Using Green Infrastructure to Create Wildlife Habitat:

Part 2 - How to Develop Habitats for Pollinators

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GREEN INFRASTRUCTURE AS
WILDLIFE HABITAT

Definition of Green Infrastructure

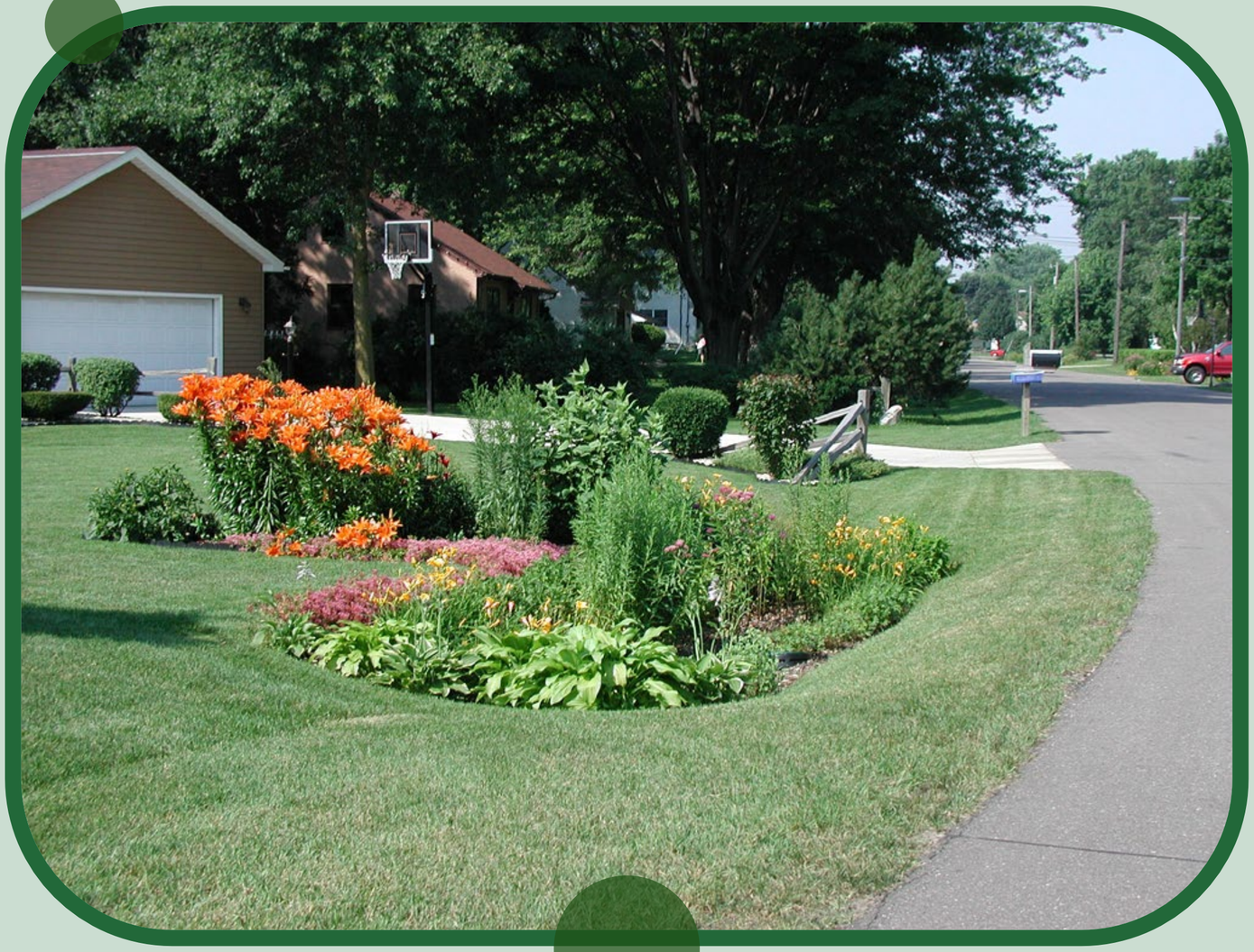
*"the range of measures that **use plant or soil systems**, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping **to store, infiltrate, or evapotranspirate stormwater and reduce flows** to sewer systems or to surface waters."*

- 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



University of Wisconsin – Milwaukee
Sandburg Resident Hall

Green Roofs

Green Roofs

Traditional sedum plantings

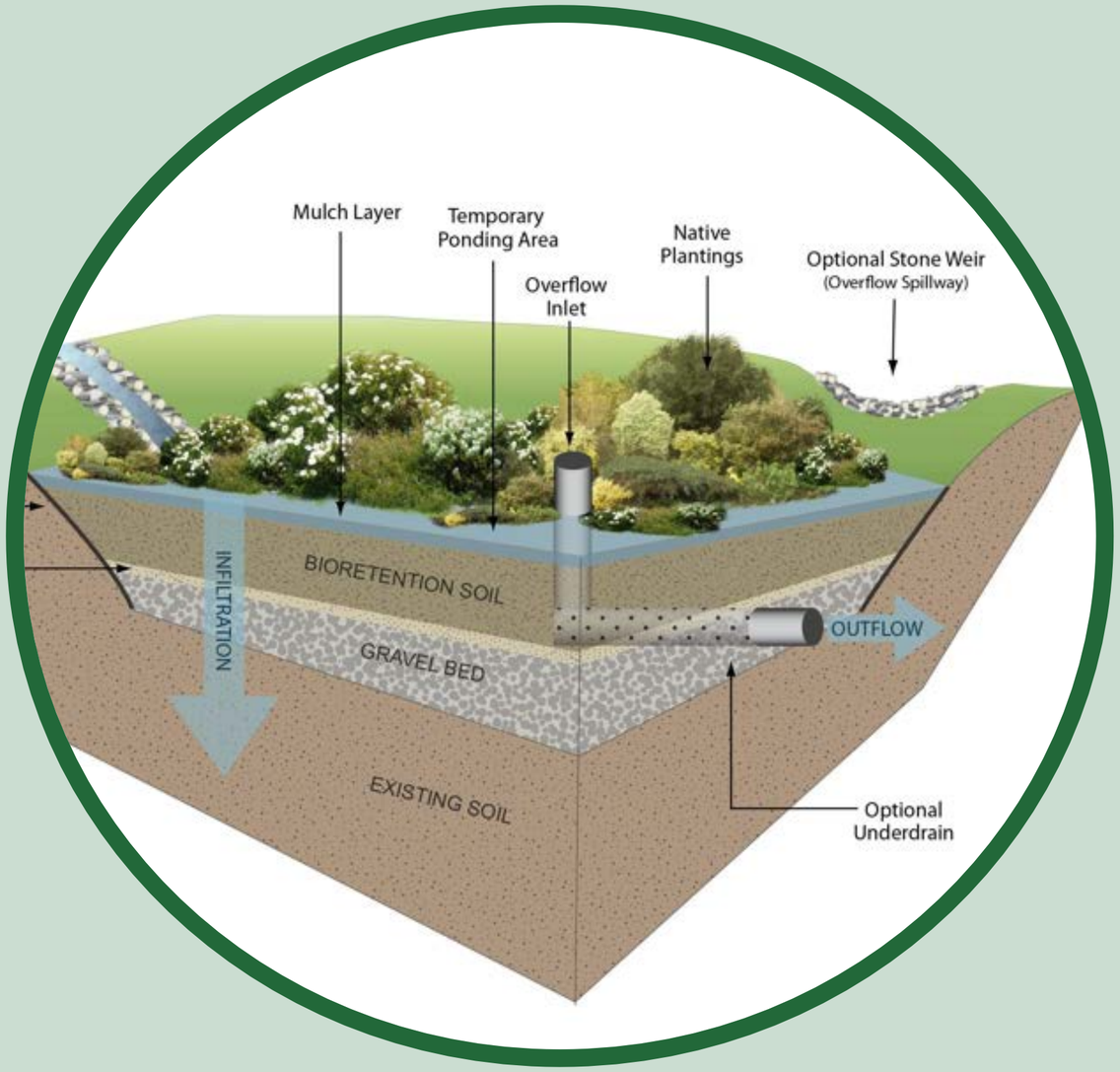
University of Wisconsin – Milwaukee
School of Freshwater Science

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

Green Roofs

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

Rain Gardens



Rain Gardens

Systems that infiltrate stormwater trough 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*

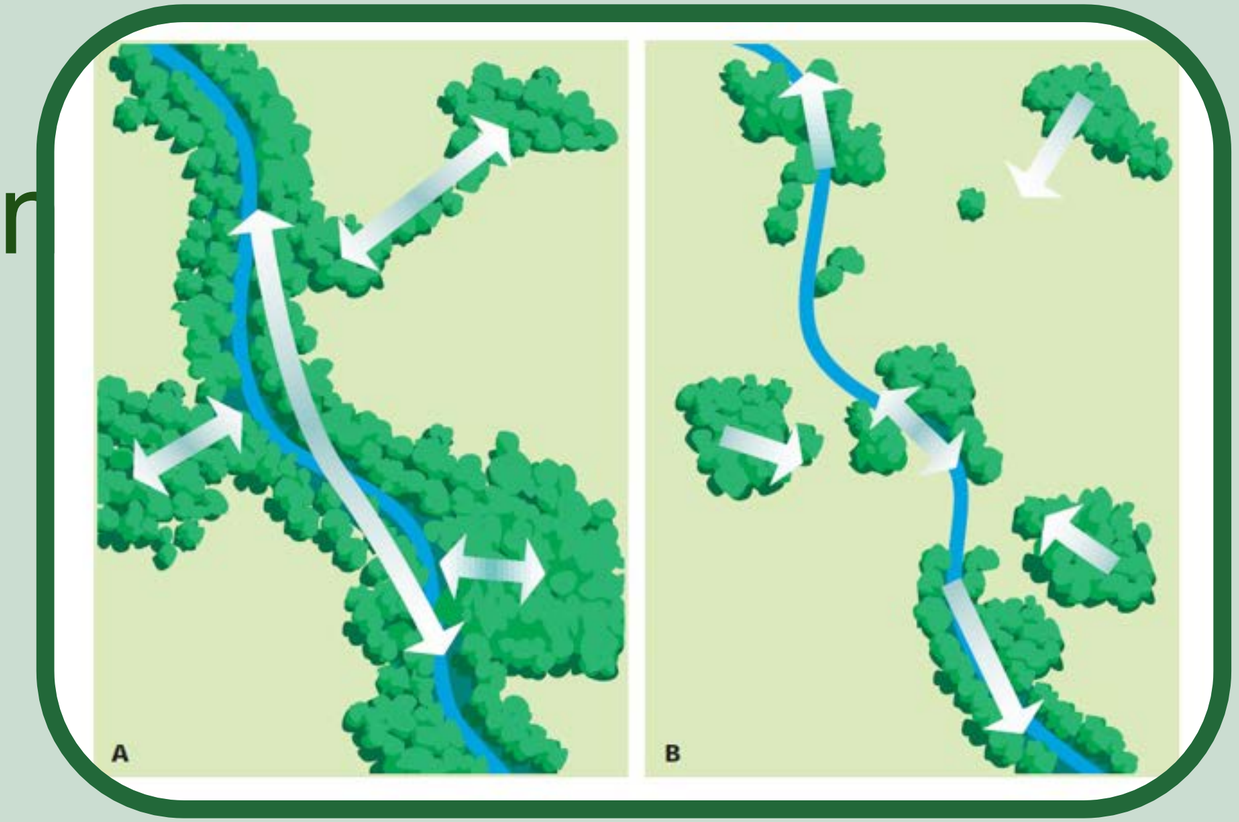
Bio-Swales

Treatment Wetlands

So Why Design Green Infrastructure for Wildlife?

So Why Design Green Infrastructure for Wildlife?

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**

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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?

