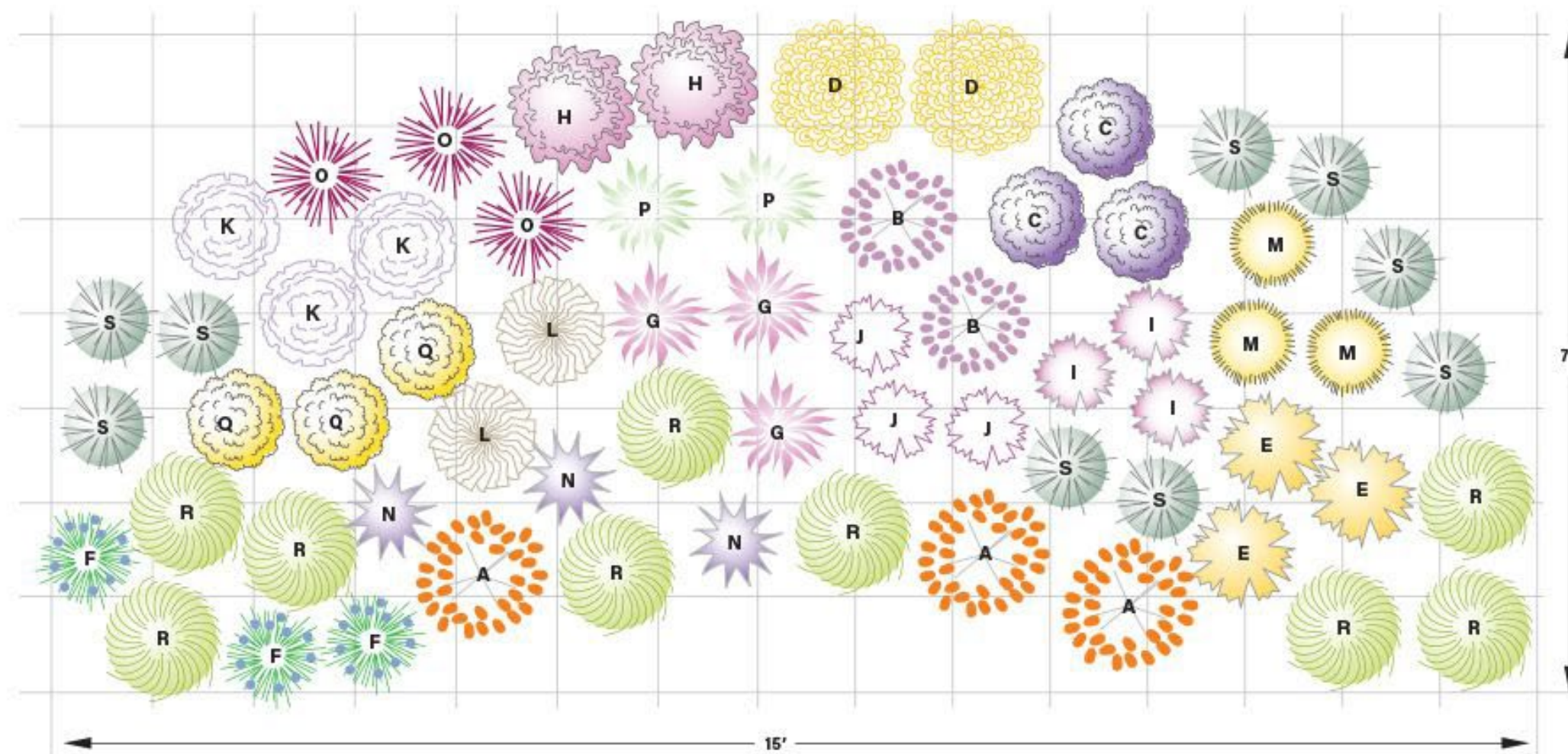
\$129.00

[VIEW PRODUCT](#)



# PLANTING PLAN

**64 Plant Pollinator Garden** for well-drained soil in full sun  
Item #: 50058



- |                                     |                                  |                                |
|-------------------------------------|----------------------------------|--------------------------------|
| <b>A</b> Butterflyweed for Clay (3) | <b>G</b> Purple Coneflower (3)   | <b>M</b> Ohio Goldenrod (3)    |
| <b>B</b> Sullivant's Milkweed (2)   | <b>H</b> Sweet Joe Pye Weed (2)  | <b>N</b> Ohio Spiderwort (3)   |
| <b>C</b> New England Aster (3)      | <b>I</b> Meadow Blazingstar (3)  | <b>O</b> Ironweed (3)          |
| <b>D</b> Wild Senna (2)             | <b>J</b> Prairie Blazingstar (3) | <b>P</b> Culver's Root (2)     |
| <b>E</b> Stiff Coreopsis (3)        | <b>K</b> Bergamot (3)            | <b>Q</b> Golden Alexanders (3) |
| <b>F</b> Purple Prairie Clover (3)  | <b>L</b> Smooth Penstemon (2)    |                                |

- GRASSES**
- R** Prairie Dropseed (9)
  - S** Little Bluestem (9)

19 species





- 
- Select for target species







Select plants and design the system based on the life cycle needs of the a group of target species such as:

- Threatened or Endangered,
- Species of local concern, or
- Species in decline





- Wisconsin is home to several bumble bee species in decline, including:
  - The rusty-patched bumble bee (*Bombus affinis*),
  - the yellow-banded bumble bee (*B. terricola*),
  - and the American bumble bee (*B. pensylvanicus*).





- Wisconsin is also home to the federally endangered Karnerblue butterfly (*Lycaeides melissasamuels*) and lies along the central migratory route of the monarch butterfly (*Danaus plexippus*), whose migration was named a “threatened phenomenon” by the International Union for Conservation of Nature (IUCN).





- State endangered butterflies and moths include:
  - the northern blue butterfly (*Lycaeides idas*),
  - the regal fritillary (*Speyeria idalia*),
  - the Phlox moth (*Schinia indiana*), and several others.
- For the vast majority of wild pollinator species, there is a lack of data on population status or trends.



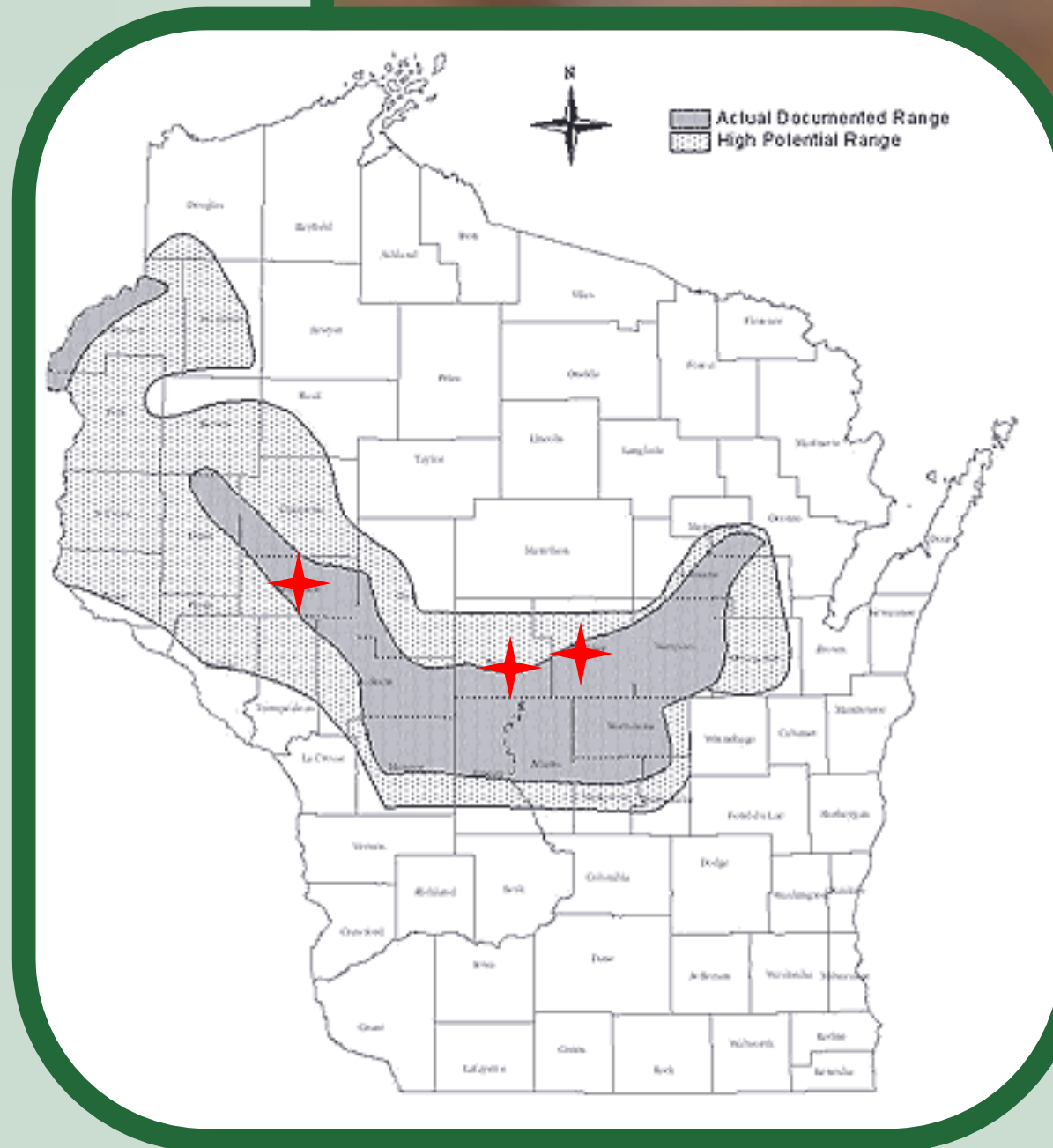


# Karner Blue Butterfly

(*Lycaeides melissasamuels*)



The Karner blue's lifecycle depends completely on one plant, the wild lupine.





- Monarch  
Butterfly  
(*Danaus plexippus*)





- Monarch
  - Lay their egg on milkweed







- Milkweed Common to Wisconsin

- Common Milkweed (*Asclepias syriaca*)
- Whorled Milkweed (*Asclepias verticillata*)
- Butterfly Weed (*Asclepias tuberosa*)
- Purple Milkweed (*Asclepias purpurascens*)
- Poke Milkweed (*Asclepias exaltata*)
- Green Comet Milkweed (*Asclepias viridiflora*)
- Swamp Milkweed (*Asclepias incarnata*)





# • Monarch

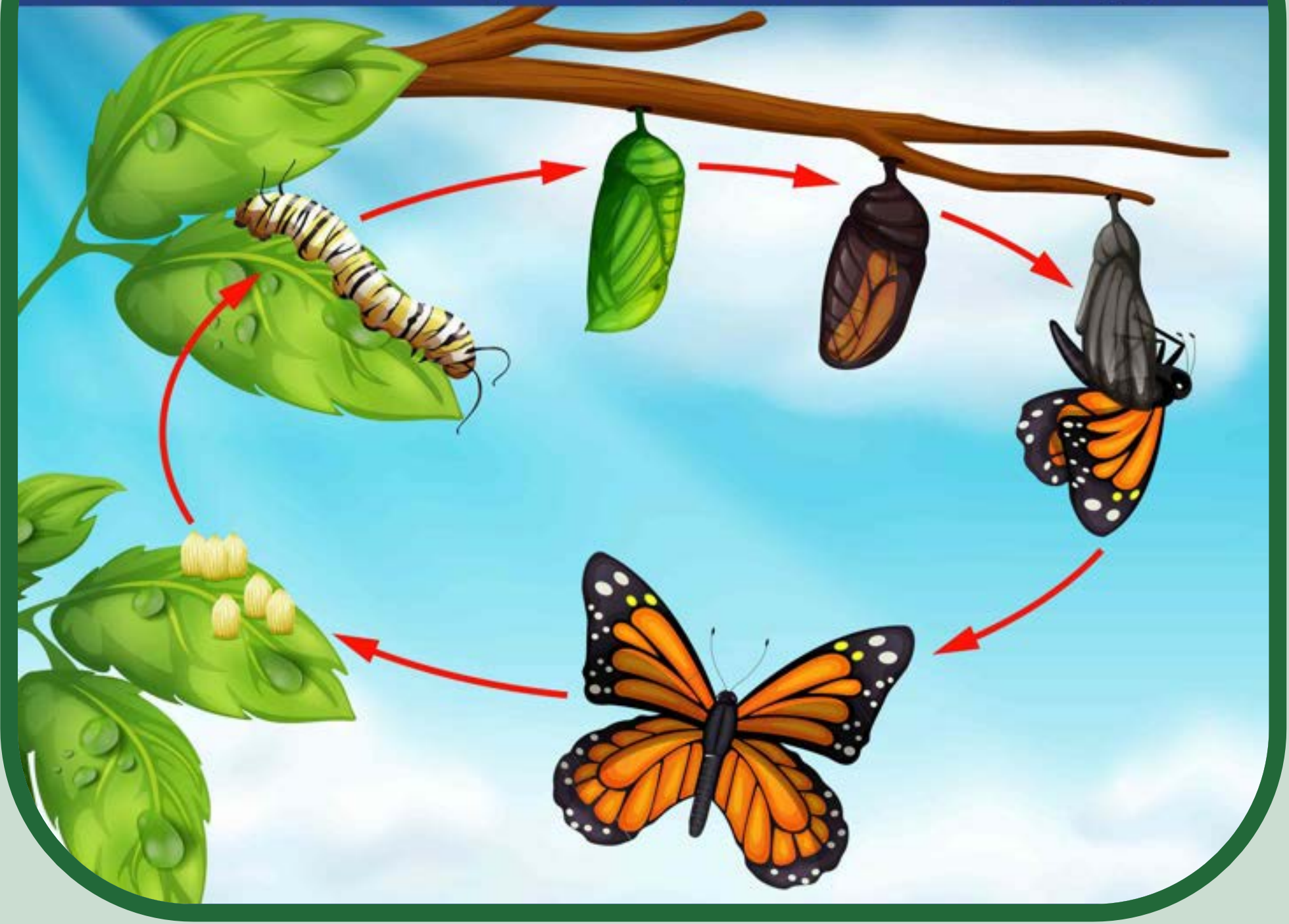


Bloom	Common Name	Scientific Name	Flower Color	Max. Height	Water Needs
	Forbs			(Feet)	Low, Medium, or High
Summer	1 Butterfly milkweed	<i>Asclepias tuberosa</i>	Orange	2	L
	2 Common milkweed	<i>Asclepias syriaca</i>	Pink	5	L/M/H
	3 Culver's root	<i>Veronicastrum virginicum</i>	White	6	M
	4 Swamp milkweed	<i>Asclepias incarnata</i>	Pink	4	M/H
Summer to Fall	5 Black-eyed Susan	<i>Rudbeckia hirta</i>	Yellow	2	L
	6 Common boneset	<i>Eupatorium perfoliatum</i>	White	6	M/H
	7 Eastern purple coneflower	<i>Echinacea purpurea</i>	Pink/purple	5	L/M
	8 Field thistle	<i>Cirsium discolor</i>	Pink/purple	7	L
	9 Marsh blazing star	<i>Liatris spicata</i>	Purple	5	M/H
	10 Meadow blazing star	<i>Liatris ligulistylis</i>	Purple	5	M
	11 Ontario blazing star	<i>Liatris cylindracea</i>	Purple	2	L
	12 Rough blazing star	<i>Liatris aspera</i>	Purple	4	L
	13 Sawtooth sunflower	<i>Helianthus grosseserratus</i>	Yellow	10	M
	14 Showy goldenrod	<i>Solidago speciosa</i>	Yellow	5	L
	15 Smooth oxeye	<i>Heliopsis helianthoides</i>	Yellow	5	L/M
	16 Spotted beebalm	<i>Monarda punctata</i>	White/pink/yellow	3	L
	17 Spotted joe pye weed	<i>Eutrochium maculatum</i>	Pink	6	H
	18 Stiff goldenrod	<i>Oligoneuron rigidum</i>	Yellow	5	L/M
	19 Swamp thistle	<i>Cirsium muticum</i>	Pink/purple	7	H
	20 Whorled milkweed	<i>Asclepias verticillata</i>	White	3	L
21 Wild bergamot	<i>Monarda fistulosa</i>	Purple	5	L/M	
Fall	22 Aromatic aster	<i>Symphotrichum oblongifolium</i>	Purple	2	L
	23 Maximilian sunflower	<i>Helianthus maximiliani</i>	Yellow	8	L
	24 New England aster	<i>Symphotrichum novae-angliae</i>	Pink/purple	6	M

Source: [https://xerces.org/sites/default/files/2018-05/17-007\\_02\\_XercesSoc\\_MonarchNectarPlants\\_Great-Lakes\\_web-4page.pdf](https://xerces.org/sites/default/files/2018-05/17-007_02_XercesSoc_MonarchNectarPlants_Great-Lakes_web-4page.pdf)



## Monarch Butterfly Life Cycle (*Danaus plexippus*)

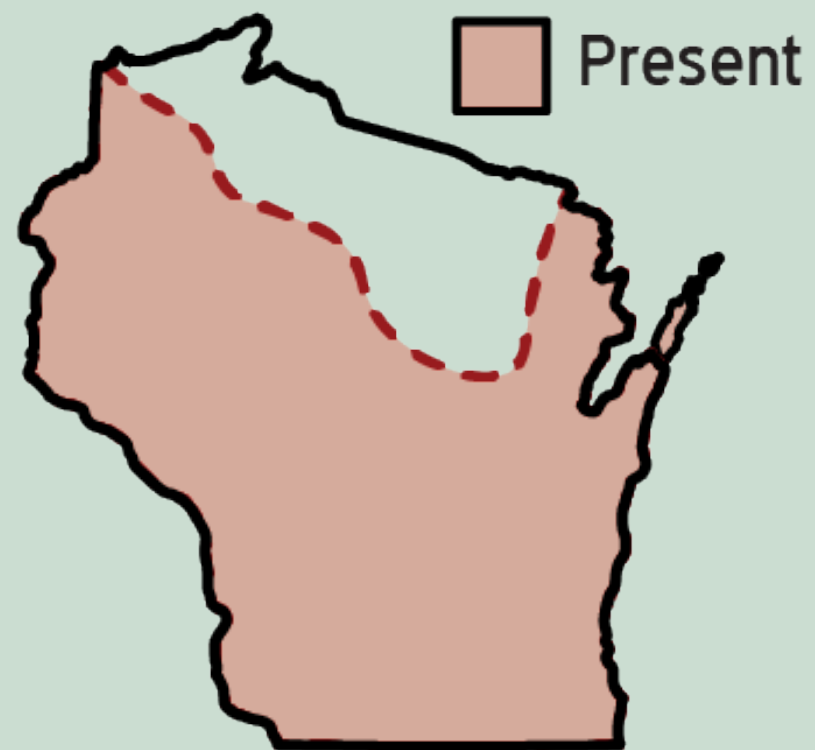


- Monarch





- Rustypatched bumble (*Bombus affinis*)







- Preferred flowers include:
  - Sunflowers
  - Goldenrod
  - Bee Balm

### Plants Favored By Rusty Patched Bumble Bee

Scientific Name	Common Name	Great Plains			Great Lakes			Northeast		
		Spring (Mar-Apr)	Summer (May-Aug)	Fall (Sept-Oct)	Spring (Mar-Apr)	Summer (May-Aug)	Fall (Sept-Oct)	Spring (Mar-Apr)	Summer (May-Aug)	Fall (Sept-Oct)
<b>Herbaceous species</b>										
<i>Agastache</i> spp	Native giant hyssop species		X			X			X	
<i>Asclepias</i> spp	Milkweed species		X			X			X	
<i>Baptisia alba</i>	Wild white indigo		X			X		X		
<i>Baptisia bracteata</i>	Cream indigo		X			X				
<i>Cirsium discolor</i>	Native field thistle		X	X		X	X		X	X
<i>Cirsium muticum</i>	Native swamp thistle		X	X		X	X		X	X
<i>Dalea candida</i>	White prairie clover		X			X				
<i>Dalea purpurea</i>	Purple prairie clover		X			X				
<i>Primula</i> spp	Shooting star species	X			X	X		X		
<i>Echinacea</i> spp	Coneflower species		X			X			X	
<i>Eutrochium</i> spp	Joe Pye weed		X			X			X	
<i>Gentiana</i> spp	Gentian species		X	X		X	X			X
<i>Geranium maculatum</i>	Wild geranium	X	X		X	X		X		
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	X	X		X	X		X		
<i>Impatiens capensis</i>	Jewelweed		X			X			X	
<i>Liatris</i> spp	Blazing-star species		X			X			X	
<i>Lupinus perennis</i>	Wild lupine	X	X		X	X		X		
<i>Monarda fistulosa</i>	Bee balm/wild bergamot		X			X			X	
<i>Pedicularis canadensis</i>	Wood betony	X	X		X	X		X		
<i>Penstemon digitalis</i>	Smooth penstemon					X				
<i>Penstemon grandiflorus</i>	Large-flowered penstemon		X			X				
<i>Pycnanthemum virginianum</i>	Mountain mint		X			X			X	
<i>Solidago speciosa</i>	Showy goldenrod		X	X			X			
<i>Solidago</i> spp	Goldenrod species		X	X			X			X
<i>Symphotrichum novae-angliae</i>	New England aster		X	X			X			X
<i>Veronicastrum virginicum</i>	Culver's root		X			X			X	
<b>Woody Species</b>										
<i>Amelanchier</i> spp	Serviceberry	X			X			X		X
<i>Amorpha canescens</i>	Leadplant		X			X				
<i>Ceanothus americanus</i>	New Jersey tea		X			X			X	
<i>Cephalanthus occidentalis</i>	Buttonbush		X			X			X	
<i>Diervilla lonicera</i>	Dwarf bush honeysuckle		X			X			X	
<i>Prunus</i> spp	Plums and cherries	X	X		X	X		X	X	
<i>Ribes</i> spp	Gooseberry and currants	X			X			X		
<i>Rosa</i> spp	Wild roses		X			X		X		
<i>Salix</i> spp	Willows	X			X			X		
<i>Spiraea</i> spp	Spiraea		X			X		X		
<i>Tilia americana</i>	American basswood		X			X			X	
<i>Vaccinium macrocarpon</i>	Large cranberry		X			X			X	

Source: *Rusty patched bumble bee recovery plan* – USFWS 2021



- Rustypatched bumble (*Bombus affinis*) need ground sites of bare earth to nest





●●●

Avoid European honey bee (*Apis mellifera*) hives near your pollinator site as these nonnative species compete with native bees.







Prairie Willow



Cream Wild Indigo



Pale Purple Coneflower



Showy Goldenrod

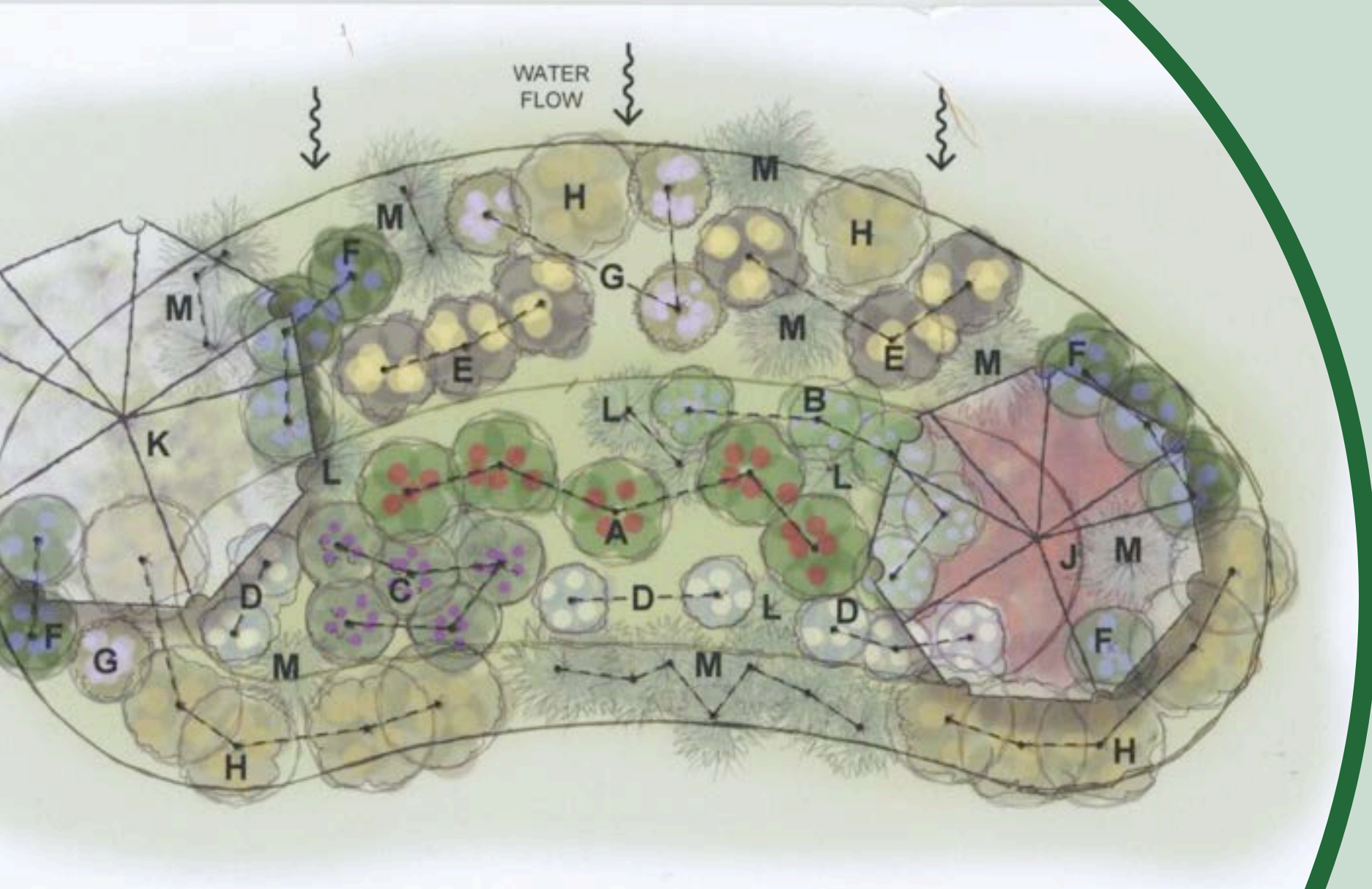


Smooth Blue Aster

So how do we select plants?







**RAIN GARDEN in FULL SUN**  
24' x 12'




- Cardinal flower ~ Hibiscus
- Blue vervain ~ Swamp milkweed
- Ironweed ~ Tall sunflower
- Green-headed coneflower ~ Blazing star
- Thin-leaved sunflower ~ Oxeye
- Brown-eyed Susan ~ Helen's flower
- Great blue lobelia ~ Wild senna
- White Beardtongue ~ Virginia bluebells
- Black root ~ Purple bergamot
- Mountain mint

- H Rough-stemmed goldenrod ~ Basil balm  
Butterflyweed ~ Perennial phlox
- J Tupelo ~ Buttonbush- Winterberry  
Grey dogwood ~ Common elderberry
- K Dogwood ~ Ninebark ~ Red maple  
Shrubby St. Johnswort ~ Wild hydrangea
- L Switchgrass ~ Wool grass ~ Wild stonecrop  
Big bluestem ~ Riverbank wild rye  
Starry campion ~ Blue-eyed grass  
Virginia wild rye ~ American
- M Bottlebrush grass