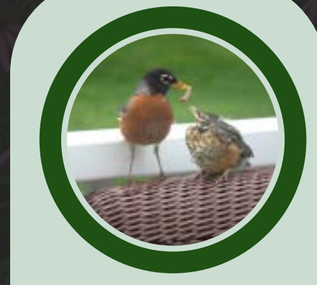
- Birds

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.

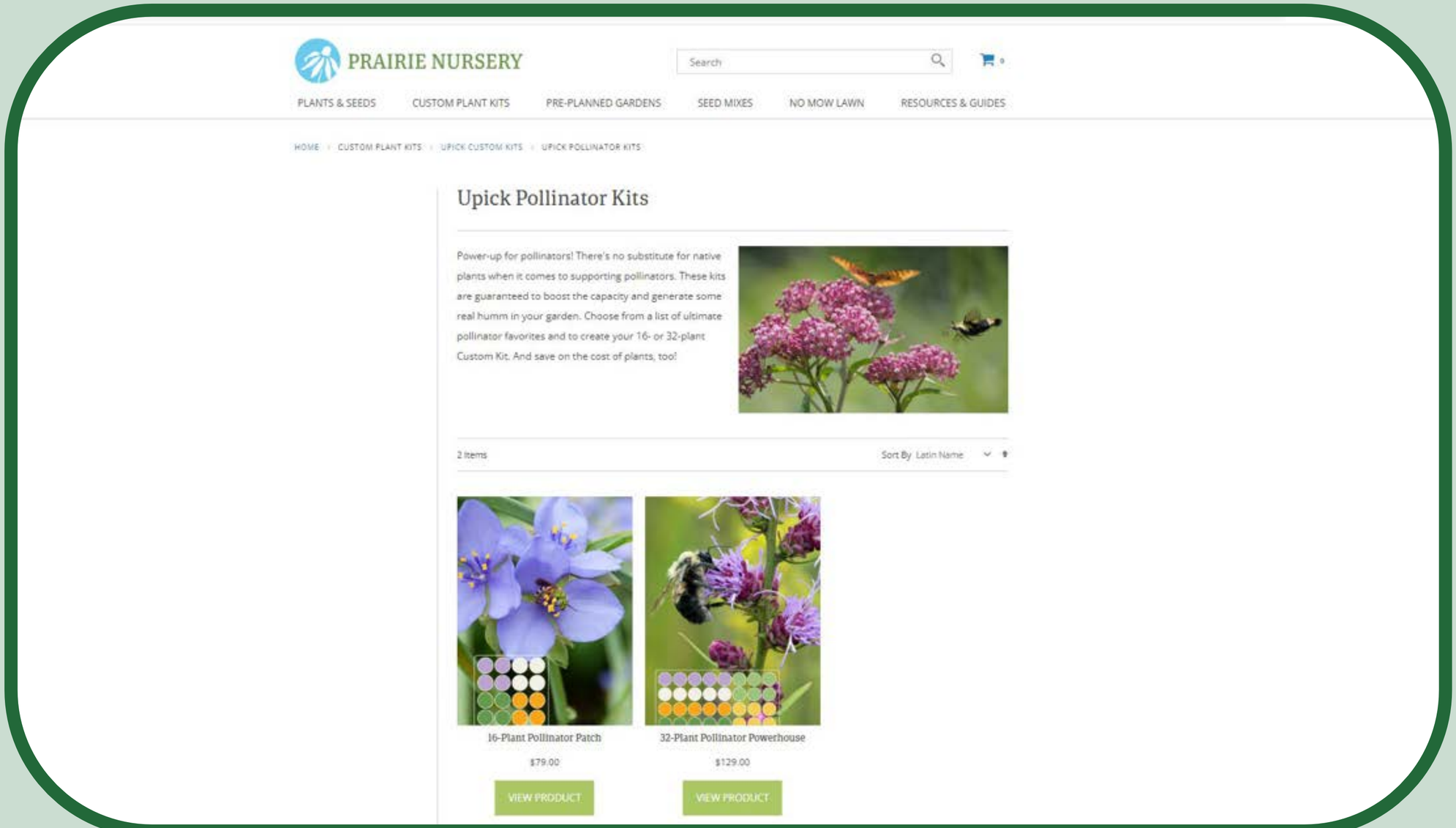
Monarch butterflies foraging in a prairie, by Ellen MacDonald.

Source: ***Wisconsin Pollinator Habitat Guide*** - University of Wisconsin-Madison Gratton Lab and the Dane County Environmental Council

When selecting plants to attract pollinators we have many options:

- Select for color

- Select for general habitat

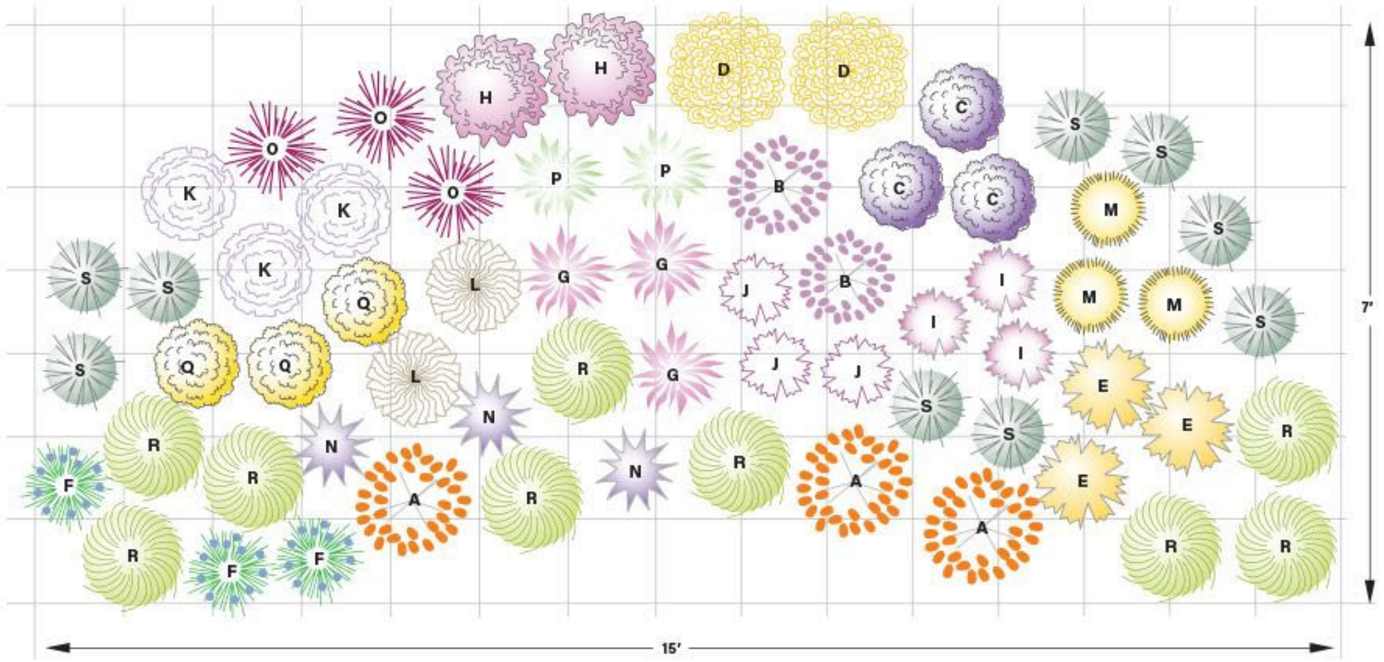


https://www.prairienursery.com/custom-plant-kits/upick-custom-kits/pollinator-kits.html

PLANTING PLAN

64 Plant Pollinator Garden for well-drained soil in full sun

Item #: 50058



PRAIRIE NURSERY

A	Butterflyweed for Clay (3)	**G**	Purple Coneflower (3)	**M**	Ohio Goldenrod (3)	**GRASSES**	
B	Sullivant's Milkweed (2)	**H**	Sweet Joe Pye Weed (2)	**N**	Ohio Spiderwort (3)	**R**	Prairie Dropseed (9)
C	New England Aster (3)	**I**	Meadow Blazingstar (3)	**O**	Ironweed (3)	**S**	Little Bluestem (9)
D	Wild Senna (2)	**J**	Prairie Blazingstar (3)	**P**	Culver's Root (2)		
E	Stiff Coreopsis (3)	**K**	Bergamot (3)	**Q**	Golden Alexanders (3)		
F	Purple Prairie Clover (3)	**L**	Smooth Penstemon (2)				

19 species

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- 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 (*Bombusaffinis*),
  - the yellow-banded bumble bee (*B. terricola*),
  - and the American bumble bee (*B. pensylvanicus*).

Source: ***The Wisconsin Pollinator Protection Plan*** –
Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)

- Wisconsin is also home to the federally endangered Karnerblue butterfly (*Lycaeidesmelissasamuelis*) 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).

Source: ***The Wisconsin Pollinator Protection Plan*** –
Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)

- 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.

Source: ***The Wisconsin Pollinator Protection Plan*** –
Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)

Karner Blue Butterfly

(*Lycaeides melissa samuelis*)

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

- Monarch Butterfly (*Danaus plexippus*)

- Monarch
  - Lay their egg on milkweed

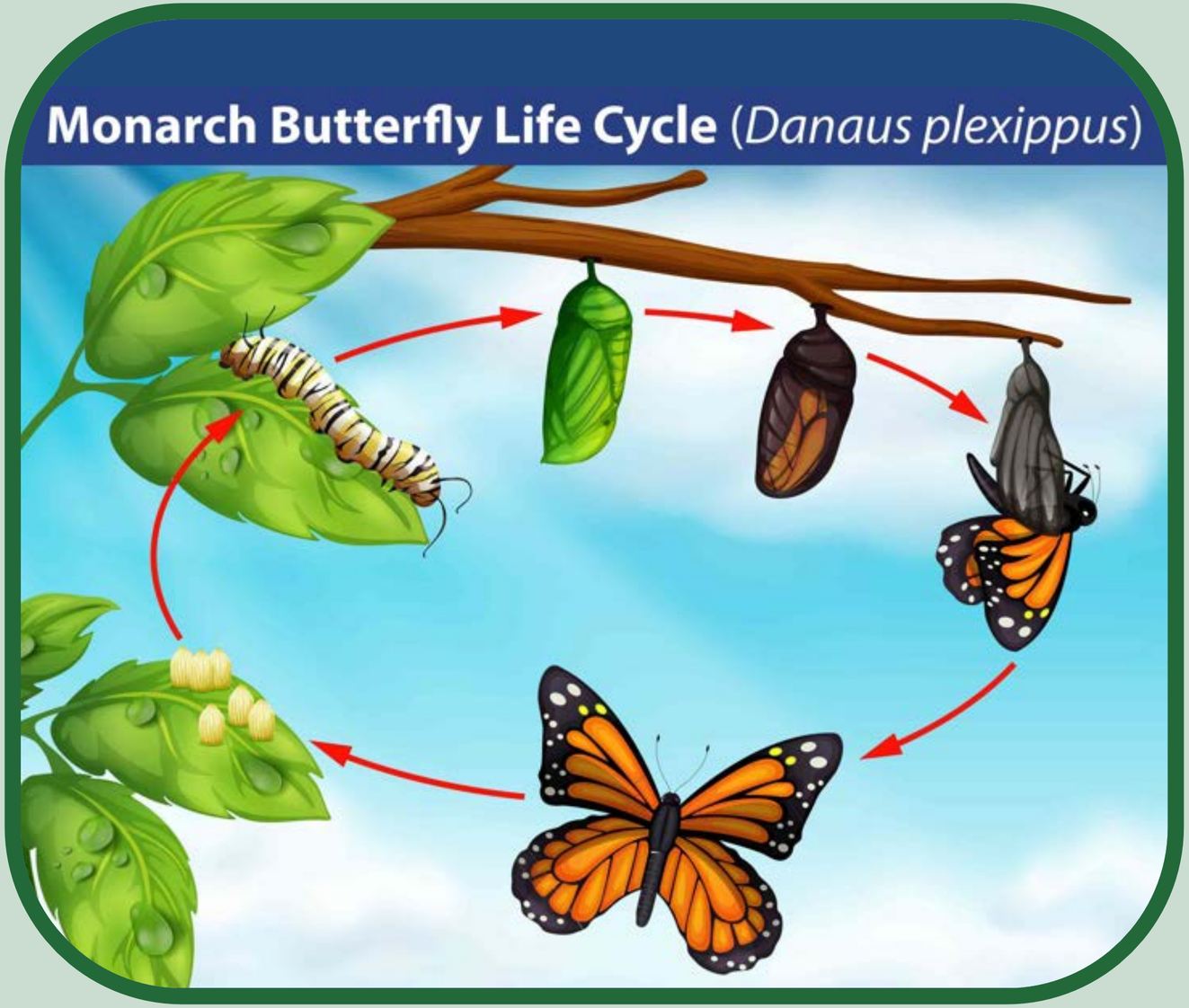
- Milkweed Common to Wisconsin
  - Common Milkweed (*Asclepias syriaca*)
  - Whorled Milkweed (*Asclepias verticillate*)
  - Butterfly Weed (*Asclepias tuberosa*)
  - Purple Milkweed (*Asclepias purpurascens*)
  - Poke Milkweed (*Asclepias exaltata*)
  - Green Comet Milkweed (*Asclepias viridiflora*)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