# Develop a Planting Plan

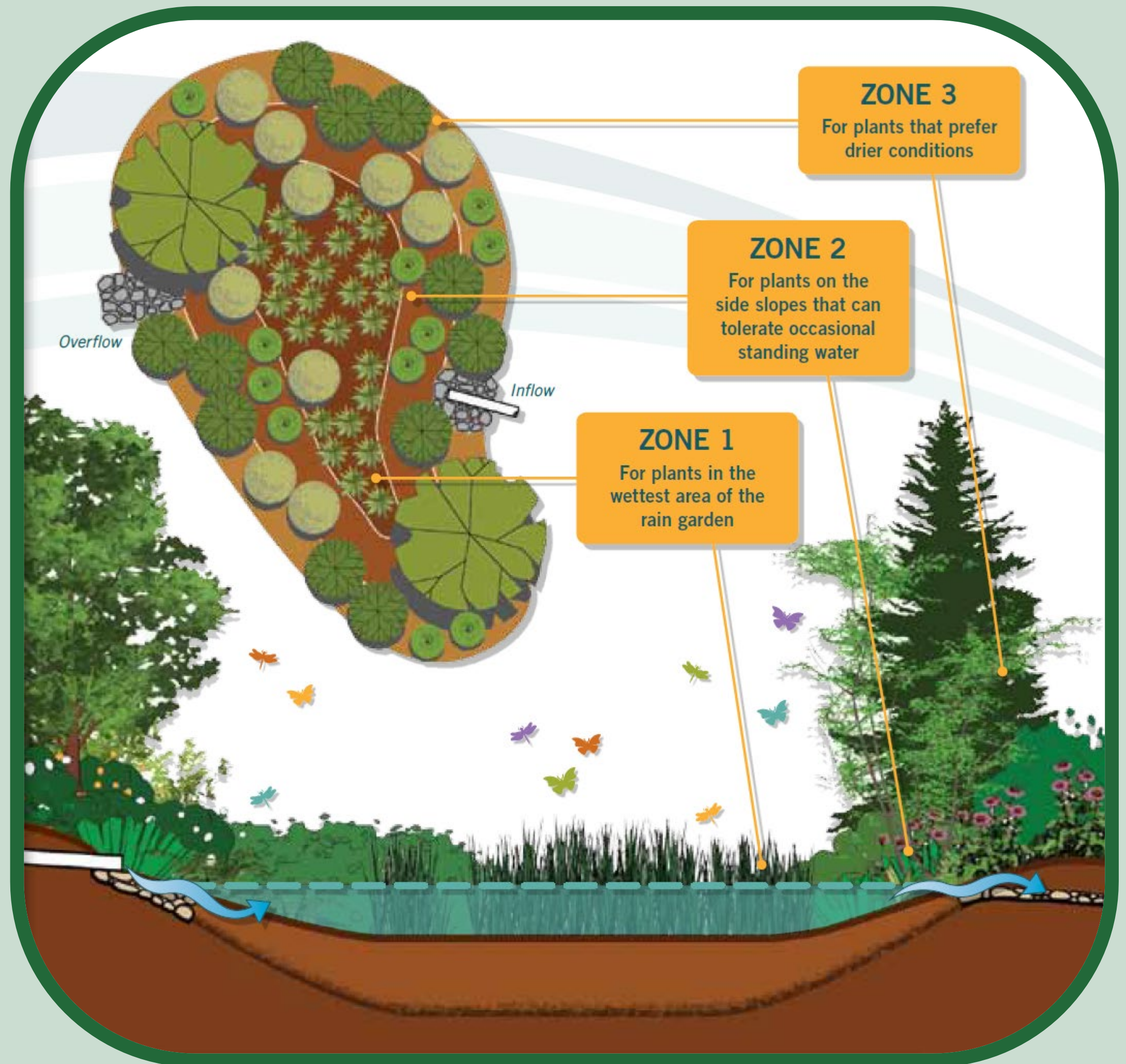


- 
- Pick plants that will be used by your target species



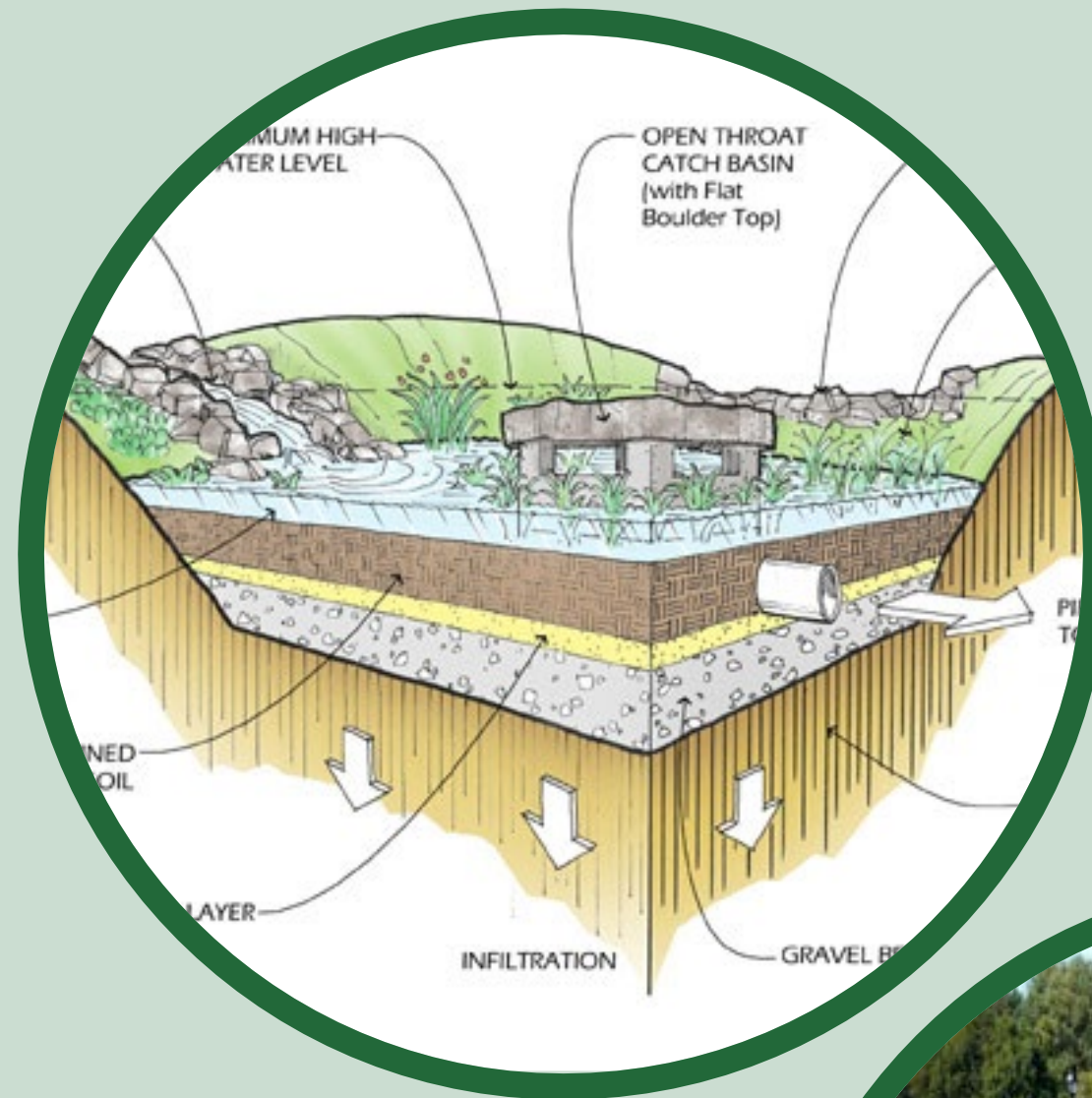


# Planting Zones





●●●  
Planting Zones  
will vary  
depending on  
the type of  
green  
infrastructure



Engineered Soil  
Rain Garden



Depression  
Rain Garden



Treatment  
Wetland



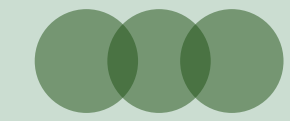


# Shelter

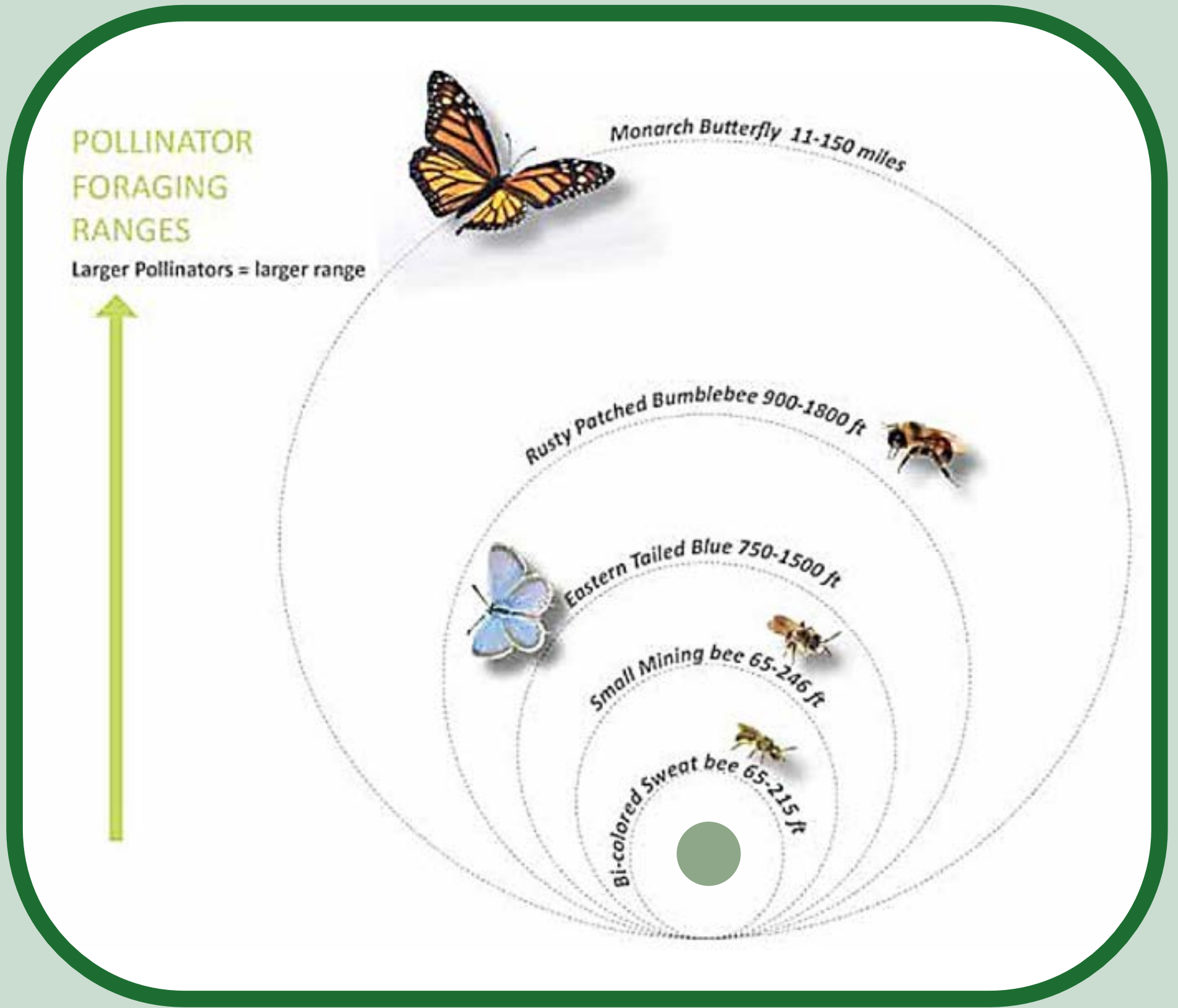
- Bare soil
- Dead plant stems
- Dead leaves
- Snags
- Rock piles
- Live plants







# Shelter





# Nesting & Overwintering Habitat

## FOR POLLINATORS & OTHER BENEFICIAL INSECTS

### STEPS TO CREATE NESTING & OVERWINTERING HABITAT:

- ✦ SAVE THE STEMS
- ✦ LEAVE THE LEAVES
- ✦ RECEIVE THE "PERFECT" LAWN
- ✦ REIMAGINE HOW YOU USE MULCH
- ✦ SAVE A SNAG AND "PLANT" A LOG
- ✦ BUILD A BRUSH PILE
- ✦ BUILD A ROCK PILE OR ROCK WALL
- ✦ PROVIDE A SAFE WATER SOURCE
- ✦ INSTALL A HABITAT SIGN



FIGURE 1: By selecting native plants and managing habitat purposefully, even small wildflower plots (left) can provide high-quality overwintering habitat for pollinators and beneficial insects, like these small carpenter bees hibernating in a pithy stem (right).

### Moving Beyond Flowers

While flowering plants provide pollinators with food, insects also require suitable shelter for nesting and overwintering. Most bees and wasps create small nests beneath the soil or within dead plant stems or cavities in wood. Other beneficial insects such as butterflies, wasps, moths, fireflies, lady beetles, and ground beetles seek shelter in places that offer protection from predators and the elements, such as leaf litter and brush piles.

### The More, The Better

The primary habitat features used by pollinators and other insects for shelter include stems and branches of trees, shrubs, and wildflowers; leaf litter; undisturbed ground; bare ground; dead wood; brush piles; and rock piles. Retaining and incorporating as many of these features as possible into your landscape (rather than "cleaning" them away) will help attract and support a diversity of bees and other beneficial insects.

### Why Natural Is Best

The availability of nesting and overwintering habitat is one of the most important factors influencing populations of native bees and other beneficial insects. Yet, traditional

landscaping practices rarely leave enough natural resources to support pollinators and other wildlife. This guide focuses on a variety of natural nesting habitat features that can be readily incorporated into most landscapes. Compared to artificial nesting options such as bee blocks and bee hotels, natural nesting habitat features often better mimic the natural nest site density of insects, and also break down naturally with time, limiting disease and parasite issues. Moreover, natural nesting features often provide multiple conservation benefits. An appropriately managed wildflower planting, for example, can provide nesting sites, pollen, and nectar for bees; host plants and overwintering habitat for butterflies; and abundant food for songbirds.

Our **Bring Back the Pollinators** campaign is based on four principles:

1. Grow a variety of pollinator-friendly flowers;
2. Protect and provide bee nest sites and caterpillar host plants;
3. Avoid using pesticides, especially insecticides; and
4. Spread the word!

You can participate by taking the **Pollinator Protection Pledge** and registering your habitat on our nationwide map at: [www.bringbackthepollinators.org](http://www.bringbackthepollinators.org)

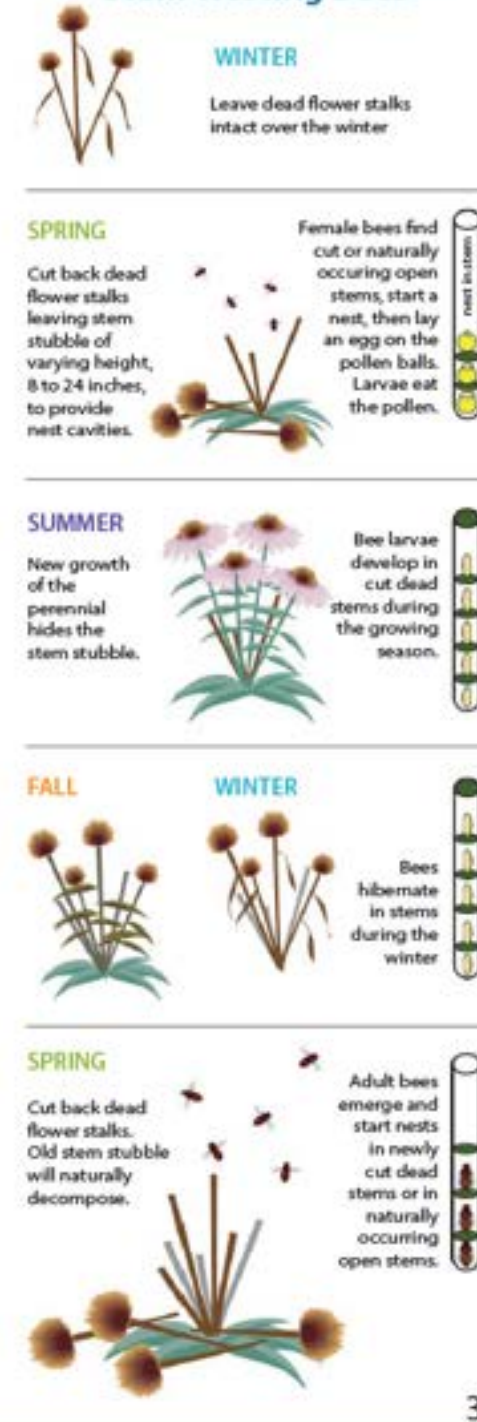


- ✦ When pruning to expose cut ends, be sure that the nest sites you are leaving are at least 4–6" from a branch or stem node. Plants with pith-filled or hollow centers should be prioritized for nest-site pruning, since these will be more attractive than shrubs that have solid centers.
- ✦ As the weather warms, watch your new nesting sites for insect activity. It is not uncommon to see bees checking out multiple stems for suitability, and eventually settling on the perfect stem to call home. Stems that have been blocked at the cut end with natural materials such as leaves, mud, pebbles, grass, or resin indicate that there is a nest inside. Stems with unblocked cut ends may also be occupied by overwintering adults. Use your observations to guide future plantings and pruning decisions (e.g., stubble height) in your garden.
- ✦ Remember to leave cut stems in place during spring clean-up the following year, as they may be housing insect larvae, pupae, or overwintering adults.

FIGURE 4: Prune shrubs to create cut ends that serve as nest entrances for stem nesting bees (A). When pruning, the tops that you cut off can be bundled to create additional habitat. After being cut to 6" lengths and bundled, these stems were occupied by yellow-faced bees (*Hylocichla spp.*) and aphid hunting wasps (*B. Pemphredon sp.*).



### How to Create Habitat for Stem-Nesting Bees



The Xerces Society for Invertebrate Conservation





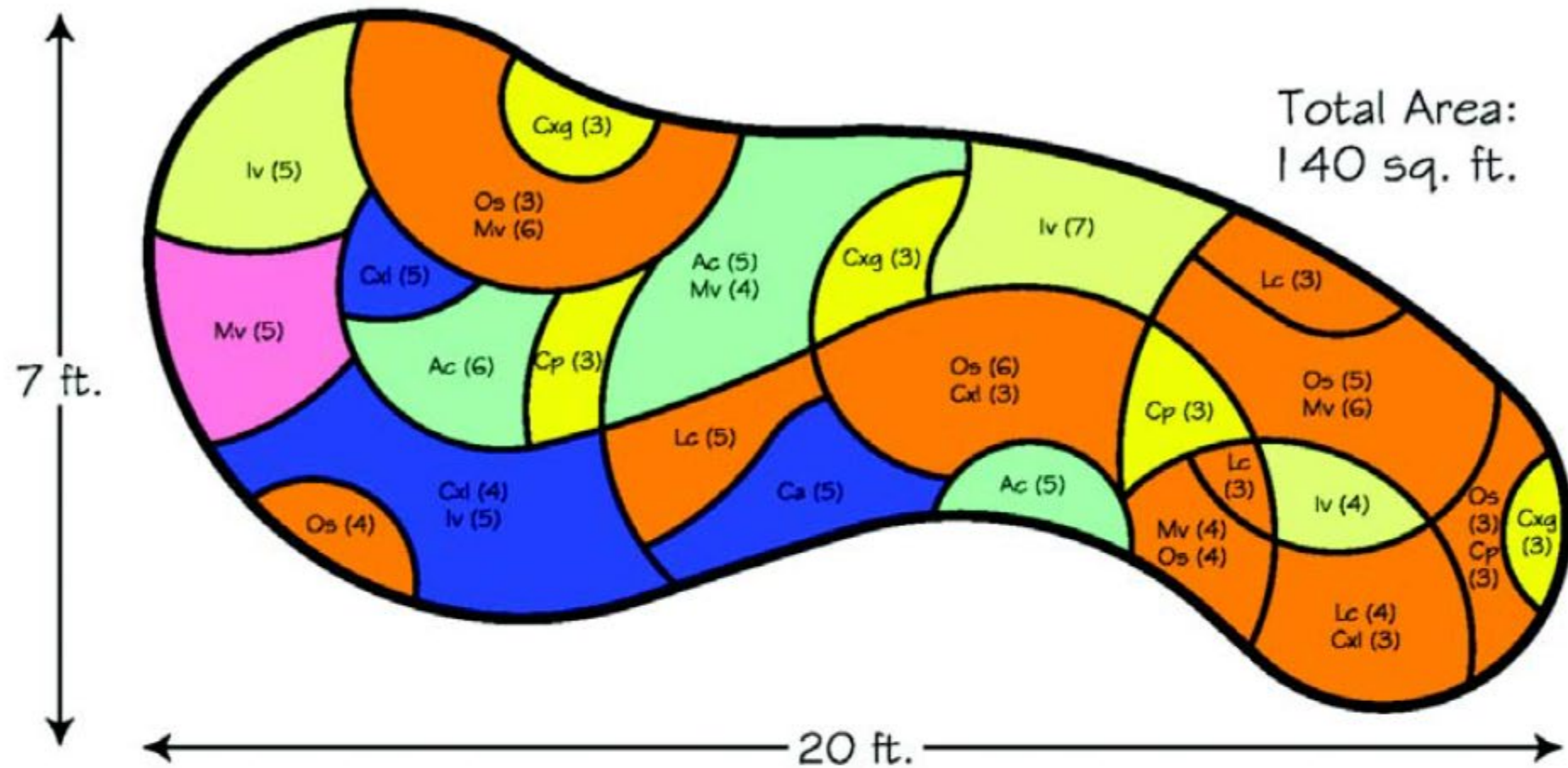
# Planting Zones





- Planting List

20 feet wide;  
full to partial  
shade  
with clay  
soils



Total Area:  
140 sq. ft.

Symbol	Species Name	Common Name	No. of Plants
Ac	<i>Acorus calamus</i>	Sweet flag	16
Cp	<i>Caltha palustris</i>	Marsh marigold	9
Ca	<i>Campanula americana</i>	Tall bellflower	5
Cxg	<i>Carex Grayii</i>	Bur sedge	9
Cxl	<i>Carex lupulina</i>	Hop sedge	15
lv	<i>Iris virginica-shrevei</i>	Wild blue flag iris	21
Lc	<i>Lobelia cardinalis</i>	Cardinal flower	15
Mv	<i>Mertensia virginica</i>	Virginia bluebells	25
Os	<i>Onoclea sensibilis</i>	Sensitive fern	25
Total Plants Needed			140





- NAVIGATION
- Main page
  - Table of contents
  - Index (Categories)
  - What's new
  - Response to comments
  - Future updates
  - Events
  - In the News
  - Funding
  - Recent changes
  - Help
  - Export to pdf
- TOOLS
- What links here
  - Related changes
  - Special pages
  - Printable version
  - Permanent link
  - Page information
- MPCA LINKS
- MPCA Homepage
  - Stormwater
  - Policies / Disclaimers

# Minnesota Stormwater Manual

Search Search Help Log in

## Minnesota plant lists

Page Content

This page introduces sources for the selection of plants for stormwater BMPs, salt tolerance, green roofs, and trees.

### Plants for Stormwater Design

An excellent resource applicable to a wide variety of vegetated BMPs, including bioretention BMPs, is *Plants for stormwater design* by Shaw and Schmidt (2003).

- **Section 1:** Table of contents; acknowledgements; Intro; using guide; environmental influences on plants; plant considerations and species for stormwater management practices; stormwater management practices; literature cited.
- **Section 2:** Table of plant species included in guide; range of applicability map; plant species descriptions, genera A-E.
- **Section 3:** Plant species descriptions, genera F-S.
- **Section 4:** Plant species descriptions, genera T-Z; plant descriptions bibliography; appendix 1: planting and maintenance recommendations; appendix 2: vegetation and hydrology data for 3 Twin Cities stormwater projects.



Example of a rain garden planted with native vegetation.

**Information:** Information on plants for green roofs has been updated. This updated information is summarized below. See [green roofs](#) or [trees](#).

### Links

Below are links to additional pages in this manual that address plants.

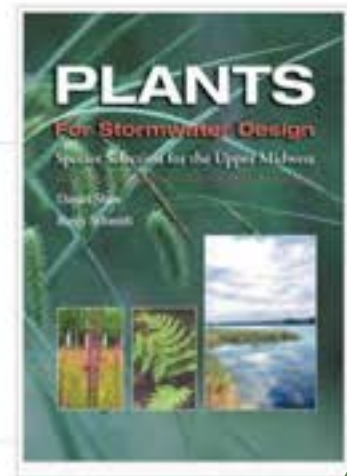
- [Salt tolerant plants](#)
- [Pollinator friendly Best Management Practices for stormwater management](#)
- [Bioretention](#)
- [Trees](#)

### Sources for stormwater BMP plant material selection

The following agencies provide up to date information on plant material selection for vegetated stormwater BMPs .

- [Minnesota Pollution Control Agency](#)
- [Rice Creek Watershed District:](#) click on the Best Management Practices browser
- [Minnesota Department of Transportation](#) - Seeding manual, 2014 edition
- [Minnesota Board of Water and Soil Resources:](#) native vegetation and seed mixes

There are two specific situations in which these above sources should not be used: high salt concentrations (in spray and soil) and [green roofs](#). Recommendations on salt tolerant and green roof plant material selection are given below.



Minnesota plant lists - Minnesota Stormwater Manual (state.mn.us)





## Pollinator friendly Best Management Practices for stormwater management

Page Content



It is clear that pollinators, both vertebrates and invertebrates, are in decline (see [1], [2], [3], [4], [5]). Vegetated stormwater BMPs can be designed to be pollinator-friendly. The following sections provide numerous links to information that can be used in designing and implementing pollinator-friendly stormwater BMPs.

**Caution:** Although the following links provide information on pollinator friendly practices, it is important to remember the primary function of a stormwater BMP is to manage stormwater. In particular, it is important to ensure that plants selected as being pollinator friendly must also function well within the stormwater practice. See [Design criteria for bioretention](#) and [Minnesota plant lists](#) for more information.



Mississippi River WMO video on plant ecology of the Mississippi River Gorge in the Twin Cities

### Pollinator friendly plants

- [Minnesota Stormwater Manual](#)
- [Metro Blooms: Planting for Pollinators: How Raingardens Can Help](#)
- [The Xerces Society for Invertebrate Conservation: Pollinator plants - Great Lakes Region](#)
- [Pollinator Partnership: Ecoregional Planting Guides](#)
- [United States Department of Agriculture - Forest Service: Attracting Pollinators to Your Garden Using Native Plants](#)
- [National Wildlife Federation: Plants for Pollinators: A Collection of Favorites](#)
- [Deeprout: Want Pollinators? Plant Trees](#)
- [Native Seed Mix Design for Roadsides: Minnesota Department of Transportation](#)

### Pollinator friendly practices

Although much of the information on these pages is general, many of the practices can be incorporated into vegetated stormwater BMPs.

- [United States Department of Agriculture - Forest Service: Pollinator Friendly Practices](#)
- [North American Pollinator Protection Campaign: Pollinator Friendly Practices](#)
- [Institute for Agriculture and Trade Policy: A landowner's guide to pollinator-friendly practices](#)

### Case studies

- [Andover Pollinator Awareness Project](#)
- [Penn State Extension](#)
- [Penn State University: Pollinator Garden Certification](#)

### Other links

- **NEW!!!** [The Environmental Quality Board](#) recently released a Minnesota State Agency Pollinator Report. The Report includes three specific goals in areas where state agencies have the greatest potential to reduce stress on pollinators.
- [The Board of Water and Soil Resources](#) has a Pollinator Plan that includes why pollinator populations and habitat restoration matter, current protection and restoration efforts, native seed mixes, a fact sheet and a solar site pollinator habitat assessment form.
- [The Xerces Society](#): Targeted for gardeners, this site contains much useful general information on pollinators and managing for pollinators
- [Pollinator Friendly Alliance](#)
- [Board of Water and Soil Resources Pollinator Toolbox](#)



Rainfall from the roof on this house is routed to a perennial garden containing, among other plants, goldenrod, milkweed, and purple coneflower, all of which are considered pollinator-friendly plants.

[https://stormwater.pca.state.mn.us/index.php?title=Pollinator\\_friendly\\_Best\\_Management\\_Practices\\_for\\_stormwater\\_management](https://stormwater.pca.state.mn.us/index.php?title=Pollinator_friendly_Best_Management_Practices_for_stormwater_management)

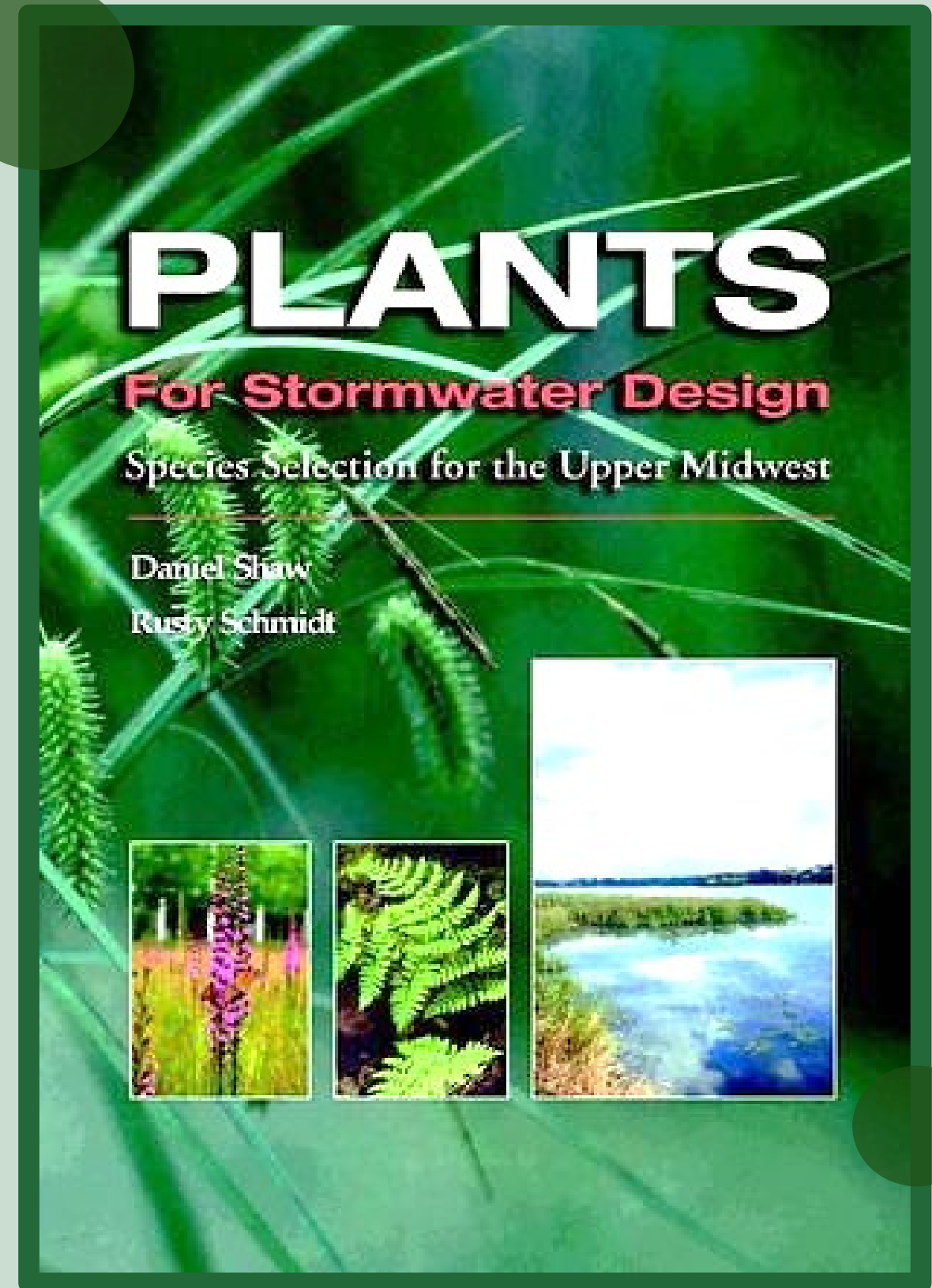


Green Infrastructure  
as Wildlife Habitat

# Develop a Planting Plan

*Plants for Stormwater Design  
Species Selection for the Upper Midwest*

- by Daniel Shaw and Rusty Schmidt
- Published by the Minnesota Pollution Control Agency
- Full color, 370 pages. Includes detailed information for 131 plant species.





Rainwater Garden Side Slopes		
Scientific Name	Common Name	See Page
<b>Trees and Shrubs</b>		
<i>Aronia melanocarpa</i>	Black chokeberry	98
<i>Cornus racemosa</i>	Gray dogwood	166
<i>Viburnum trilobum</i>	High bush cranberry	334
<b>Forbs and Ferns</b>		
<i>Allium stellatum</i>	Prairie wild onion	84
<i>Anemone canadensis</i>	Canada anemone	92
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	96
<i>Artemisia ludoviciana</i>	Prairie sage	100
<i>Asclepias tuberosa</i>	Butterfly milkweed	104
<i>Aster laevis</i>	Smooth aster	106
<i>Aster macrophyllus</i>	Bigleaf aster	112
<i>Aster pilosus</i>	Frost aster	116
<i>Epilobium angustifolium</i>	Fireweed	174
<i>Eryngium yuccifolium</i>	Rattlesnake master	178
<i>Galium boreale</i>	Northern bedstraw	190
<i>Heuchera richardsonii</i>	Prairie alumroot	202
<i>Liatris ligulistylis</i>	Meadow blazingstar	220
<i>Liatris pycnostachya</i>	Prairie blazingstar	222
<i>Lilium superbum</i>	Turk's-cap lily	224
<i>Matteuccia struthiopteris</i> var. <i>pennsylvanica</i>	Ostrich fern	234
<i>Monarda fistulosa</i>	Wild bergamot	236
<i>Osmunda regalis</i>	Royal fern	240
<i>Pteridium aquilinum</i>	Bracken fern	260
<i>Pycnanthemum virginianum</i>	Mountain mint	262
<i>Ratibida pinnata</i>	Yellow coneflower	266
<i>Rudbeckia subtomentosa</i>	Brown-eyed Susan	268
<i>Smilacina racemosa</i>	False Solomon's seal	300
<i>Solidago flexicaulis</i>	Zig-zag goldenrod	302
<i>Solidago riddellii</i>	Riddell's goldenrod	304
<i>Solidago rigida</i>	Stiff goldenrod	306
<i>Tradescantia ohiensis</i>	Ohio spiderwort	320
<i>Zizia aurea</i>	Golden alexanders	336
<b>Grasses, Sedges and Rushes</b>		
<i>Andropogon gerardii</i>	Big bluestem	90
<i>Bromus ciliatus</i>	Fringed brome	128
<i>Panicum virgatum</i>	Switchgrass	242
<i>Schizachyrium scoparium</i>	Little bluestem	280
<i>Sorghastrum nutans</i>	Indian grass	308

Rainwater Garden Base		
Scientific Name	Common Name	See Page
<b>Trees and Shrubs</b>		
<i>Aronia melanocarpa</i>	Black chokeberry	98
<i>Cephalanthus occidentalis</i>	Buttonbush	160
<i>Cornus sericea</i>	Red-osier dogwood	168
<i>Ilex verticillata</i>	Winterberry	204
<i>Viburnum trilobum</i>	High bush cranberry	334
<b>Forbs and Ferns</b>		
<i>Agastache foeniculum</i>	Giant hyssop	80
<i>Anemone canadensis</i>	Canada anemone	92
<i>Angelica atropurpurea</i>	Angelica	94
<i>Asclepias incarnata</i>	Marsh milkweed	102
<i>Aster novae-angliae</i>	New England aster	114
<i>Aster puniceus</i>	Red-stemmed aster	118
<i>Boltonia asteroides</i>	Boltonia	126
<i>Chelone glabra</i>	Turtlehead	162
<i>Equisetum fluviatile</i>	Horsetail	176
<i>Eupatorium maculatum</i>	Joe-pye weed	180
<i>Eupatorium perfoliatum</i>	Boneset	182
<i>Gentiana andrewsii</i>	Bottle gentian	192
<i>Helenium autumnale</i>	Sneezeweed	198
<i>Iris versicolor</i>	Blueflag	208
<i>Liatris ligulistylis</i>	Meadow blazingstar	220
<i>Liatris pycnostachya</i>	Prairie blazingstar	222
<i>Lilium superbum</i>	Turk's-cap lily	224
<i>Lobelia cardinalis</i>	Cardinal flower	226
<i>Lobelia siphilitica</i>	Blue lobelia	228
<i>Lysimachia thysiflora</i>	Tufted loosestrife	230
<i>Onoclea sensibilis</i>	Sensitive fern	238
<i>Osmunda regalis</i>	Royal fern	240
<i>Physostegia virginiana</i>	Obedient plant	248
<i>Pteridium aquilinum</i>	Bracken fern	260
<i>Pycnanthemum virginianum</i>	Mountain mint	262
<i>Rudbeckia subtomentosa</i>	Brown-eyed Susan	268
<i>Scutellaria lateriflora</i>	Mad-dog skullcap	294
<i>Silphium perfoliatum</i>	Cup plant	298
<i>Solidago rigida</i>	Stiff goldenrod	306
<i>Thalictrum dasycarpum</i>	Tall meadowrue	318
<i>Vernonia fasciculata</i>	Ironweed	328
<i>Veronicastrum virginicum</i>	Culver's root	330



## *Silphium perfoliatum*

Cup Plant - a.k.a. Indian-cup

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forests, stream banks, wet prairies and savannas, wet meadows, along wetlands and springs. [7, 16, 35, 41] **Range:** S. and ec. Minn. (Eco-Region: 6-9), s. Wis., s. LP of Mich. S. Ont. to N.D., s. to Ga. and La. [7, 21] **This is a threatened species in the s. LP of Mich.**

### Description

**General:** A robust, native, perennial herb, usually 4-6' tall, with sunflower-like heads up to 4" across and unique united leaves that form a "cup" that holds rainwater, hence its common name. **Flower:** A multibranching flower stalk with 10-30 heads arranged in a spreading cluster. Each head has 20-30 yellow rays that are 3-4" wide, with a light green-to-yellow, sterile disk flower center that blooms from July to September. **Leaf:** Bristly, lance-shaped, opposite leaves that are 6-10" long and united at the base to form a "cup." **Stem:** Often reddish in color, wide, square and smooth to the touch. **Fruit:** Only the ray flowers produce seeds. **Root:** Spreads by rhizomes. **Soil:** Moist, fertile soils, especially in river valleys. [7, 35, 41]

### Normal Water Level

This species prefers upland moist to wet/saturated conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day).