Monarch

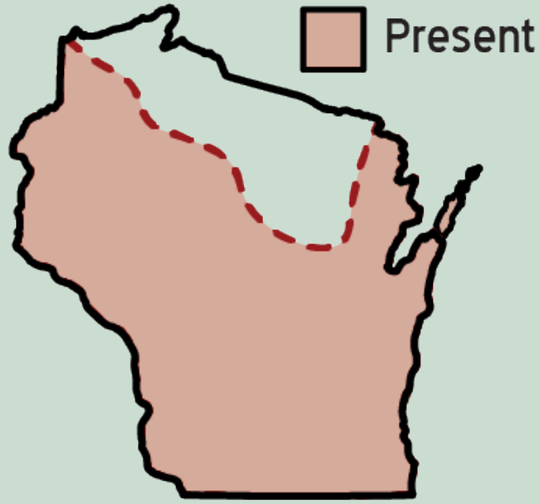
Bloom		Common Name	Scientific Name	Flower Color	Max. Height	Water Needs
		Forbs			(Feet)	Low, Medium, or High
Summer	1	Butterfly milkweed	*Asclepias tuberosa*	Orange	2	L
	2	Common milkweed	*Asclepias syriaca*	Pink	5	L/M/H
	3	Culver's root	*Veronicastrum virginicum*	White	6	M
	4	Swamp milkweed	*Asclepias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

Source: https://xerces.org/sites/default/files/2018-05/17-007_02_XercesSoc_MonarchNectarPlants_Great-Lakes_web-4page.pdf

- Monarch



- Rusty-patched bumble (*Bombus affinis*)



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

Plants Favored By Rusty Patched Bumble Bee

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

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

- Rusty-patched 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?

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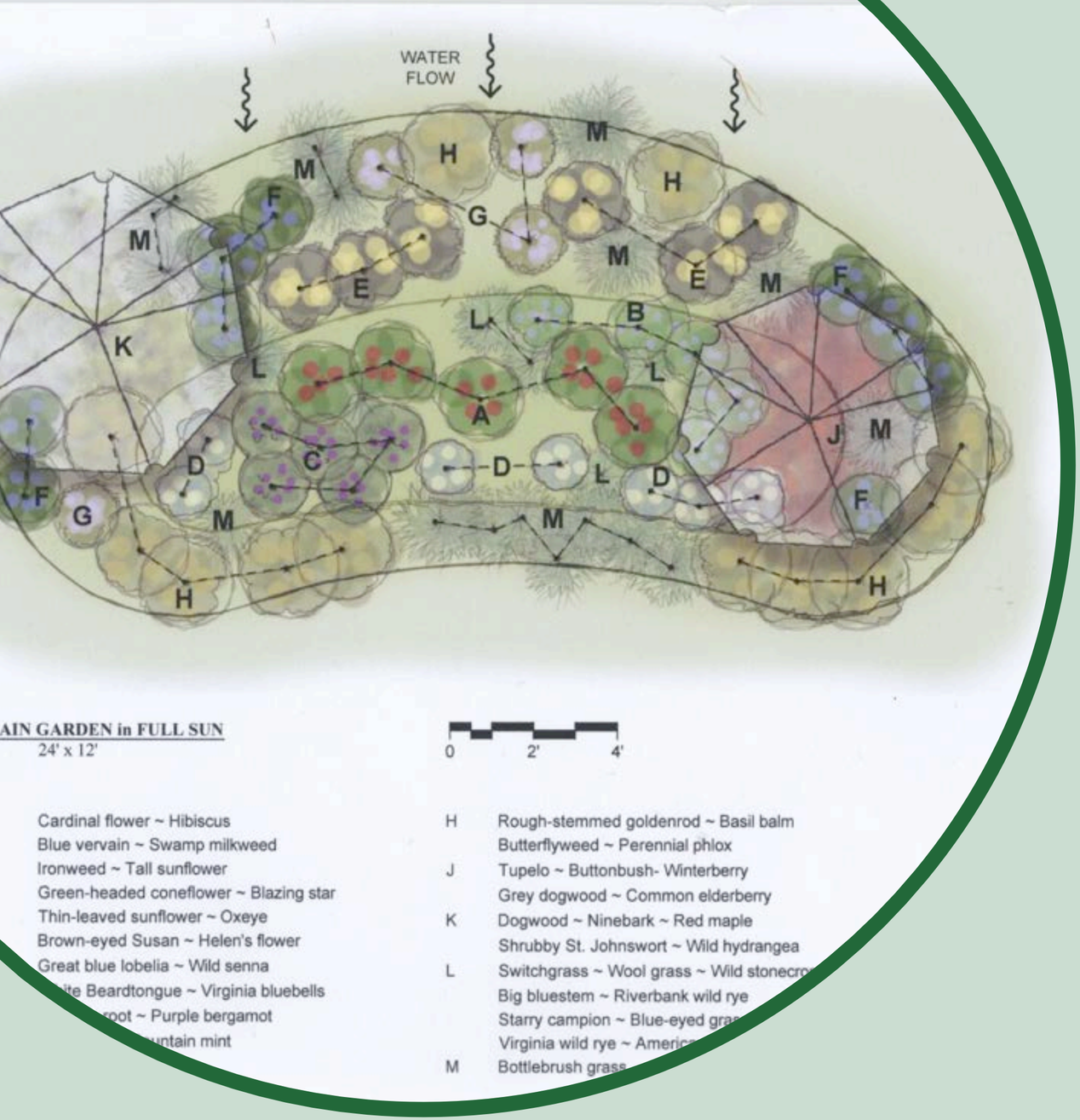
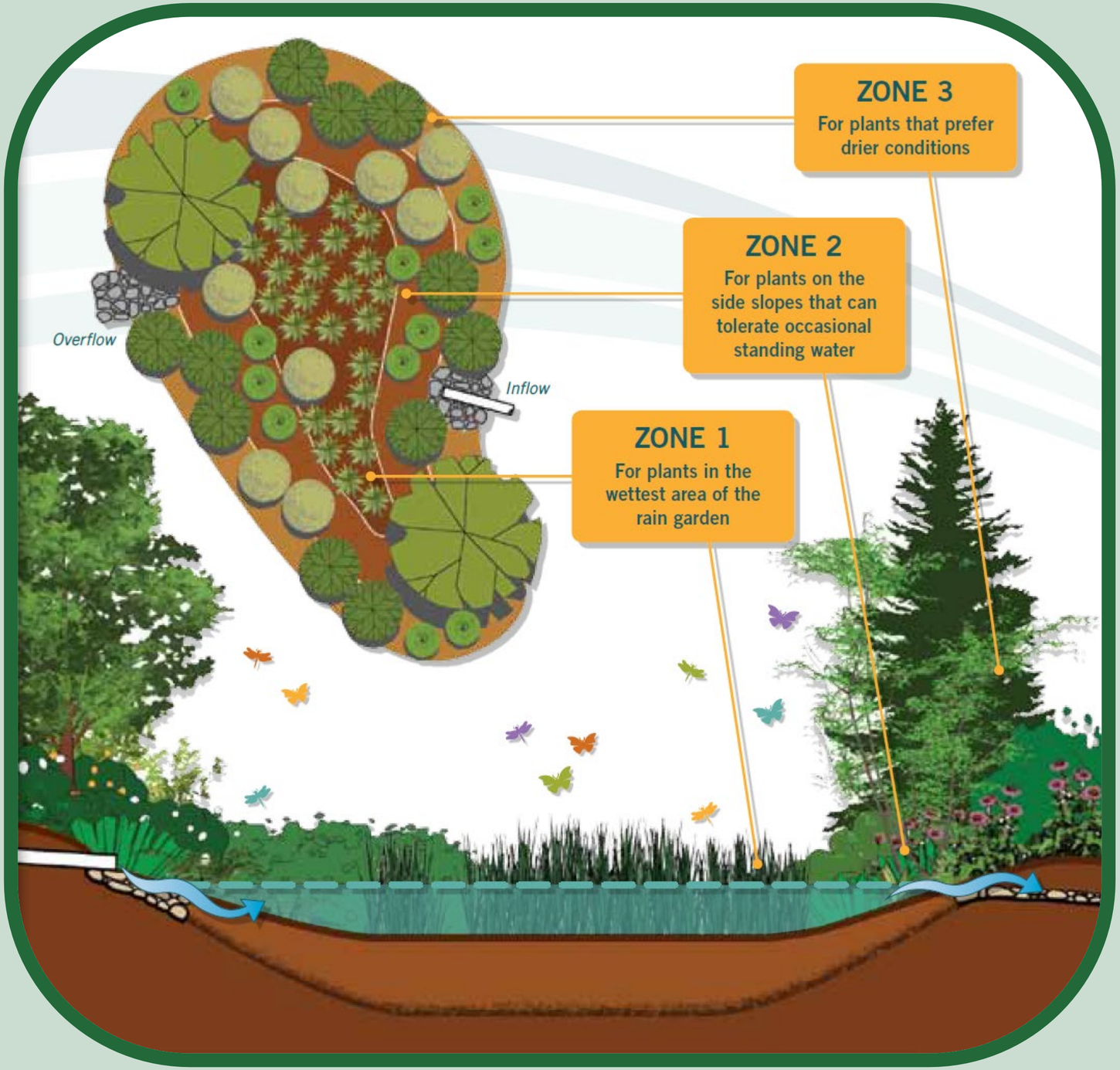