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species is sensitive to herbicide drift. It has a moderate tolerance to general disturbance and stress. [1, 16, 47]

### Design Considerations

Cup plant has wonderful wildlife use and is used in wetland and prairie restorations. It has also been used for shoreline, buffer and vegetated swale soil stabilization. It is also an ideal plant for the background of rain water gardens. **Concerns:** This species is sensitive to herbicide drift. It can be aggressive, which may be desirable in some situations. [16]

### Wildlife Use

The seeds of cup plant are eaten by meadow mice, goldfinches and sharp-tailed grouse. Cup plant is also a good butterfly and hummingbird plant. Yet, it is used mostly as a source of water after rain events. Birds use the "cups" as baths, and tree frogs will sit in them. [21, 32, 41]

### Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

Indicator Status: FACW-

### Planting Techniques

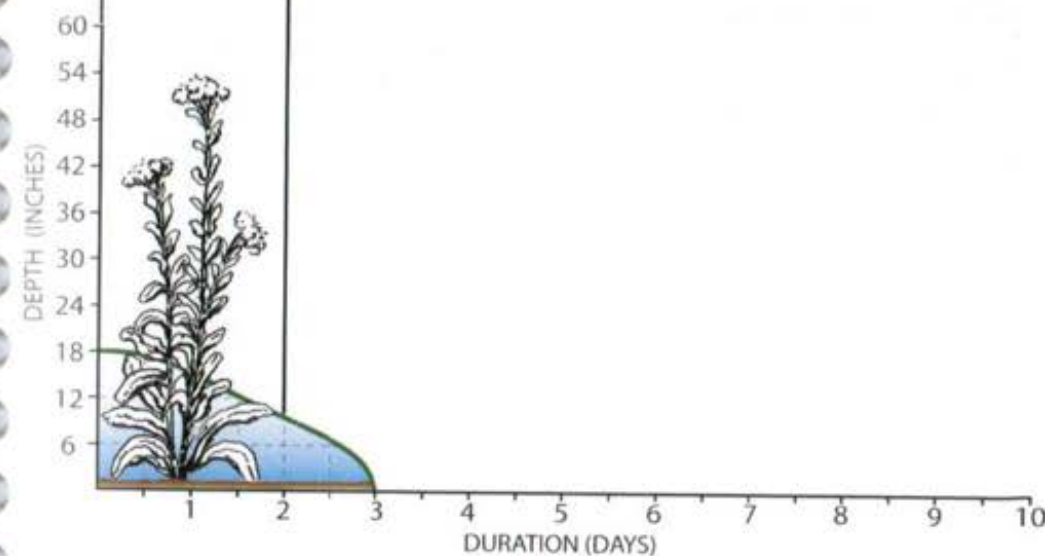
Cup plant propagates from seed well and produces about 22,400 seeds/lb. [16]



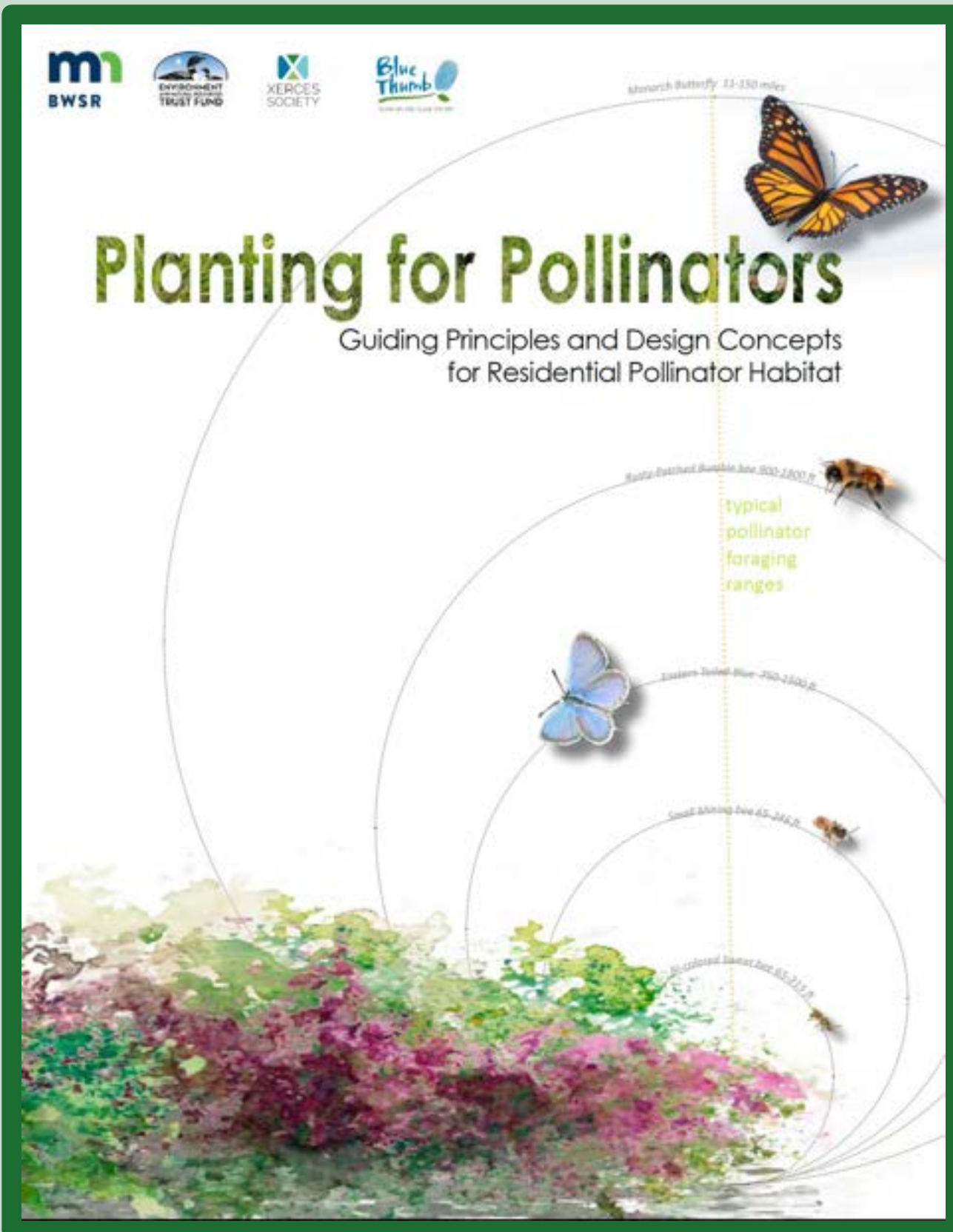
Photo: Dan Shaw



Photo: Dan Shaw







### Plant Selection

Create continuous bloom with native plants, the preferred food sources of native pollinators. Most pollinators have adapted with native plant communities. Native plantings provide the best support for native pollinator species.

- **Buy Locally Produced Native Plants:** This helps protect nearby native plant communities and provides plant species that are sure to be compatible with local insect populations. *see plant lists and Wild Ones resources list in appendix*
- **Continuous bloom** throughout the growing season helps ensure pollinators have food when they need it. This allows them to conserve energy by not having to travel long distances when blooms are scarce. Include an assortment of flower colors, sizes, shapes and scents to attract a variety of pollinators *see planting templates in appendix*
- **Grouping plants** together can help pollinators find and access resources more easily. It also is a way to create a sense of order in your planting.
- **Best Selections:** A number of sources provide information on specific plant species that provide excellent pollen and nectar resources for native bees, monarchs, and other pollinators. *see short list below and plant lists in appendix*

**Continuous Blooms**

flowering trees and shrubs are an excellent way to provide continuous blooms when there are limited options for pollinators

**Top Ten MN Plants for Native Bumblebees:**

- Virginia Bluebells *Mertensia virginica*
- Blazingstars *Liatris* species
- Wild White Indigo *Baptisia alba*
- Milkweeds *Asclepias* species
- Goldenrods *Solidago* species
- Beebalm *Monarda* species
- Beardlongues *Penstemon* species
- Red Columbine *Aquilegia canadensis*
- Asters *Aster* species
- Blue Giant Hyssop *Agastache foeniculum*

<https://bwsr.state.mn.us/sites/default/files/2020-03/Planting%20for%20Pollinators%20Design%20Guide%20with%20logos.pdf>



## Design Considerations + Goals

Factors such as square footage, function, existing plant communities, soil moisture levels, weed pressure, hardiness zone, and local ordinances should be considered when designing habitat plantings.

Always protect pollinator habitat from insecticide and fungicide use to prevent harmful exposure.



### PRIORITIZE THESE SITES



### DESIGN CONSIDERATIONS



### LONG TERM CONSIDERATIONS







## RAIN GARDENS

Home / What We Do / Green Infrastructure / Rain Gardens

Rain gardens can help reduce the risk of sewer overflows and water pollution by naturally absorbing stormwater runoff from hard surfaces into the ground. Since 2006, MMSD and Agrecol Native Seed and Plant Nursery have offered a rain garden plant sale to customers within MMSD's service area. Plants are provided at a reduced price, up to a 50% discount compared to retail prices.

To be notified of MMSD's next Rain Garden Plant Sale, sign up for our Fresh Coast Guardians newsletter: [Sign-Up](#)

<https://mmsd.com/what-we-do/green-infrastructure/rain-gardens>





# RAIN GARDEN PLANT GUIDE

Use this guide to select the best plant mix for your Rain Garden



## Bird and Butterfly Mix

### Wildflowers

	Height	Bloom	Color
Wild Columbine: <i>Aquilegia canadensis</i>	1-3'	Apr-June	Pink/Yellow
Cardinal Flower: <i>Lobelia cardinalis</i>	3-5'	July-Sept	Red
New England Aster: <i>Aster novae-angliae</i>	3-6'	Sept-Oct	Light Purple
Butterfly Weed: <i>Asclepias tuberosa</i>	2-3'	Jun-Sep	Orange
Blue Vervain: <i>Verbena hastata</i>	3-5'	Jul-Sep	Blue/Purple

### Grasses/Sedges

Switchgrass: <i>Panicum virgatum</i>	4-6'	May-Sep	
--------------------------------------	------	---------	--



Wild Columbine: Flower and Leaves



New England Aster: Flower and Leaves



Blue Vervain: Flower and Leaves



Cardinal Flower: Flower and Leaves



Butterfly Weed: Flower and Leaves



Switch Grass: Full-Grown Plant and Leaves

[https://mmsd.com/application/files/9015/9648/9612/18-103\\_RainGardenPlantGuideNewWEB\\_2.pdf](https://mmsd.com/application/files/9015/9648/9612/18-103_RainGardenPlantGuideNewWEB_2.pdf)





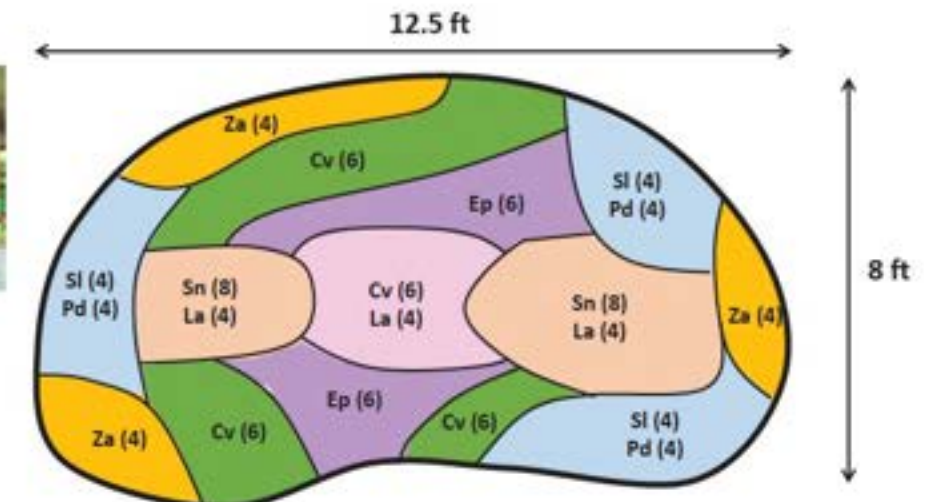
Design Possibilities are Endless.

# RAIN GARDEN DESIGN

## CONCEPTUAL PLANTING DESIGNS FOR YOUR GARDEN



100 sf Rain Garden  
Full/Partial Sun



Symbol	Species Name	Common Name	Qty
Ep	<i>Echinacea purpurea</i>	Broad Leaf Purple Coneflower	12
Pd	<i>Penstemon digitalis</i>	Beardtongue	12
Cv	<i>Carex vulpinoidea</i>	Fox Sedge	24
La	<i>Lythrum alatum</i>	Winged Loosestrife	12
Sl	<i>Symphotrichum laeve</i>	Smooth blue aster	12
Sn	<i>Sorghastrum nutans</i>	Indian Grass	16
Za	<i>Zizia aurea</i>	Golden Alexander	12
<b>Total</b>			<b>100</b>



<https://mmsd.com/application/files/2415/5630/4675/RainGardenSamplePlansBkWEB.pdf>





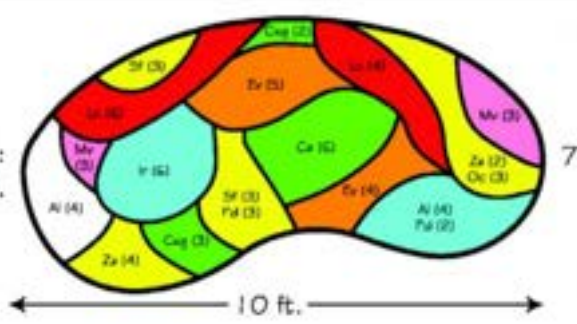
# RAIN GARDENS

A how-to manual for homeowners

10 feet wide; full to partial shade with silty & sandy soils

Total Area: 70 sq. ft.

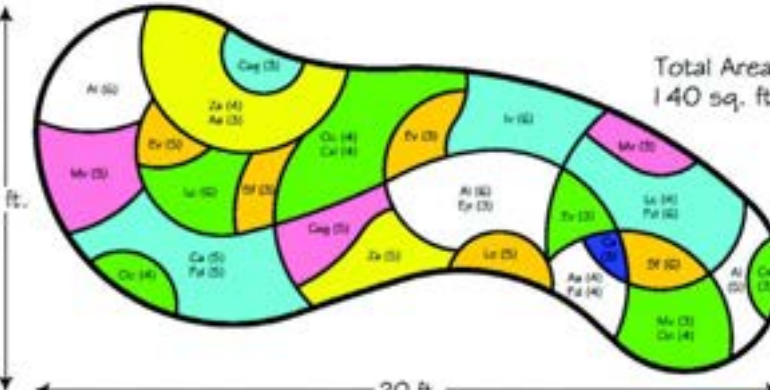


Symbol	Species Name	Common Name	No. of Plants
Ai	Aster lateriflorus	Side-flowering aster	8
Ca	Campanula americana	Tall bellflower	6
Cag	Carex Grayi	Bur sedge	5
Ev	Elymus virginicus	Virginia wild rye	9
Iv	Iris virginica-shrevei	Wild blue flag iris	6
Lc	Lobelia cardinalis	Cardinal flower	10
Mv	Mertensia virginica	Virginia bluebells	6
Oc	Osmunda claytonia	Interrupted fern	3
Pf	Phlox divaricata	Woodland phlox	5
Sf	Solidago flexicaulis	Zig zag goldenrod	6
Za	Zizia aurea	Golden Alexander	6
Total Plants Needed			70

20 feet wide; full to partial shade with silty & sandy soils

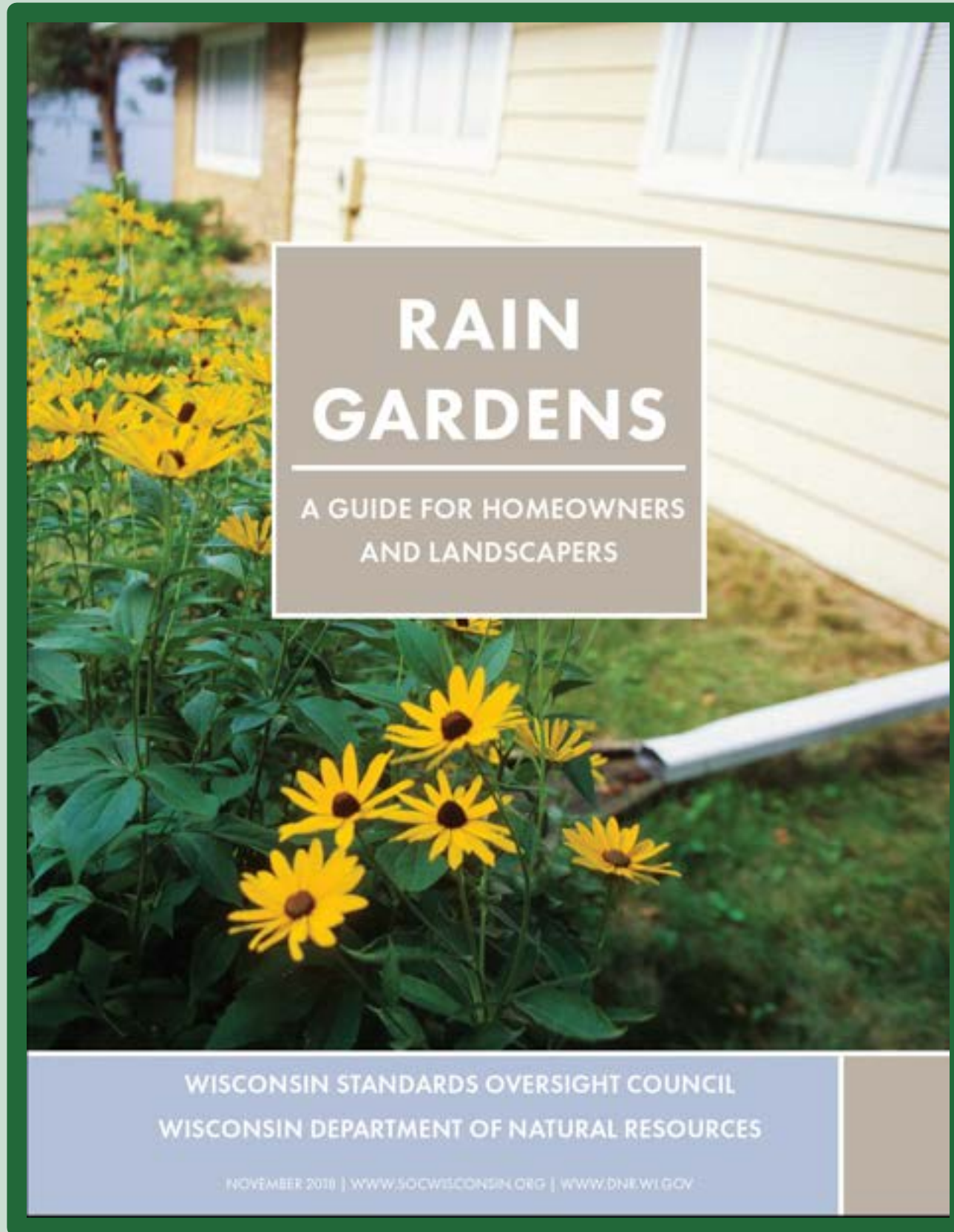
Total Area: 140 sq. ft.



Symbol	Species Name	Common Name	No. of Plants
Aa	Ansaema atrorubens	Jack-in-the-pulpit	7
Ai	Aster lateriflorus	Side-flowering aster	17
Ca	Campanula americana	Tall bellflower	8
Cag	Carex Grayi	Bur sedge	8
Cal	Carex lupulina	Hop sedge	7
Ev	Elymus virginicus	Virginia wild rye	11
Ep	Eupatorium purpureum	Purple Joe-Pye weed	3
Iv	Iris virginica-shrevei	Wild blue flag iris	6
Lc	Lobelia cardinalis	Cardinal flower	15
Mv	Mertensia virginica	Virginia bluebells	11
Oc	Osmunda claytonia	Interrupted fern	12
Pf	Phlox divaricata	Woodland phlox	15
Sf	Solidago flexicaulis	Zig zag goldenrod	9
Za	Zizia aurea	Golden Alexander	14
Total Plants Needed			143

20






## RAIN GARDEN PLANT RECOMMENDATIONS


From bursts of color to tall fluid brush, choosing the right plants in your rain garden can transfigure your outdoor space. Select plants that are hardy for Wisconsin growing conditions. Ensure they are capable of withstanding the site's soil, sunlight, and shade conditions, as well as water inundation and drought cycles associated with rain gardens. Native species, non-native perennials, or cool season turf grasses may be used. The deep roots of many native species will enhance soil infiltration and can better withstand the challenging growing environment inherent to rain gardens.

The following plants are recommended for Wisconsin gardens by Prairie Nursery, Aspen Gardens, and the Good Oak Ecological Service. Before planting, it's always best to research different types of plants and consult with a local nursery or landscape professionals to determine what's best for you.


Common Name	Scientific name	Soil Types	Sunlight Levels	Plant Characteristics
		Sand	Full sun	Height of mature plant (feet)
		Silt	Partial sun	Bloom period
		Clay		Toxicity advisory



Blue Flag Iris  
*Iris versicolor*



Bottlebrush Sedge  
*Carex comata*



Butterfly weed  
*Asclepias tuberosa*

<https://dnr.wi.gov/topic/Stormwater/documents/RainGardenManual.pdf>





BARNES

Purple Coneflower  
*Echinacea purpurea*

☀️ 🌿 3-4'  
🌻 July-Sept



MAYER

Rattlesnake Master  
*Eryngium yuccifolium*

☀️ 🌿 3-5'  
🌻 June-Aug



ZHARKIKH

Red Baneberry  
*Actaea rubra*

☁️ 🌿 1-2'  
⚠️ 🌻 June



CARLSON

Rough Blazing Star  
*Liatris aspera*

☀️ 🌿 2-5'  
🌻 Aug-Sept



CHAYKA

Showy Goldenrod  
*Solidago speciosa*

☀️ 🌿 1-3'  
🌻 Aug-Sept



MULLEN

Smooth Blue Aster  
*Aster laevis*

☀️ 🌿 2-4'  
🌻 Aug-Oct



[Home](#) - [Pollinator Conservation Program](#) - Who Are The Pollinators?

## Who Are the Pollinators?

Although birds, bats, and other creatures are also pollinators, insects are the animals that do the bulk of the pollination that affects our daily lives. Some of these insect pollinators will be familiar (bees and butterflies), but you might be surprised by some of the others (flies, wasps, and beetles). Here we provide an overview of these five main groups of insect pollinators—including their life cycles, habitat requirements, and conservation needs. For further reading, check out our page about [endangered pollinators](#).

### Solitary Bees

Honey bees (*Apis* spp.) may be the most well-known, but they represent a tiny fraction of all bee species! Worldwide, there are an estimated 20,000 species of bees, and approximately 3,600 bee species are native to the United States and Canada alone. Of these myriad bee species, more than 90% lead solitary—rather than social—lives, in which each female constructs and provisions her own nest, without the assistance of others.

The majority of solitary bee species are not aggressive and many are stingless—undeserving of the fear many people feel towards bees. Bees are also important pollinators of a variety of plants, possessing hairs and other specialized anatomical structures that readily collect and transfer pollen.

### Pollinator Conservation Resource Center



Find national and region-specific resources including plant lists, conservation guides, seed mixes, native plant nursery and seed producers, and more in our searchable library.

[pollinator conservation resource center](#)

<https://www.xerces.org/pollinator-conservation/about-pollinators>



## Pollinator Conservation Seed Mixes

The Xerces Society partners with the native seed industry to produce wildflower seed mixes meeting Xerces specifications, to provide foraging and nesting resources for a diversity of pollinators. For details about species composition, recommended seeding rate, and how to contact the producer, please download the specification sheet for each seed mix.

### About the Seed Mixes

Regional seed mixes are locally produced in their respective regions by independent farmers, using local eco-type seed wherever possible. Seeds are not treated with pesticides, and are designed to include widely adapted, non-weedy species. Most species require full sun and average soil drainage. For extremely wet, dry, or shady conditions, please contact the respective nursery in your region for recommendations. Note that mixes are designed to include multiple blooming species throughout the entire growing season. Only wildflowers with extensive documented value to pollinators are included. Where appropriate, host plants for regionally important butterflies are included, along with bunch grasses to provide bumble bee nest habitat.

If a recommended seed mix for your region is not featured on this page, we have not yet partnered with a regionally-based seed producer to design a mix. To search for a seed mix that is suitable for planting in your region, please visit the [Pollinator Conservation Resource Center](#) to browse the list of native pollinator plant nurseries by region, and then contact seed vendors to inquire about the availability of pollinator seed mixes that are composed of native wildflower species.

### Pollinator Conservation Resource Center



Find national and region-specific resources including plant lists, conservation guides, seed mixes, native plant nursery and seed producers, and more in our searchable library.

[pollinator conservation resource center](#)

[Pollinator Conservation Seed Mixes](#)

<https://www.xerces.org/pollinator-conservation/pollinator-conservation-seed-mixes>



#### Western Great Lakes Native Seed Mixes



These mixes from Prairie Nursery include high quality annual and perennial wildflowers that provide pollinators with season-long sources of pollen and/or nectar. To provide nesting habitat for bumble bees and other beneficial insects, several species of bunch grass are also included. These mixes are appropriate for habitat restoration in Wisconsin, Illinois, Iowa, and Missouri. Separate mixes are available for sites with dry versus mesic soils.

[Prairie Nursery](#)

#### MNL Upper Midwest Pollinator Mix – Dry to Mesic



This mix developed by [Minnesota Native Landscapes](#) is the dry-mesic version of their popular Pollinator Mix approved by the Xerces Society for pollinator habitat enhancement and restoration. Their most diverse mix, with over 25 species of wildflowers including 3 or more in each bloom season: spring, summer, fall.

[Minnesota Native Landscapes](#)

#### Southern Rocky Mountain Native Seed Mix



Produced by [Applewood Seed Company](#), this mix features high quality native wildflowers that provide sources of pollen and/or nectar for pollinators. To provide nesting habitat for bumble bees and other beneficial insects, two or more species of bunch grass are also included in the mix. This mix is appropriate for habitat restoration in the Southern Rocky Mountains (elevations between 6,000 and 10,000 feet in Wyoming, Colorado & New Mexico).

[Applewood Seed Company](#)

#### Pollinator-Palooza! (Upper Midwest Native Seed Mix)



An all-out party for bees, butterflies, and other pollinators - designed for full sun to partial-shade sites with medium soils. This 3 to 5 foot tall mix boasts 45 native prairie species, including some not commonly available like late figwort and hairy mountain mint. This mix is highly appropriate for habitat restoration in Minnesota, Wisconsin, Illinois, and Iowa. Produced by [Prairie Moon Nursery](#).

[Prairie Moon Nursery](#)

<https://www.xerces.org/pollinator-conservation/pollinator-conservation-seed-mixes>





Photos, left to right: Monarch caterpillar on swamp milkweed (Xerces Society / Stephanie McKnight); Bumblebee on butterfly milkweed (Xerces Society / Sarah Foltz Jordan); Monarch over showy milkweed (Xerces Society / Stephanie McKnight)

## Milkweed Finder

Native milkweeds (*Asclepias* spp.) are essential for monarch butterfly (*Danaus plexippus*) caterpillars and support a diversity of pollinators with their abundant nectar. By including milkweeds in gardens, landscaping, wildlife habitat restoration projects, and native revegetation efforts, you can provide breeding habitat for monarchs as well as a valuable nectar source for butterflies, bees, and other beneficial insects. As part of our [Project Milkweed](#), we have created this comprehensive national directory of milkweed seed vendors to help you find sources of seed. To learn more about monarch butterflies and how you can participate in conservation efforts, please visit the Xerces Society's [Monarch Butterfly Conservation page](#) or the [Monarch Joint Venture webpage](#).

[Jump down to the Milkweed Finder Tool](#)

### Pollinator Conservation Resource Center



Find national and region-specific resources including plant lists, conservation guides, seed mixes, native plant nursery and seed producers, and more in our searchable library.

[pollinator conservation resource center](#)

### Pollinator Conservation Seed Mixes

Our partners in the native seed industry are offering



Please use the drop-down menus to search for seed sources by species and/or state. You can also review the map to ensure you aren't missing out on any vendors just across a state line from you!

State:

Plant species:

Live plant:

Seed:

#### Agrecol Native Nursery

State: Wisconsin  
City: Evansville  
<http://www.agrecol.com/>  
[ecosolutions@agrecol.com](mailto:ecosolutions@agrecol.com)  
(608) 223-3571

##### Available Species

- |   |  |
|---|--|
| <b><i>Asclepias tuberosa</i></b> (butterfly milkweed)<br>Seed, Live plant   | <b><i>Asclepias syriaca</i></b> (common milkweed)<br>Seed, Live plant          |
| <b><i>Asclepias incarnata</i></b> (swamp milkweed)<br>Seed, Live plant      | <b><i>Asclepias sullivantii</i></b> (grainie milkweed)<br>Seed, Live plant     |
| <b><i>Asclepias verticillata</i></b> (whorled milkweed)<br>Seed, Live plant | <b><i>Asclepias exaltata</i></b> (poke milkweed)<br>Seed, Live plant           |
| <b><i>Asclepias speciosa</i></b> (showy milkweed)<br>Seed, Live plant       | <b><i>Asclepias hirtella</i></b> (green milkweed)<br>Seed, Live plant          |
| <b><i>Asclepias purpurascens</i></b> (purple milkweed)<br>Seed, Live plant  | <b><i>Asclepias viridiflora</i></b> (short green milkweed)<br>Seed, Live plant |

#### Taylor Creek Restoration Nurseries

State: Wisconsin  
<http://www.restorationnurseries.com/>  
[nurseryservice@appliedeco.com](mailto:nurseryservice@appliedeco.com)  
(608) 897-8641

##### Available Species

- |   |  |
|---|--|
| <b><i>Asclepias exaltata</i></b> (poke milkweed)<br>Seed, Live plant        | <b><i>Asclepias hirtella</i></b> (green milkweed)<br>Seed, Live plant      |
| <b><i>Asclepias incarnata</i></b> (swamp milkweed)<br>Seed, Live plant      | <b><i>Asclepias purpurascens</i></b> (purple milkweed)<br>Seed, Live plant |
| <b><i>Asclepias speciosa</i></b> (showy milkweed)<br>Seed, Live plant       | <b><i>Asclepias sullivantii</i></b> (grainie milkweed)<br>Seed, Live plant |
| <b><i>Asclepias syriaca</i></b> (common milkweed)<br>Seed, Live plant       | <b><i>Asclepias tuberosa</i></b> (butterfly milkweed)<br>Seed, Live plant  |
| <b><i>Asclepias verticillata</i></b> (whorled milkweed)<br>Seed, Live plant |  |

<https://www.xerces.org/milkweed/milkweed-seed-finder>



## Pollinator Conservation Resource Center

Region-specific resources to aid in the planning, establishment, restoration, and maintenance of pollinator habitat.