Develop a Planting Plan

- Pick plants that will be used by your target species

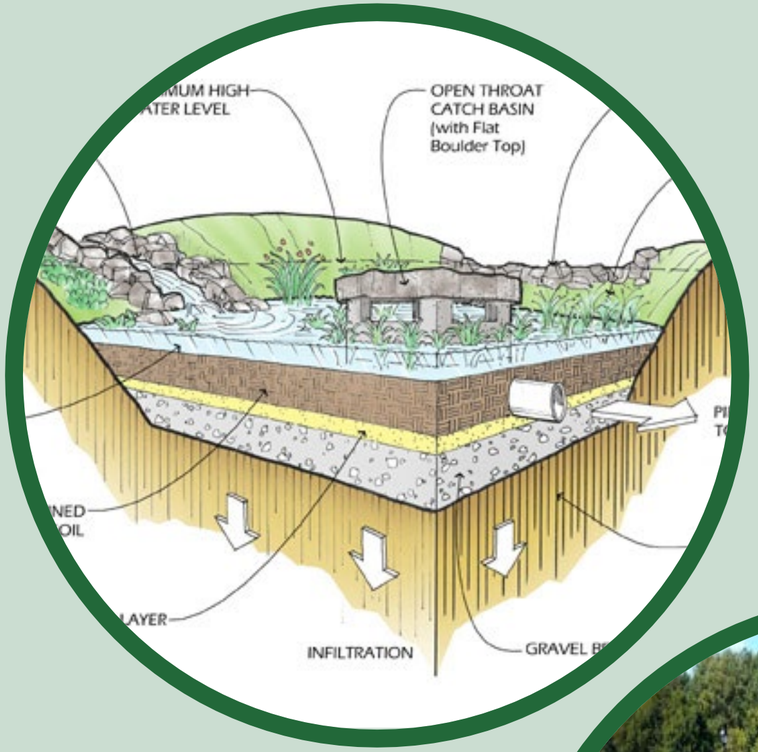
Planting Zones



Source: ***Rain Garden Handbook for Western Washington*** - Washington State Department of Ecology

Planting Zones

will vary depending on the type of green infrastructure



Engineered Soil
Rain Garden

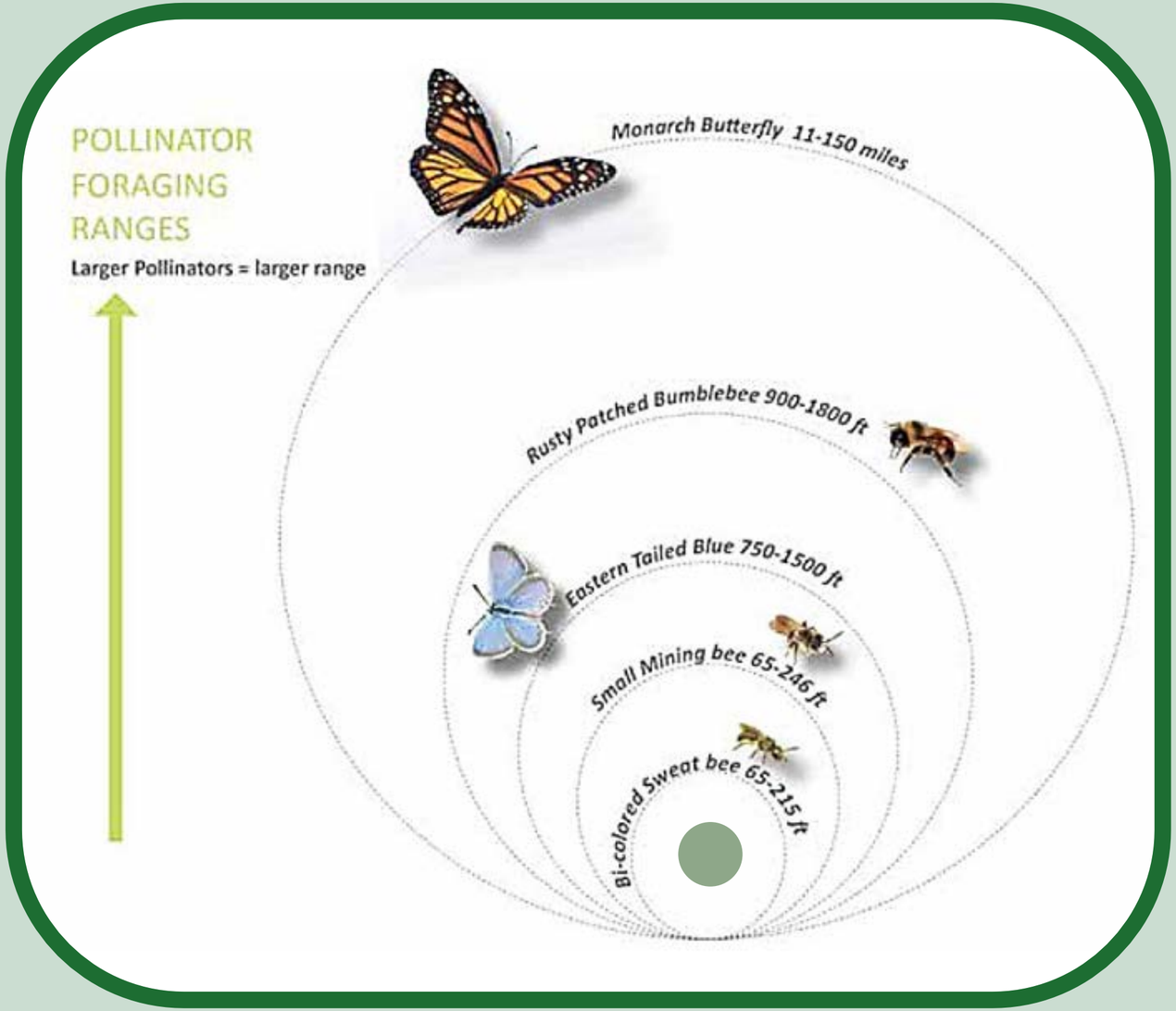
Depression
Rain Garden

Treatment
Wetland

Shelter

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

Shelter


POLLINATOR
FORAGING
RANGES
Larger Pollinators = larger range
Monarch Butterfly 11-150 miles
Rusty Patched Bumblebee 900-1800 ft
Eastern Tailed Blue 750-1500 ft
Small Mining bee 65-246 ft
Bi-colored Sweat bee 65-215 ft

Nesting & Overwintering Habitat

FOR POLLINATORS & OTHER BENEFICIAL INSECTS

STEPS TO CREATE NESTING & OVERWINTING HABITAT:

- Save the stems
- Leave the leaves
- Redefine the "perfect" lawn
- Rethink 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.

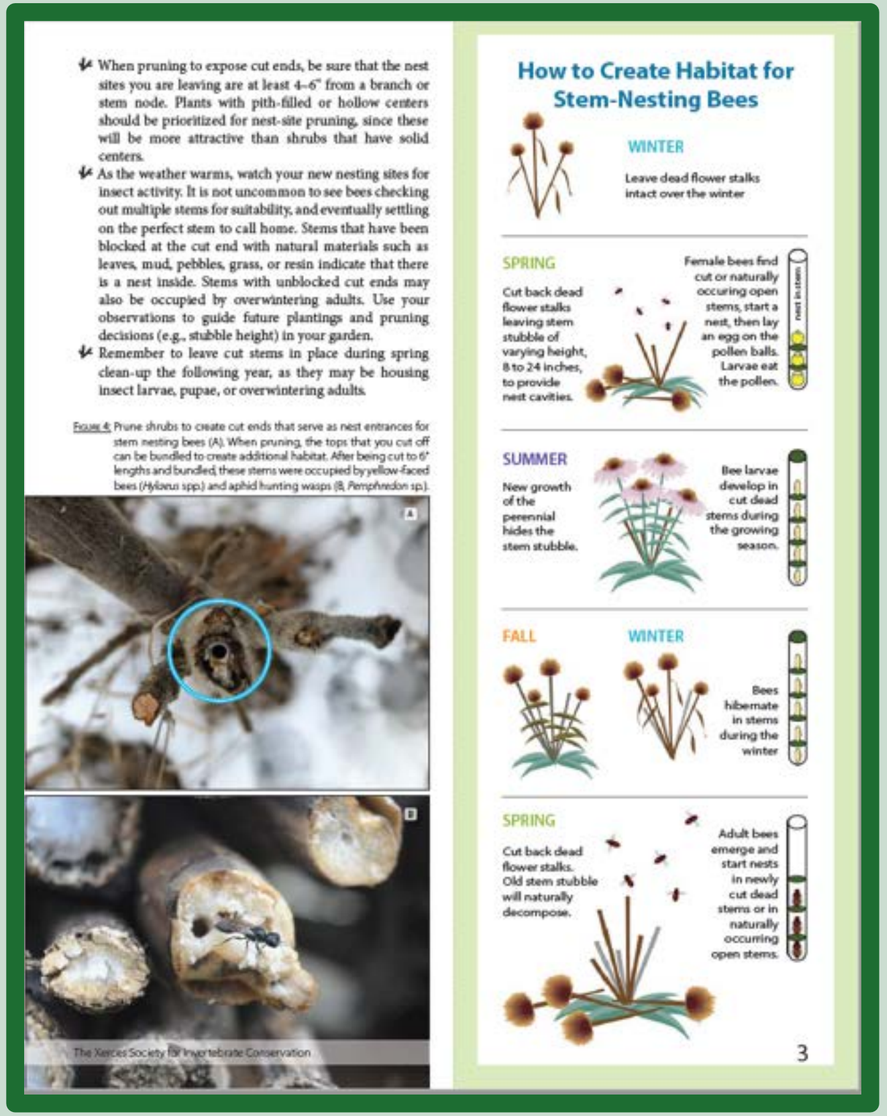
Our **Bring Back the Pollinators** campaign is based on four principles:

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.

BRING BACK THE POLLINATORS
A Xerces Society Conservation Campaign

XERCES SOCIETY for Invertebrate Conservation



- 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 (*Hylaeus* spp.) and aphid hunting wasps (*Pemphredon* sp.).

The Xerces Society for Invertebrate Conservation

How to Create Habitat for Stem-Nesting Bees

WINTER

Leave dead flower stalks intact over the winter

SPRING

Cut back dead flower stalks leaving stem stubble of varying height, 8 to 24 inches, to provide nest cavities.

Female bees find cut or naturally occuring open stems, start a nest, then lay an egg on the pollen balls. Larvae eat the pollen.

nest in stem

SUMMER

New growth of the perennial hides the stem stubble.

Bee larvae develop in cut dead stems during the growing season.

FALL

WINTER

Bees hibernate in stems during the winter

SPRING

Cut back dead flower stalks. Old stem stubble will naturally decompose.

Adult bees emerge and start nests in newly cut dead stems or in naturally occurring open stems.

3

https://xerces.org/sites/default/files/publications/18-014.pdf

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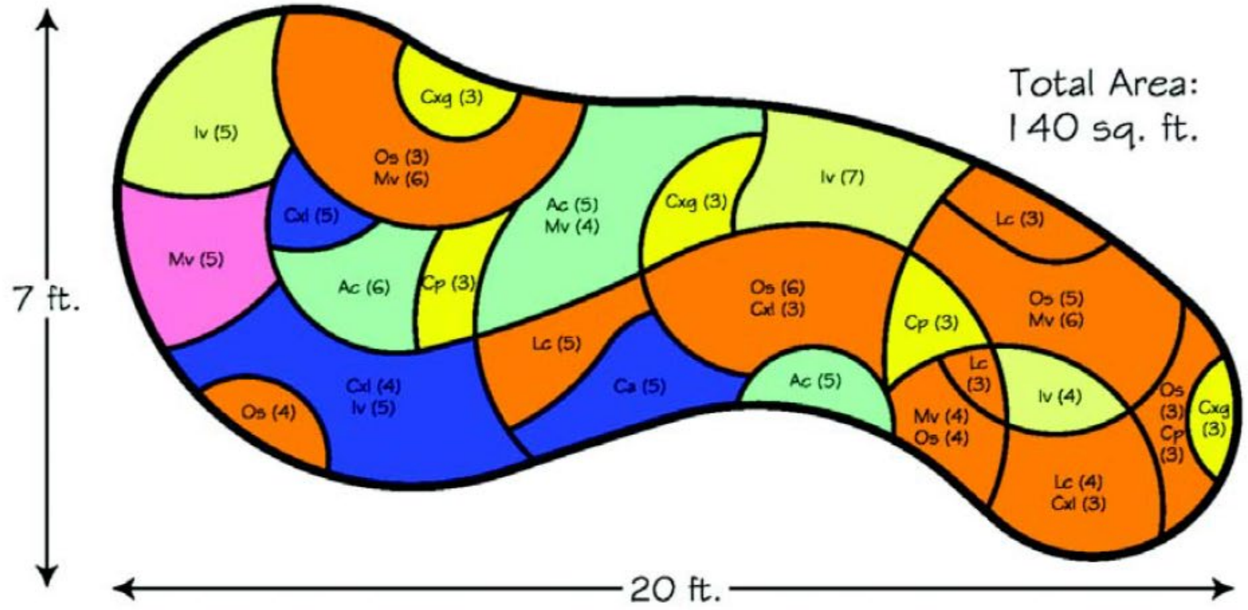
Planting Zones

Source: ***Rain Garden Handbook for Western Washington*** - Washington State Department of Ecology

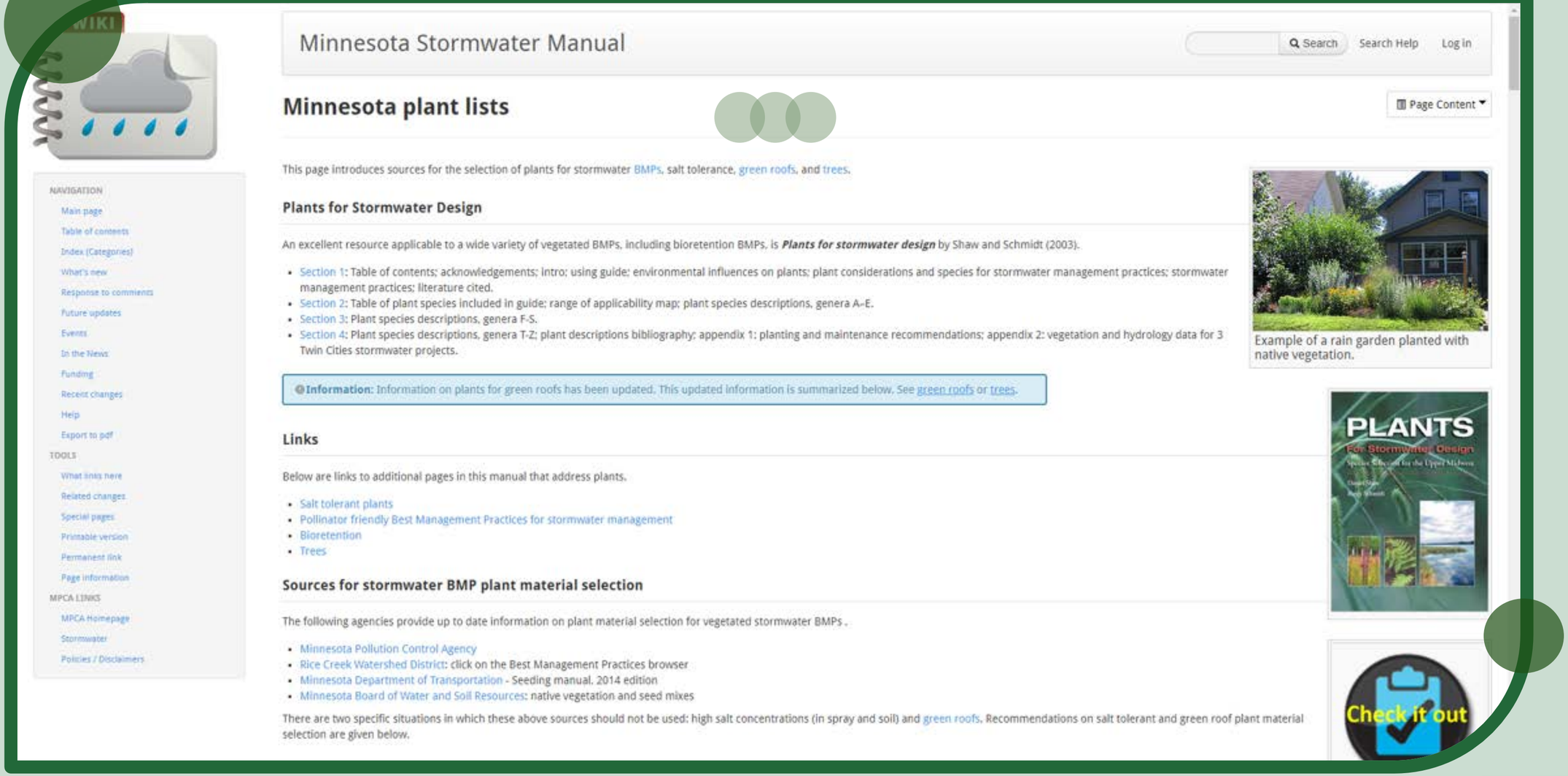
- Planting List

20 feet wide; full to partial shade with clay soils



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

Source: ***Rain Gardens- A how to manual for homeowners*** – WDNR & UW-Ext (2003)



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

Minnesota Stormwater Manual

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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
- Deeproot: 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

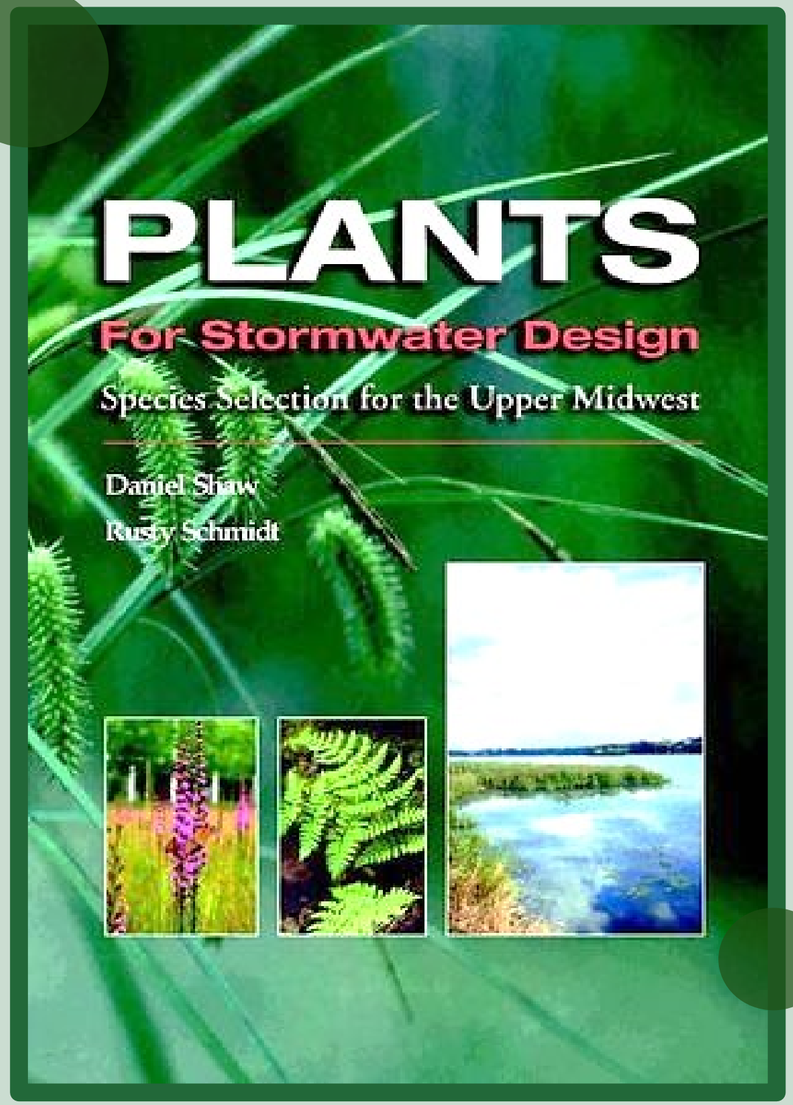
Rainfall from the roof on this house is routed to a perennial garden containing, among other plants, goldenrod, milkweed, and purple coneflower, all of which are considered pollinator-friendly plants.

https://stormwater.pca.state.mn.us/index.php?title=Pollinator_friendly_Best_Management_Practices_for_stormwater_management

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

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

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Silphium perfoliatum

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

Indicator Status: FACW-

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 multibranched 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

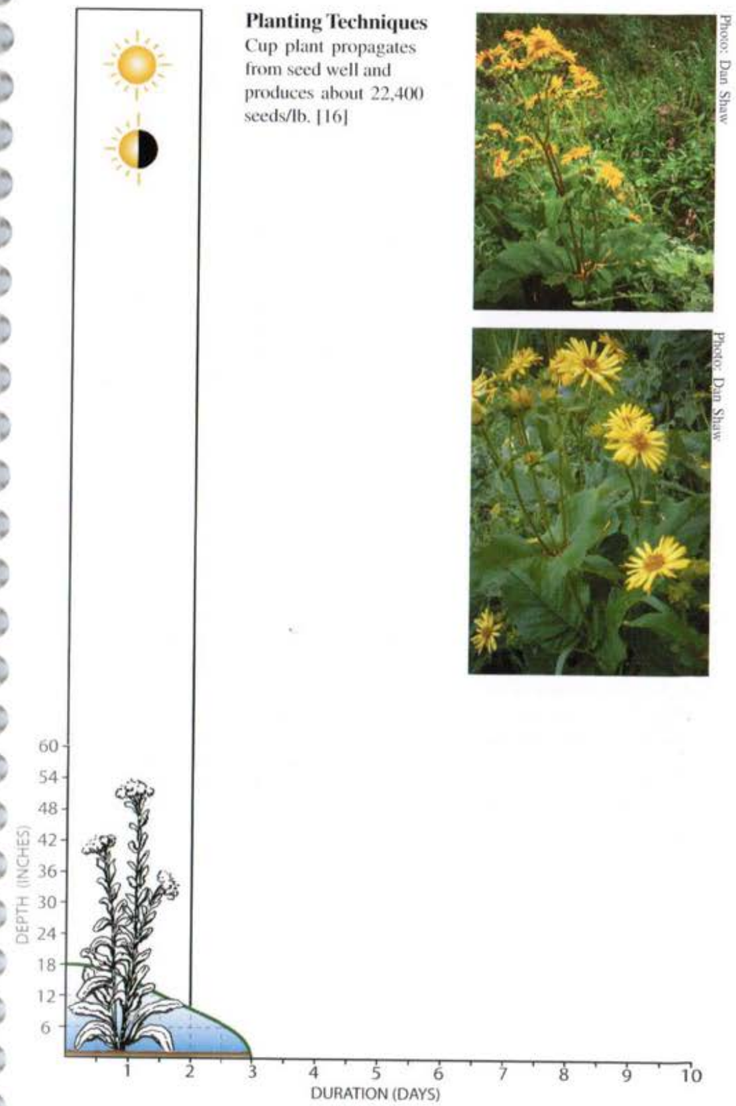
Cup plant has wonderful wildlife use and is used in wetland and prairie restorations. It has also been used for shoreline, buffer and vegetated swale soil stabilization. It is also an ideal plant for the background of rain water gardens. **Concerns:** This species is sensitive to herbicide drift. It 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.