Welcome to the Pollinator Conservation Resource Center! Here we offer region-specific collections of publications, native plant and seed suppliers, and other resources to aid in planning, establishing, restoring, and maintaining pollinator habitat—as well as materials to help you learn about the various invertebrates you might encounter.

To view resources relevant to where you live and work, start by selecting your region from the map or the list.



### Choose Location

- [Alaska](#)
- [California](#)
- [Great Lakes Region](#)
- [Hawaii](#)
- [Mid-Atlantic Region](#)
- [Mountain Region](#)
- [North Central Region](#)
- [Northeast Region](#)
- [Northwest](#)
- [Pacific Northwest Region](#)
- [Puerto Rico](#)
- [South Central Region](#)
- [Southeast Region](#)
- [Southwest Region](#)
- [Yukon](#)

<https://www.xerces.org/pollinator-resource-center>



## Pollinator Conservation Resources: Great Lakes Region



(Photo: Xerces Society / Karin Jokela)

Welcome to our Pollinator Conservation Resources for the Great Lakes Region! Here you'll find region-specific collections of publications, native plant and seed suppliers, and other resources to aid in planning, establishing, restoring, and maintaining pollinator habitat—as well as materials to help you learn about the species of invertebrates and native plants you might encounter.

For more resources, see our [Publications Library](#) or learn about our [Pollinator Conservation Program](#).

[Click to return to the Pollinator Conservation Resource Center home page.](#)

### Habitat Assessment

[Click to Expand](#)

### Habitat Installation

[Click to Expand](#)

### Plant Lists

[Click to Expand](#)



### Pollinator-Friendly Parks



To support the work being done by park managers across the country, the Xerces Society has recently released [Pollinator-Friendly Parks: Enhancing Our Communities by Supporting Native Pollinators in Our Parks and Other Public Spaces](#).

### You Can Help Bring Back The Pollinators

<https://www.xerces.org/pollinator-resource-center/great-lakes>



For more resources, see our [Publications Library](#) or learn about our [Pollinator Conservation Program](#).  
[Click to return to the Pollinator Conservation Resource Center home page](#)

#### Habitat Assessment

[Click to Expand](#)

#### Habitat Installation

[Click to Expand](#)

#### Plant Lists

[Click to Expand](#)

#### Habitat Management

[Click to Expand](#)

#### Pesticide Protection

[Click to Expand](#)

#### Identification & Monitoring Resources

[Click to Expand](#)

#### Native Seed & Plant Suppliers

[Suppliers](#)

[Seed Mixes](#)

#### Further Reading

[Click To Expand](#)

#### Pollinator-Friendly Parks



To support the work being done by park managers across the country, the Xerces Society has recently released [Pollinator-Friendly Parks: Enhancing Our Communities by Supporting Native Pollinators in Our Parks and Other Public Spaces](#).

#### You Can Help Bring Back The Pollinators

This campaign is focused on four simple principles: growing pollinator-friendly flowers, providing nest sites, avoiding pesticides, and spreading the word.

[learn more](#) [sign the pledge](#)

#### Bumble Bee Watch

[Bumble Bee Watch](#) is a collaborative effort to track and conserve North America's bumble bees. Everyone is invited to contribute to this important community science effort. Have fun while learning more about bumble bees and the vital role they play in our environment!

#### Bee Better Certified

[Bee Better Certified](#)<sup>™</sup> partners with farmers and food companies to conserve bees and other pollinators in agricultural lands. The Bee Better Certified seal identifies and celebrates farmers and businesses that adopt farm management practices that support pollinators, and gives consumers confidence that their purchasing decisions benefit pollinators and the farmers working to protect them.

[Bee City & Bee Campus USA](#)

<https://www.xerces.org/pollinator-resource-center/great-lakes>





## Species Profiles: At-Risk Invertebrates



The endangered island marble butterfly (Euchloe ausonides insulana) - (Photo: Scott McCarthy / USFWS)

A crucial step towards protecting invertebrates is to identify the species in greatest need of conservation attention—a process that requires the methodical collection of data, and then spreading the word to raise awareness about their plights. To that end, we are producing detailed species profiles for a variety of invertebrate groups, which can be found here. Click on a species group below to begin learning about the vital creatures that Xerces is working to protect!

*PLEASE NOTE: While the profiles provided are the most current that we have, in some cases, they were completed a number of years ago. Please contact [endangeredspecies@xerces.org](mailto:endangeredspecies@xerces.org) with any questions.*

### Endangered Species Resources

[community science projects](#) [species profiles](#)

[save western monarchs](#) [bumble bee conservation](#)

[firefly conservation](#) [monarch conservation](#)

[freshwater mussel conservation](#)

### Endangered Species On The Blog



Searching for Rare Butterflies on the Oregon and California Coasts



Keep Monarchs Wild: Why Captive Rearing Isn't the Way to Help Monarchs



Without State-Level Protection, These Invertebrates Face an Uncertain Future

<https://www.xerces.org/endangered-species/species-profiles>



# Habitat Assessment Guide for Pollinators in Yards, Gardens, and Parks



Above: a diversity of native wildflowers make it possible for this small urban pollinator garden to support a variety of bees, butterflies, and other insects all season long. Below: native wildflowers and fruit trees provide high quality resources for pollinators, wildlife, and people in a small space.

## Purpose

Landscaping for pollinators is one of the easiest ways for urban, suburban, and rural residents to directly benefit local wildlife. Schoolyards, community gardens, back yards, corporate campuses, rain gardens, and neighborhood parks all have the potential to meet the most basic needs of pollinators, including protection from pesticides, and resources for foraging, nesting, and overwintering.

The goal of this tool is to evaluate pollinator habitat at a given site, and identify areas for improvement. This process will also help you prioritize the most essential next steps to take for pollinators at the site.



November 2019  
The Xerces Society for Invertebrate Conservation  
www.xerces.org

**XERCES SOCIETY**  
for Invertebrate Conservation

**UNIVERSITY OF MINNESOTA**

## Xerces Society Recommended High Value Plants for Pollinators

- ★ **POLLINATOR "SUPERFOODS"**—Certain native plants are known to provide exceptional forage for a wide variety of bees and other pollinators, including monarchs. See table below for a list of some of these plants.
- ✦ **FOOD FOR SPECIALIST BEES**—Many native bees are "specialists," only collecting pollen and other resources from specific plants. See table below for a list of plants known to provide food for a number of specialist bees.
- ✦ **LEPIDOPTERA HOST PLANTS**—The caterpillars of many butterflies and moths can only feed on specific plants. For example, great spangled fritillary larvae only feed on violet leaves. Some plants support an amazing diversity of lepidoptera, e.g., oaks support hundreds of butterflies and moths species. Since most native plants support at least one butterfly or moth, we use ✦ for a genus supports over five species and ✦ for one species that doesn't eat anything else.

NOTE: These lists are not exhaustive—see Resource section to identify additional native plants for your site. Some of these plants may not be appropriate for every region/site.

TABLE 1: SUPERFOODS & HOST PLANTS		
HIGH VALUE PLANTS Appropriate for Most Regions		
<b>Native Wildflowers</b>	<ul style="list-style-type: none"> <li>Agrostache (giant hyssop) —★✦</li> <li>Asclepias (milkweed) —★✦</li> <li>Cirsium (thistle (native)) —★✦</li> <li>Echinacea (purple coneflower) —✦</li> <li>Euthamia (goldenrope) —★✦</li> </ul>	<ul style="list-style-type: none"> <li>Helianthus (sunflower) —★✦✦</li> <li>Lupinus (lupine) —✦</li> <li>Monarda/Monardella (bee balm) —★✦✦</li> <li>Penstemon (beardtongue) —✦</li> <li>Ratibida (coneflower) —✦</li> </ul>
<b>Native Shrubs &amp; Trees</b>	<ul style="list-style-type: none"> <li>Acer (maple) —★✦</li> <li>Amelanchier (serviceberry) —★✦</li> <li>Amorpha (leadplant/false indigo) —★✦✦</li> <li>Ceanothus (wild lilac) —★✦✦</li> <li>Cercis (redbud) —✦</li> <li>Cornus (dogwood) —✦</li> </ul>	<ul style="list-style-type: none"> <li>Pinus (pine) —✦</li> <li>Prunus (wild plum) —★✦✦</li> <li>Quercus (oak) —✦</li> <li>Rhus (sumac) —✦</li> <li>Ribes (currant) —★✦</li> <li>Rosa (wild rose) —★✦✦</li> </ul>
<b>Native Grasses</b>	<ul style="list-style-type: none"> <li>Andropogon (bluestem) —✦</li> <li>Bouteloua (grama) —✦</li> <li>Carex (sedge) —✦</li> </ul>	<ul style="list-style-type: none"> <li>Elymus (wheatgrass, wildrye) —✦</li> <li>Hierochloa (sweetgrass) —✦</li> <li>Koeleria (Junegrass) —✦</li> </ul>
HIGH VALUE PLANTS for Specific Regions		
<b>Pacific Northwest</b>	<b>Great Plains &amp; Intermountain West</b>	<b>Great Lakes &amp; Northeast</b>
<ul style="list-style-type: none"> <li>Baccharis (coyotebush) —★✦</li> <li>Berberis (barberry) —★✦✦</li> <li>Clarkia (clarkia) —★✦✦</li> <li>Cleome (bee plant) —★✦</li> <li>Fragaria (strawberry) —✦</li> <li>Grindelia (gumweed) —★✦✦</li> <li>Helianthus (sneezeweed) —★✦✦</li> <li>Phacelia (phacelia) —★✦✦</li> <li>Rhus (sumac) —✦</li> <li>Sidalcea (checkerbloom) —★✦</li> </ul>	<ul style="list-style-type: none"> <li>Callirhoe (poppy mallow) —✦</li> <li>Dalea (prairie clover) —★✦✦</li> <li>Eriogonum (wild buckwheat) —★✦✦</li> <li>Geranium (wild geranium) —✦</li> <li>Heterotheca (false goldenaster) —★✦✦</li> <li>Machaeranthera (taraxacum) —★✦✦</li> <li>Oenothera (evening primrose) —★✦✦</li> <li>Sphaeralcea (globemallow) —★✦✦</li> <li>Vernonia (ironweed) —★✦✦</li> </ul>	<ul style="list-style-type: none"> <li>Cephalanthus (buttonbush) —★</li> <li>Dalea (prairie clover) —★✦✦</li> <li>Eutrochium (joe pye weed) —★✦✦</li> <li>Ilex (holly) —★✦✦</li> <li>Liatris (blazing star) —★✦</li> <li>Packera (fragwort) —✦</li> <li>Pycnanthemum (mountain mint) —★</li> <li>Siphium (cup plant) —★✦✦</li> <li>Zizia (Alexander's zizia) —★✦✦</li> <li>Carya (hickory) —✦</li> </ul>
<b>Southwest &amp; California</b>	<b>Midwest &amp; South Central</b>	<b>Southeast &amp; Mid-Atlantic</b>
<ul style="list-style-type: none"> <li>Arctostaphylos (manzanita) —★✦✦</li> <li>Baccharis (coyotebush) —★✦✦</li> <li>Berberis (barberry) —★✦✦</li> <li>Bidens (beggartick) —★✦</li> <li>Eriogonum (wild buckwheat) —★✦✦</li> <li>Grindelia (gumweed) —★✦✦</li> <li>Larrea (creosote bush) —★✦✦</li> <li>Monardella (monardella) —★✦</li> <li>Phacelia (phacelia) —★✦✦</li> <li>Salvia (sage) —✦</li> </ul>	<ul style="list-style-type: none"> <li>Boltania (doll's daisy/false aster) —★✦✦</li> <li>Chamaecrista (partridge pea) —★✦✦</li> <li>Eutrochium (joe pye weed) —★✦✦</li> <li>Helianthus (sneezeweed) —★✦✦</li> <li>Liatris (blazing star) —★✦</li> <li>Pycnanthemum (mountain mint) —★</li> <li>Siphium (cup plant) —★✦✦</li> <li>Tilia (basewood) —✦</li> <li>Verbena (wingstem) —★✦</li> <li>Zizia (Alexander's zizia) —★✦✦</li> </ul>	<ul style="list-style-type: none"> <li>Baptisia (wild indigo) —✦✦</li> <li>Carex (sedge) —✦</li> <li>Desmodium (tick clover) —✦</li> <li>Eutrochium (joe pye weed) —★✦✦</li> <li>Gaillardia (blanketflower) —✦</li> <li>Helianthus (sneezeweed) —★✦✦</li> <li>Hibiscus (rose mallow) —✦</li> <li>Ilex (holly) —★✦✦</li> <li>Liatris (blazing star) —★✦</li> <li>Vernonia (ironweed) —★✦✦</li> </ul>

GROWTH FORMS: Wildflower/Forb (✦), Shrub/Tree (✦), Grass/Sedge (✦)

TABLE 2: EDIBLE LANDSCAPING PLANTS WITH VALUE TO POLLINATORS		
<ul style="list-style-type: none"> <li>Abelmoschus esculentus (okra)</li> <li>Allium** (chives, garlic, leek, onions, shallot)</li> <li>Amelanchier* (serviceberry, serviceberry)</li> <li>Artemisia* (pawpaw)</li> <li>Anethum graveolens* (dill)</li> <li>Beta sica** (broccoli, cabbage, cauliflower, kale)</li> <li>Calendula (calendula)</li> <li>Capivium* (peppers (bell/chili, habanero))</li> <li>Castanea* (chestnut, chinquapin)</li> <li>Citrus (lemon, lime, tangerine)</li> <li>Coriandrum sativum* (coriander/cilantro)</li> <li>Caryophyllus (cherry)</li> </ul>	<ul style="list-style-type: none"> <li>Cucumis (cucumber, melon)</li> <li>Cucurbita* (pumpkin, squash)</li> <li>Diospyros virginiana* (common persimmon)</li> <li>Eragrostis esculentus* (buckwheat)</li> <li>Fragaria* (strawberry)</li> <li>Helianthus annuus* (sunflower)</li> <li>Lavandula (lavender)</li> <li>Malus* (apple, crab apple)</li> <li>Matricaria* (chamomile)</li> <li>Mentha** (mint)</li> <li>Ocimum* (basil)</li> <li>Quercus* (prickly pear)</li> </ul>	<ul style="list-style-type: none"> <li>Oenanthe vulgare* (oregano)</li> <li>Passiflora* (passionfruit)</li> <li>Persia americana (avocado)</li> <li>Phaseolus* (bean (common, scarlet runner, wild))</li> <li>Prunus* (almond, apricot, cherry, peach, plum)</li> <li>Pyrus (pear)</li> <li>Ribes* (currant (black, golden, red))</li> <li>Rosa* (rose (dogrose, hybrid tea, wild))</li> <li>Rubus* (blackberry, raspberry)</li> <li>Sambucus* (elderberry (black, blue, red))</li> <li>Solanum* (eggplant, potato, tomato)</li> <li>Vaccinium* (blueberry, cranberry)</li> <li>Vicia* (fava bean, vetch)</li> </ul>

The Xerces Society for Invertebrate Conservation

19-038\_01

[https://www.xerces.org/sites/default/files/publications/19-038\\_01\\_HAG\\_Yard-Park-Garden\\_web.pdf](https://www.xerces.org/sites/default/files/publications/19-038_01_HAG_Yard-Park-Garden_web.pdf)





UNIVERSITY of WISCONSIN—MADISON



## Wisconsin Pollinators

Bees, butterflies, and their conservation

Q Search

[Home](#)

[The WiBee App](#) ▾

[Bee Identification](#) ▾

[Pollinator Resources](#)

[More Information](#) ▾

[About Us](#)



<https://pollinators.wisc.edu/>







### Create Pollinator Habitat

Insect pollinators need three things to survive: food, shelter, and protection from insecticides. Whether you are a farmer, gardener or homeowner, learn how you can provide a healthy habitat for Wisconsin's native pollinators.