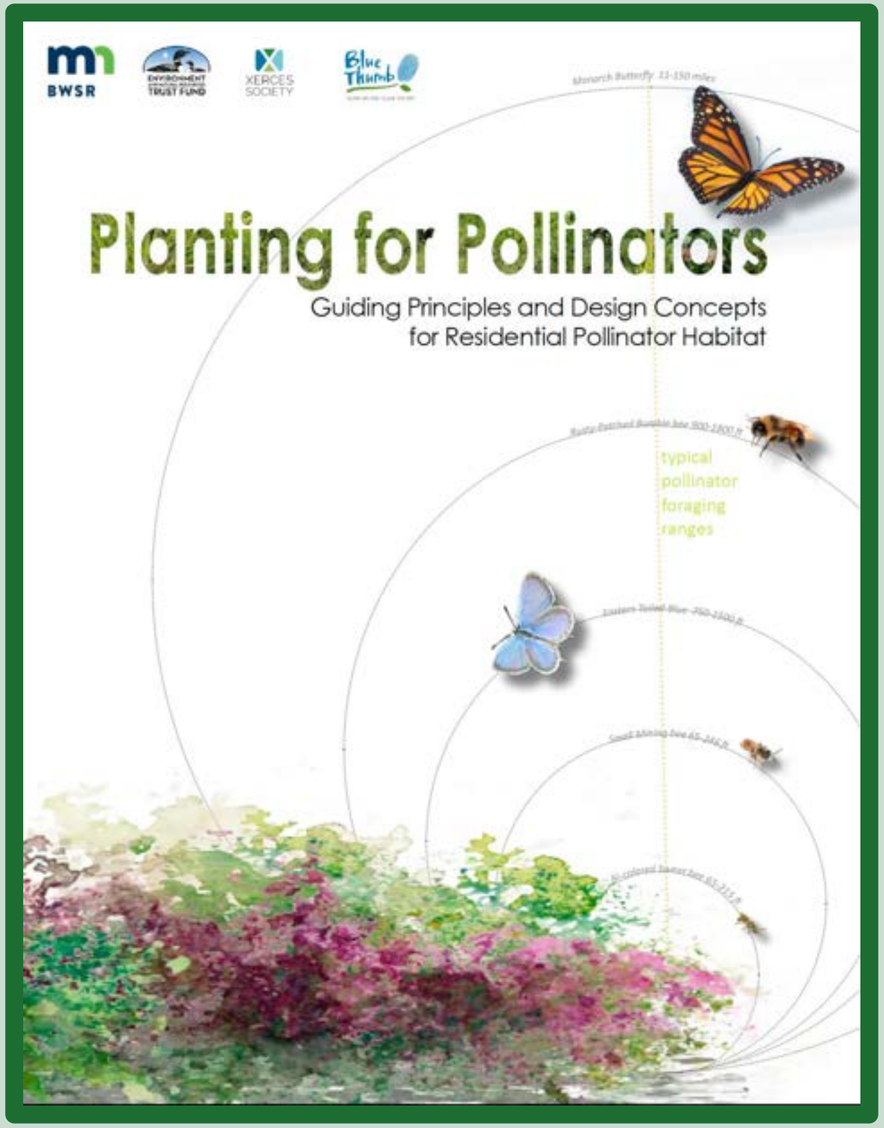


Planting Techniques

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

Photo: Dan Shaw

Photo: Dan Shaw



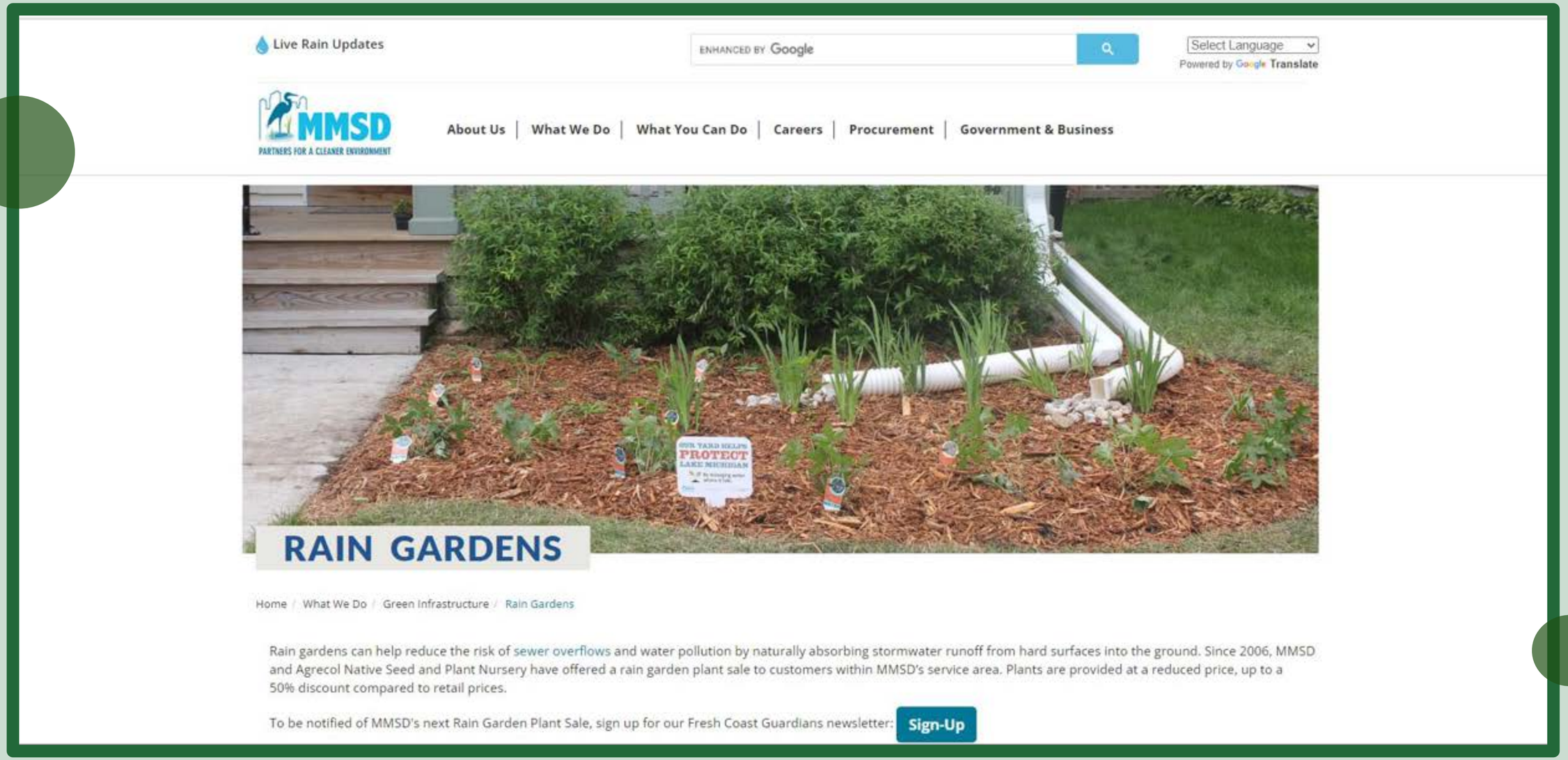
https://bwsr.state.mn.us/sites/default/files/2020-03/Planting%20for%20Pollinators%20Design%20Guide%20with%20logos.pdf

Design Considerations + Goals

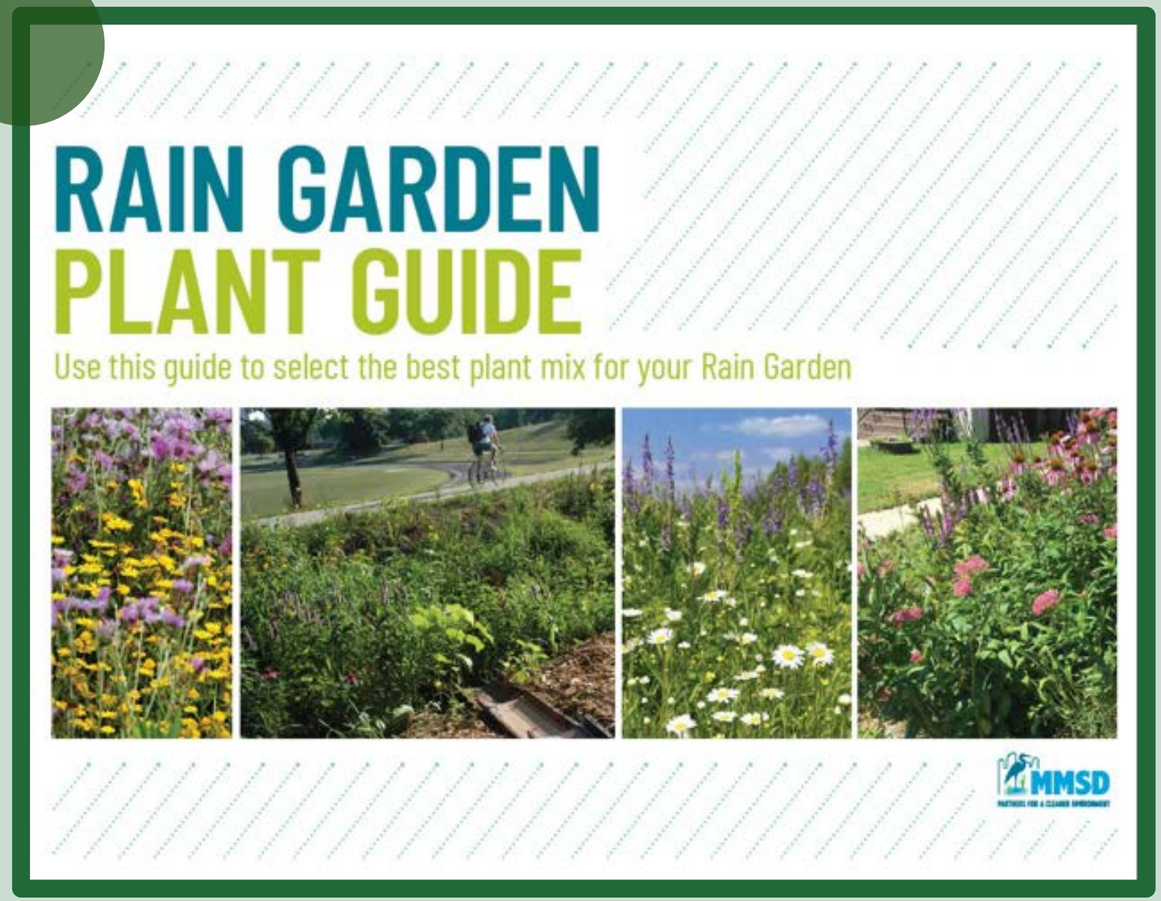
Factors such as square footage, function, existing plant communities, soil moisture levels, weed pressure, hardiness zone, and local ordinances should be considered when designing habitat plantings.

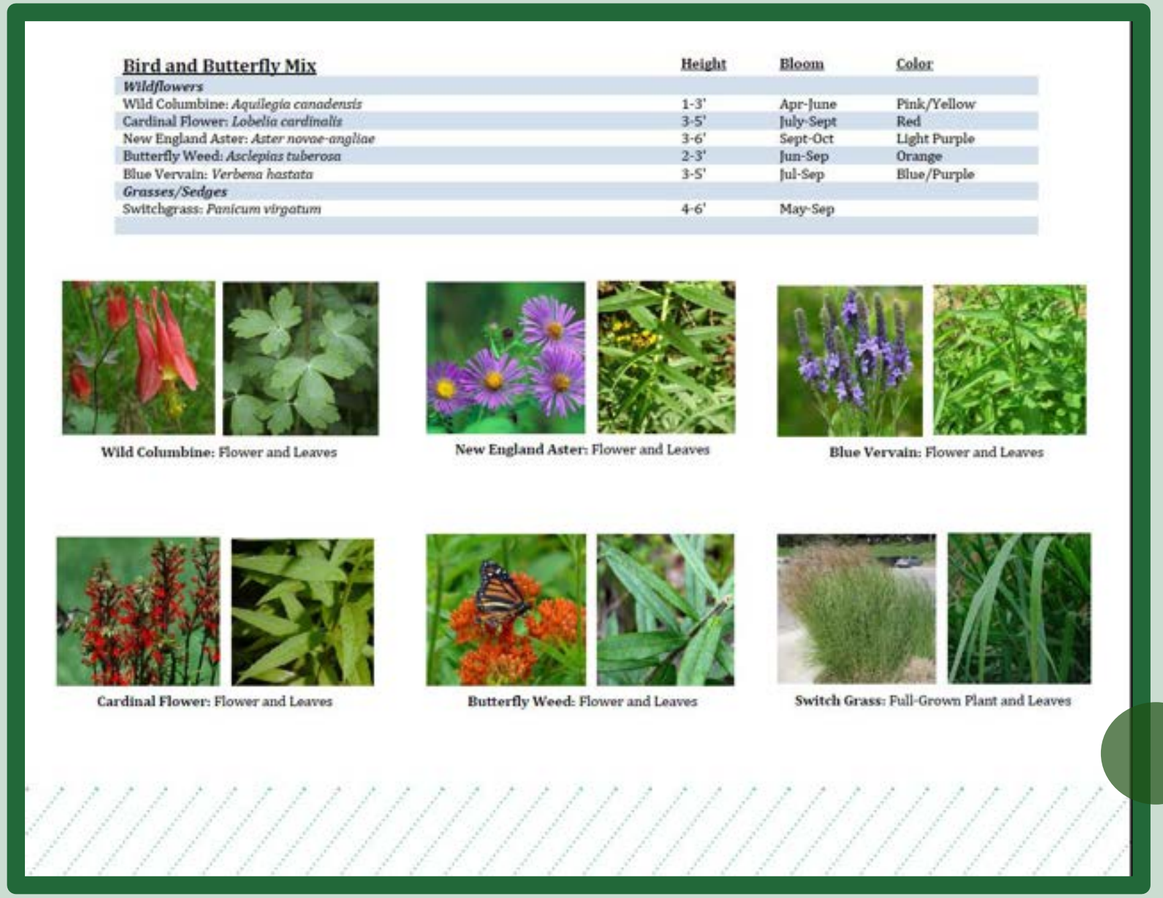
Always protect pollinator habitat from insecticide and fungicide use to prevent harmful exposure.