[Pollinator Resources»](#)

### Wisconsin Online Pollinator Habitat Assessment

Do you have a garden area, a yard or a larger property where you would like to create healthy habitat that attracts pollinators? Choose a specific site and use our online tool to complete a habitat assessment.

[Learn more and get started»](#)



<https://pollinators.wisc.edu/>





[Home](#) / [Wisconsin Online Pollinator Habitat Assessment](#)

## Wisconsin Online Pollinator Habitat Assessment

We are glad you are interested in evaluating a site to identify actions you can take to improve the abundance and health of your local insect pollinator community. Whether you have a single garden bed, a yard, or a multiple-acre property, this tool can support your planning.

**This tool is designed to give you:**

1. Familiarity with the features that create a healthy pollinator habitat,
2. A simple yet complete assessment of the quality of pollinator habitat for food and nesting and ways to mitigate activities that are potentially harmful to pollinators.
3. A list of actions (and supporting resources) to improve the pollinator habitat on your site.

*This tool was developed in 2020 by the [University of Wisconsin-Madison Gratton Lab](#) and the [Dane County Environmental Council](#).*

### Quick Links

[Begin my site assessment >](#)

[Download our pollinator habitat guide \(PDF\) >](#)

[Improve my pollinator habitat >](#)

<https://pollinators.wisc.edu/habitat/>







**I am completing this habitat assessment for:**

*Myself (e.g. in my yard, in my community garden plot) Myself (e.g. in my yard, in my community garden plot)*

**The site I am assessing is located in the following zip code:**

*53089*

**The site I am assessing is located in a:**

*Suburban area*

**The size of the site that I am assessing for a pollinator habitat is:**

*0.25 to 1 acre*

**Is this your first time evaluating this site with our assessment tool?**

*Yes, this is my first time using this tool for this site.*

**What percentage of the site is covered with flowering vegetation?**

*Include any plant that blooms at some point during growing season - from April to October - even if it is not currently in bloom. Include ornamental flowering plants, native wildflowers, flowering shrubs and trees, weeds, and lawn areas blooming with low growing flowers.*

*26% to 50%*

**During the Spring season (April to May), how many plant species are in bloom on your site?**

- Include ornamental flowering plants, native wildflowers, weeds and flowering shrubs and trees.*

*7 or more plant species in bloom*

**During the Summer season (June to August), how many plant species are in bloom on your site? Include ornamental flowering plants, native wildflowers, weeds and flowering shrubs and trees.**

*4 to 6 plant species in bloom*

**During the Fall season (September to October), how many plant species are in bloom on your site? Include ornamental flowering plants, native wildflowers, weeds and flowering shrubs and trees.**

*4 to 6 plant species in bloom*

**Native plants**

Our native pollinators have co-evolved with native plants, and the plants are well-adapted to thrive in Wisconsin's soils and climate. Native plants provide the best food resources for native pollinators throughout the stages of their life.

Non-native plants, while they can be attractive, are sometimes inedible to caterpillars, and the pollen and nectar of non-native flowers can be less nutritious, or even inaccessible to pollinators. As a result, it is valuable to identify how much of your site is currently planted with native plant species.

We understand that not everyone will be able to differentiate native plants from non-native plants, so this section is optional. **Would you like to assess your site for native plant species, or skip this section?**

*Yes, I would like to assess my site for native plants.*

**What percentage of the plants on the site are native species?**

- Include native wildflowers, shrubs and trees.*

*More than 75%*

**Is there a managed honey bee hive on or adjacent to the site you are assessing, or not?**

*No, there are no hives that I am aware of.*

**Does the site have standing dead perennial woody stems and grasses, or dead wood for cavity nesting insects?**

*Yes, this type of habitat is abundant year-round.*

**Does the site have patches of leaf litter and/or brush for ground nesting insects?**

*Yes, this type of habitat is abundant year-round.*

**Which of the following insecticides, if any, are used on the site? (Check all that apply)**

- If you use a lawn care or landscaping company, ask them whether or not they are using any insecticides on the site.*

*Insecticides are not used on this site at any time.*





You have completed the Wisconsin Pollinator Habitat Assessment!

**Your site scored 29 / 33 total points.**

Habitat Quality	Assessment Score
Healthy	23 - 33 pts
Room to grow	10 - 22 pts
Opportunities abound!	0 - 9 pts

We hope this assessment gave you ideas for how to create a healthy pollinator habitat on your site. You can use your scores in each category to focus your next steps:

**Food Habitat: 13 / 17 points**

**Nesting Habitat: 10 / 10 points**

**Insecticide Use: 6 / 6 points**

Download our two-page [Pollinator Habitat Guide](#) or return to our website at [www.pollinators.wisc.edu/habitat](http://www.pollinators.wisc.edu/habitat) to learn how to improve your food habitat, nesting habitat and insecticide use on the site.

If you provided your email address, a copy of your scores and responses will be sent to you at [oreillyn@uwm.edu](mailto:oreillyn@uwm.edu).







Once you  
established your  
garden you can see  
who visits and do  
some *citizen  
science monitoring*





## Wisconsin Bumble Bee Brigade



● <https://wiatri.net/inventory/BBB/>



## Resources

### Q Identification and Monitoring

- View full profiles of Wisconsin's bumble bee species, including photos, identification information, and biology.
- [Bumble Bee Brigade Field Guide](#)
- [Bumble Bee Brigade Identification Quiz, Beginner Part 1](#)
- [Bumble Bee Brigade Identification Quiz, Beginner Part 2](#)
- [Bumble Bee Brigade Identification Quiz, Intermediate Part 1](#)
- [Bumble Bee Brigade Identification Quiz, Intermediate Part 2](#)
- [Bumble Bee Brigade Advanced ID: Cheek, Hair, and Eyes](#)
- [Bumble Bee Brigade Advanced Identification Webinar Recording](#) (transcript available [here](#))
- [Bumble Bee Brigade Virtual Bee ID Webinar: Queens and Workers Recording](#) (Feb 2023)
- [Bumble Bee Brigade Virtual Bee ID Webinar: Males Recording](#) (Jul 2023)
- [Bumble Bee Brigade Small Area Surveys Webinar Recording](#)
- [Bumble Bees of North America: An Identification Guide](#), 2014. Williams, P., Thorp, R., Richardson, L. & Colla, S. Princeton University Press.
- [Bumble Bees of the Eastern United States](#), 2011. Colla, S., Richardson, L. & Williams, P., USDA Forest Service and the Pollinator Partnership.
- The Ohio State University's [Bumble Bee Short Course for Community Scientists](#) - a 7 part series on wild bee conservation and importance of community science.
- [Minnesota Bee Atlas](#) - online bumble bee tutorial, flashcards, and species identification slides. University of Minnesota Extension.
- [Bee Spotter: Keys to Bumble Bees of Illinois, Missouri, Ohio, and Indiana](#).
- [Bumble Bee Watch](#) - species identification key and anatomy resources.
- [Wisconsin Wild Bee Guide](#). University of Wisconsin Great Lakes Bioenergy Research Center.
- [Bumble Bee Identification Guide](#). Discover Life.
- [Bumble Bees of Wisconsin](#). University of Wisconsin-Madison.

### Q Conservation

- [Pollinators in Peril](#) - The Wisconsin Bumble Bee Brigade and Participatory Science
- Wisconsin DNR's [pollinator page](#)
- Xerces Society's [Bumble Bee Conservation Page](#)
- US Fish and Wildlife Service's [Rusty Patched Page](#)
- Judy Cardin & Bob Plamann's [Rusty Patched Bumble Bee Floral Phenology](#) online flipbook (December 2022)
- Amy T. Wolf, Jay C. Watson, Terrell J. Hyde, Susan G. Carpenter, and Robert P. Jean "Floral Resources Used by the Endangered Rusty Patched Bumble Bee (*Bombus affinis*) in the Midwestern United States," *Natural Areas Journal* 42(4), 301-312, (21 October 2022).

### Q Other

- Wisconsin Bumblebee Observers [Facebook Page](#)
- [Get information on volunteering with the Wisconsin Bumble Bee Brigade](#)



This site is produced in conjunction with the Wisconsin Aquatic and Terrestrial Resources Inventory and sponsored by the Wisconsin Department of Natural Resources. The information presented on this site is subject to the Wisconsin Department of Natural Resources' [Legal Notices](#), [Disclaimers](#), and [Terms of Use](#).



● <https://wiatri.net/inventory/bbb/resources/>



The future of Monarch Watch: an announcement by Chip Taylor, Director



# CHIP IN FOR MONARCH WATCH

## A FUNDRAISER IN CHIP'S HONOR

**DONATE NOW**

**MONARCHWATCH.ORG/CHIP**

[SUBMIT YOUR TAGGING DATA](#)

[VIEW TAG RECOVERIES](#)

[BLOG](#)

[MILKWEED MARKET](#)

[FREE MILKWEEDS](#)

[SHOP](#)

[DONATE](#)

[Tagging Program](#) • [Monarch Calendar Project](#) • [Directional Flight Project](#) • [Monarch Watch Tag Recoveries](#) • [Report a Tagged Monarch Sighting](#) • [Free Milkweeds for Restoration Projects](#) • [Monarch Population Status](#) • [Monarch Conservation Specialists](#) • [Bring Back The Monarchs](#) • [Monarchs in Space Project](#) • [Monarch Butterfly Press Materials](#) • [Monarch Conservation Articles](#) • [Weather near the Overwintering Sites](#) • [Chip in for Monarch Watch](#)

**EVENTS:** [Chip in for Monarch Watch](#) • [Monarch Watch Fall Open House](#) • [Monarch Watch Tagging Event](#)

 [Monarch Waystation Program](#)  
Monarchs need our help! Get involved in monarch conservation by creating a Monarch Waystation.

[Ordering Information](#)  
Order your Monarch Watch tags, T-shirts, posters, videos, live critters and a whole lot more!

 [Monarch Biology](#)  
Monarch life cycle, natural populations, and monarch enemies.

[Rearing Monarchs](#)

[Multimedia Gallery](#)  
Monarch photos, drawings, essays and more!

 [Conservation](#)  
Find out about these issues and how you can help.

[In the Classroom](#)  
Lots of great information about using monarchs in the classroom.

 [Research Projects](#)  
Here you'll find several ongoing

Download the [Monarch Watch mobile app today](#) to participate in Monarch Watch community science projects and submit your monarch tagging, recovery and calendar data! Now available for iOS and Android devices.



<https://monarchwatch.org/>



GREEN INFRASTRUCTURE AS  
WILDLIFE HABITAT

# MONITORING AND MAINTENANCE

Green infrastructure are  
gardens, and like all gardens  
will require monitoring and  
maintenance to fully function.





**Table 1. Typical Maintenance Activities for Bioretention Areas**

Source: Center for Watershed Protection, 2001

<b>Activity</b>	<b>Frequency</b>
Water plants	As necessary during first growing season
Water as necessary during dry periods	As needed after first growing season
Re-mulch void areas	As needed
Treat diseased trees and shrubs	As needed
Inspect soil and repair eroded areas	Monthly
Remove litter and debris	Monthly
Add additional mulch	Once per year





# Monitoring and Maintenance

If facilities are properly planned and designed (*protected from sediment and compaction and incorporating a sufficient pretreatment area*), a rainwater basin is likely to retain its effectiveness for well over 20 years.





## CONCLUSION

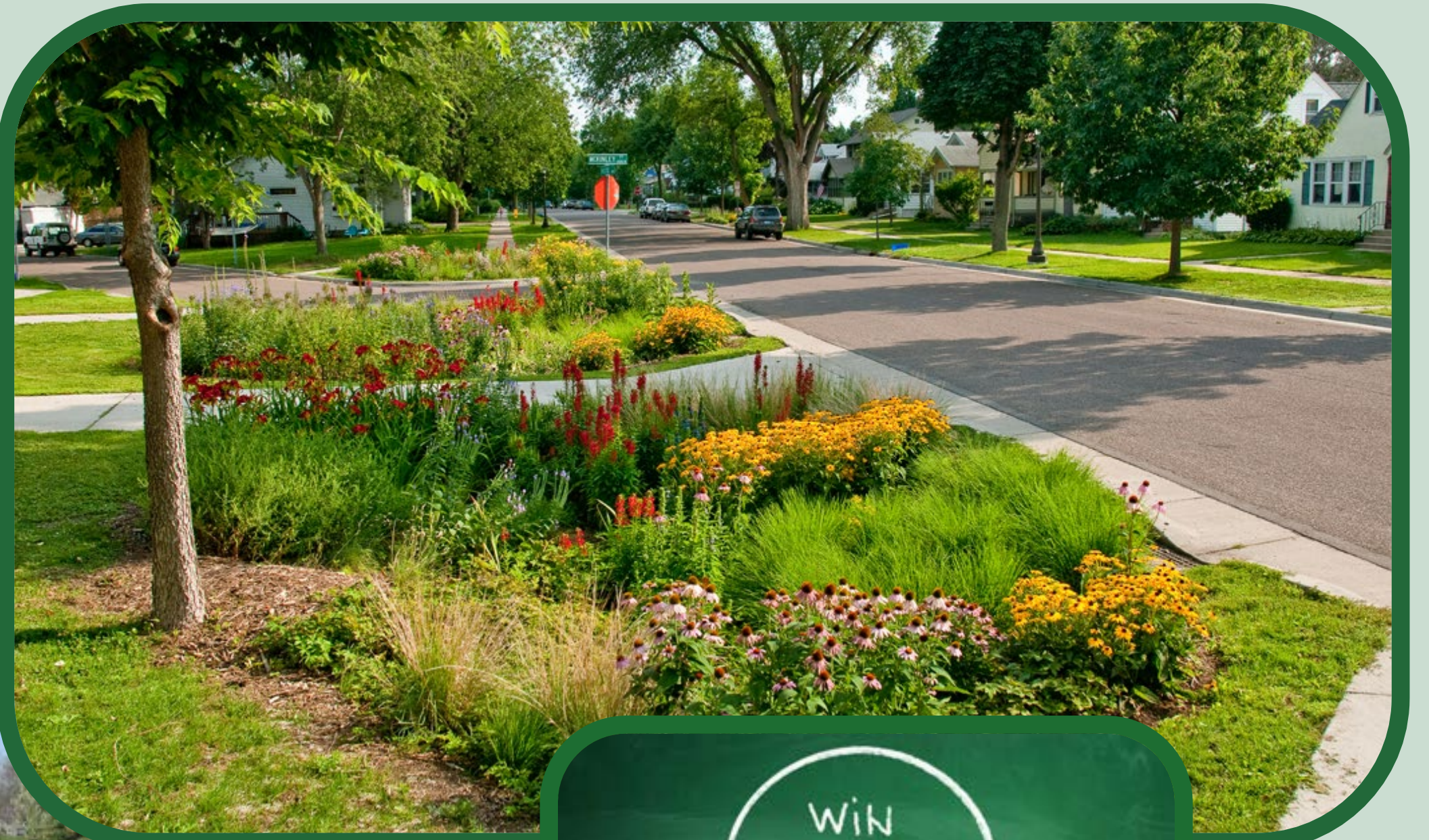
With good design green infrastructure can serve many functions from:

- Stormwater storage,
- Water quality treatment,
- Improved neighborhood aesthetics,
- but also, Wildlife habitat





Let go from seas of  
mowed lawns to seas of  
flowers and habitat and  
better water quality







THANK YOU

GREEN INFRASTRUCTURE AS WILDLIFE HABITAT







# CONTACT ME

**NEAL O'REILLY**

University of Wisconsin- Milwaukee

[oreillyn@uwm.edu](mailto:oreillyn@uwm.edu)

414.229.6112







# Funding and Technical Assistance Opportunities

- 01. Milwaukee Metropolitan Sewerage District- Green Infrastructure Partnership Program
- 02. Wisconsin Department of Natural Resources- Surface Water Grants
- 03. Fund for Lake Michigan
- 04. Sustain our Great Lakes







# Funding and Technical Assistance Opportunities

05. Sweet Water—  
Mini Grants

06. Root-Pike  
Watershed  
Initiative  
Network

07. Green Schools  
Consortium of  
Milwaukee

08. Reflo -  
Sustainable  
Water Solutions

09. Fresh Coast  
Guardians  
Resource Center

10. Talk to your  
municipality