PRIORITIZE THESE SITES	DESIGN CONSIDERATIONS	LONG TERM CONSIDERATIONS
Low Pesticide Risk	Planting Size	Maintenance
Connection to other Habitat	Benefitting specific pollinator species	Habitat Type
Plant Diversity	Aesthetics	Outreach
Access to Water and Nesting	Blooms through the seasons	Project Lifespan



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





Bird and Butterfly Mix

	Height	Bloom	Color
Wildflowers			
Wild Columbine: *Aquilegia canadensis*	1-3'	Apr-June	Pink/Yellow
Cardinal Flower: *Lobelia cardinalis*	3-5'	July-Sept	Red
New England Aster: *Aster novae-angliae*	3-6'	Sept-Oct	Light Purple
Butterfly Weed: *Asclepias tuberosa*	2-3'	Jun-Sep	Orange
Blue Vervain: *Verbena hastata*	3-5'	Jul-Sep	Blue/Purple
Grasses/Sedges			
Switchgrass: *Panicum virgatum*	4-6'	May-Sep	

https://mmsd.com/application/files/9015/9648/9612/18-103_RainGardenPlantGuideNewWEB_2.pdf

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Design Possibilities are Endless.

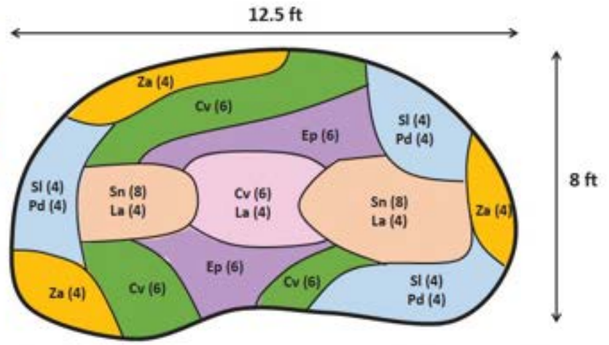
RAIN GARDEN DESIGN

CONCEPTUAL PLANTING DESIGNS FOR YOUR GARDEN

MMSD

100 sf Rain Garden

Full/Partial Sun



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

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

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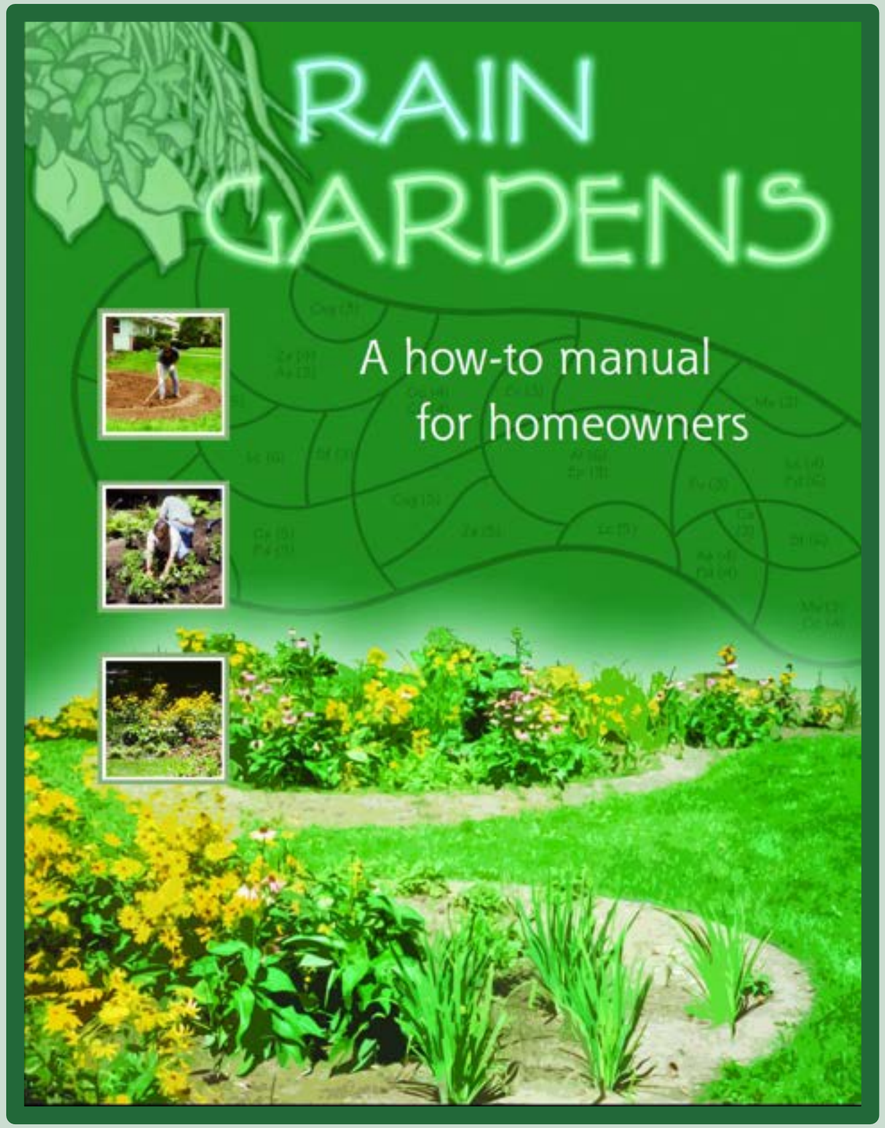
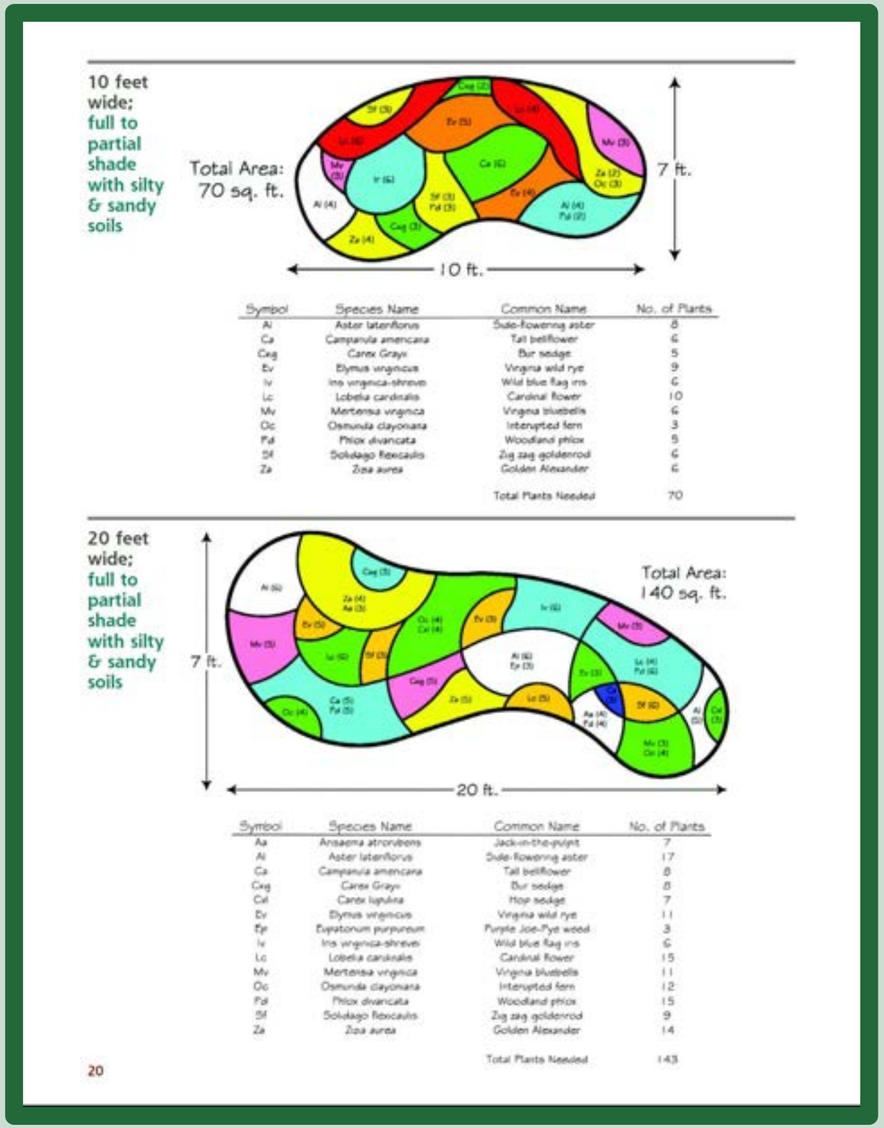




10 feet wide; full to partial shade with silty & sandy soils

Total Area: 70 sq. ft.

7 ft.

10 ft.

Symbol	Species Name	Common Name	No. of Plants
Ai	Aster lateriflorus	Side-flowering aster	8
Ca	Campanula americana	Tall bellflower	6
Cxg	Carex Grayi	Bur sedge	5
Ev	Elymus virginicus	Virgina wild rye	9
Iv	Iris virginica-shreve	Wild blue flag iris	6
Lc	Lobelia cardinalis	Cardinal flower	10
Mv	Mertensia virginica	Virgina bluebells	6
Oc	Osmunda clayoniana	Interrupted fern	3
Pd	Phlox divancata	Woodland phlox	5
Sf	Solidago flexcaulis	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.

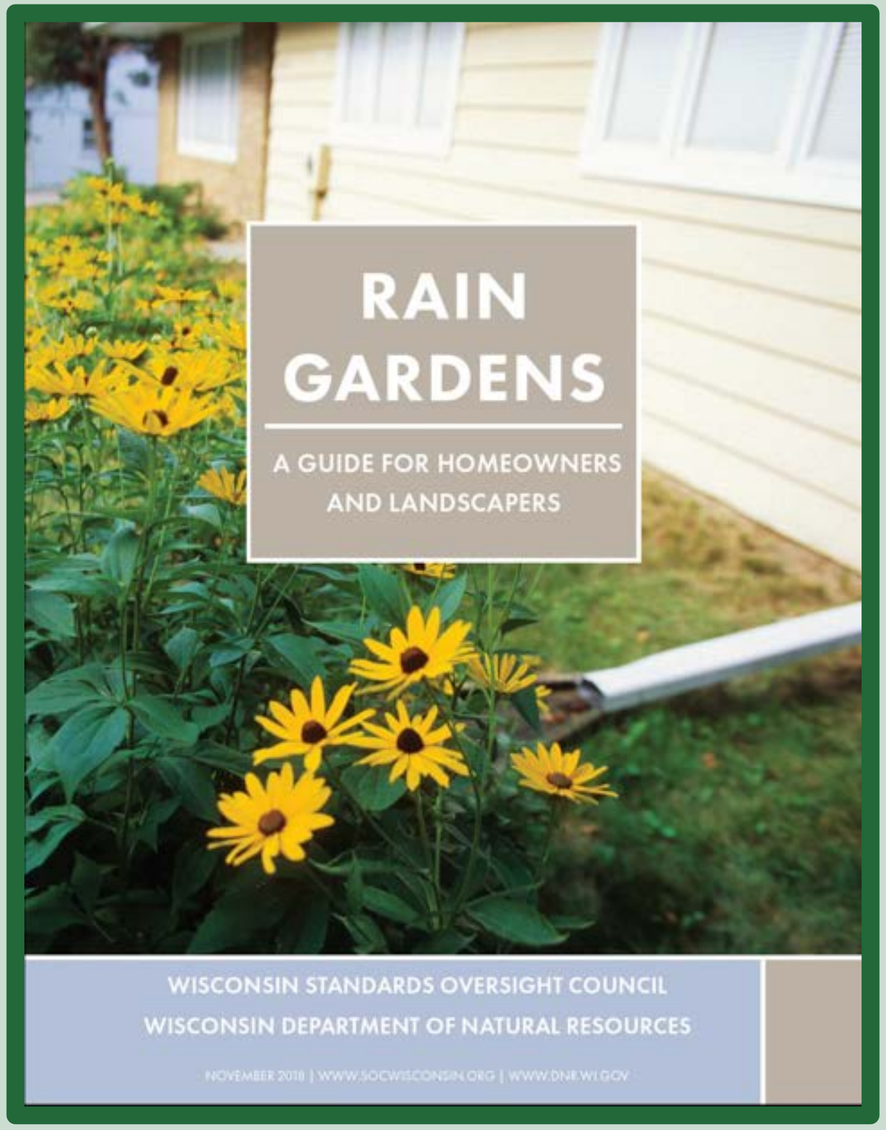
7 ft.

20 ft.

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

20

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



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
2-4'
May-July

Soil Types
Sand
Silt
Clay

Sunlight Levels
Full sun
Partial sun

Plant Charateristics
Height of mature plant (feet)
Bloom period
Toxicity advisory

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

Purple Coneflower
Echinacea purpurea
3-4'
July-Sept

Rattlesnake Master
Eryngium yuccifolium
3-5'
June-Aug

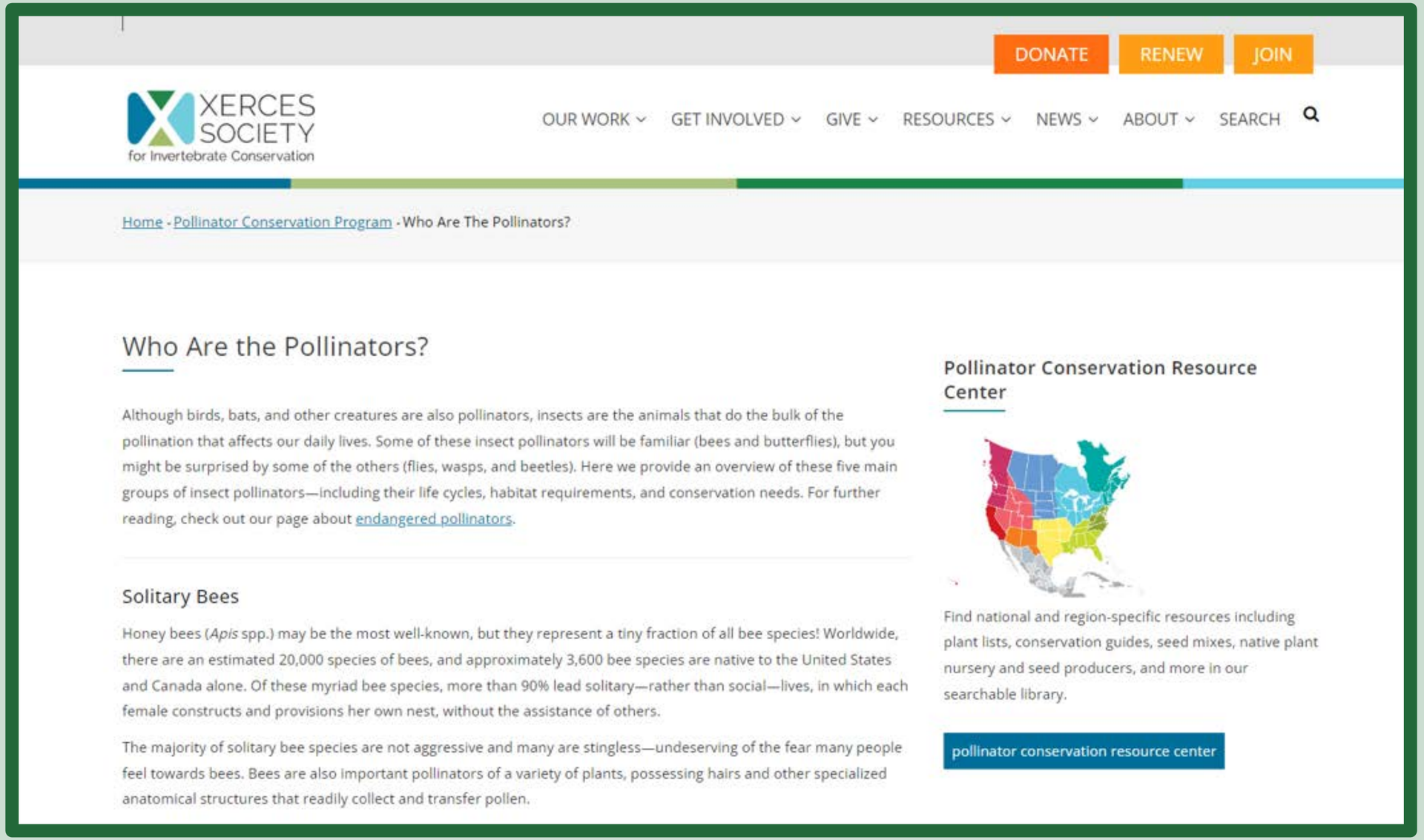
Red Baneberry
Actaea rubra
1-2'
June

Rough Blazing Star
Liatris aspera
2-5'
Aug-Sept

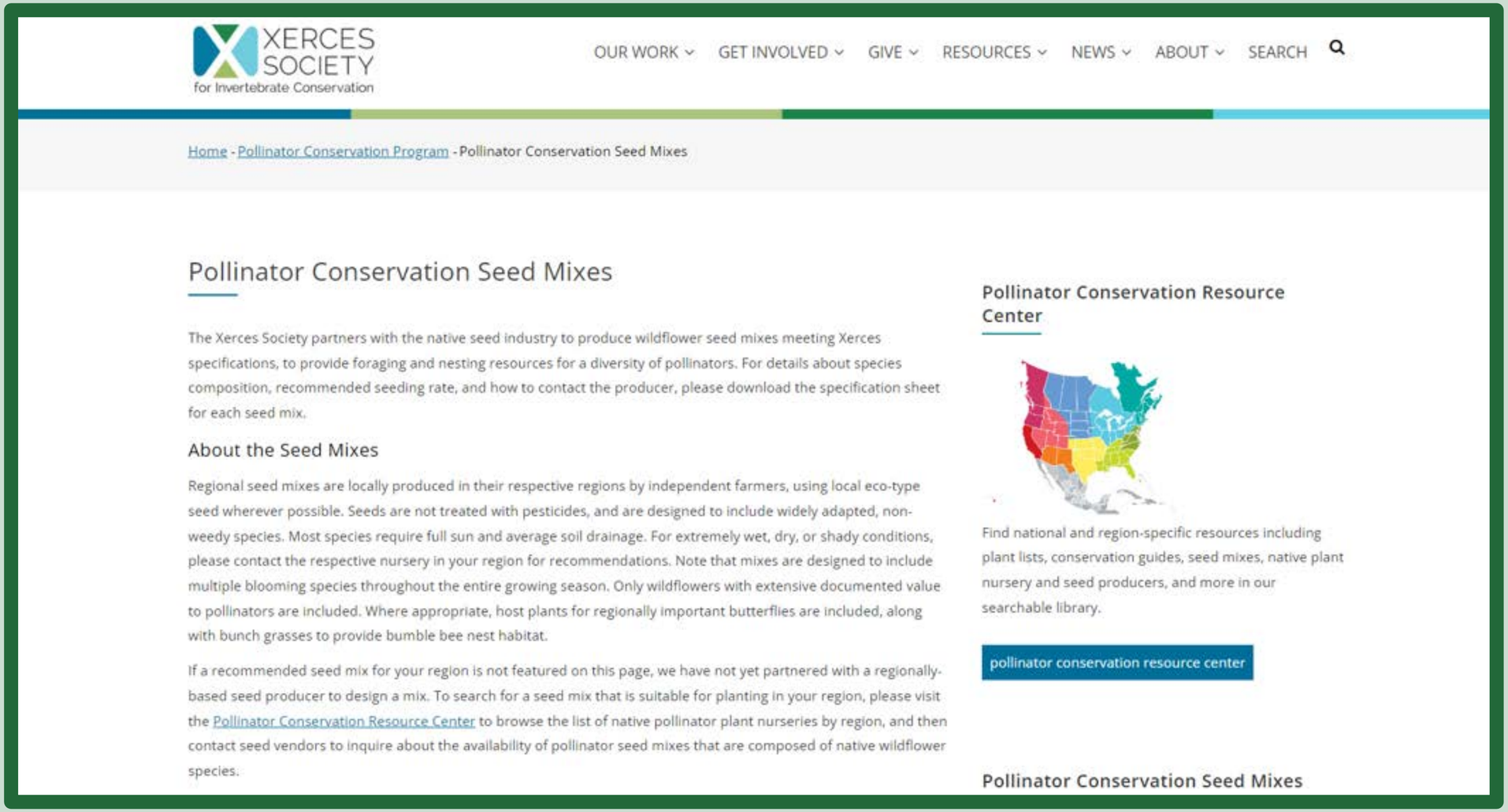
Showy Goldenrod
Solidago speciosa
1-3'
Aug-Sept

Smooth Blue Aster
Aster laevis
2-4'
Aug-Oct

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



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



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

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

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for Invertebrate Conservation

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Home - Native Milkweeds - Milkweed Finder

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 -- Select --

Plant species - Any -

Live plant - Any -

Seed - Any -

Apply

Agrecol Native Nursery

State: Wisconsin
City: Evansville
http://www.agrecol.com/
ecosolutions@agrecol.com
(608) 223-3571

Available Species

Asclepias tuberosa (butterfly milkweed) Seed, Live plant
Asclepias incarnata (swamp milkweed) Seed, Live plant
Asclepias verticillata (whorled milkweed) Seed, Live plant
Asclepias speciosa (showy milkweed) Seed, Live plant
Asclepias purpurascens (purple milkweed) Seed, Live plant
Asclepias syriaca (common milkweed) Seed, Live plant
Asclepias sullivantii (prairie milkweed) Seed, Live plant
Asclepias exaltata (poke milkweed) Seed, Live plant
Asclepias hirtella (green milkweed) Seed, Live plant
Asclepias viridiflora (short green milkweed) Seed, Live plant

Taylor Creek Restoration Nurseries

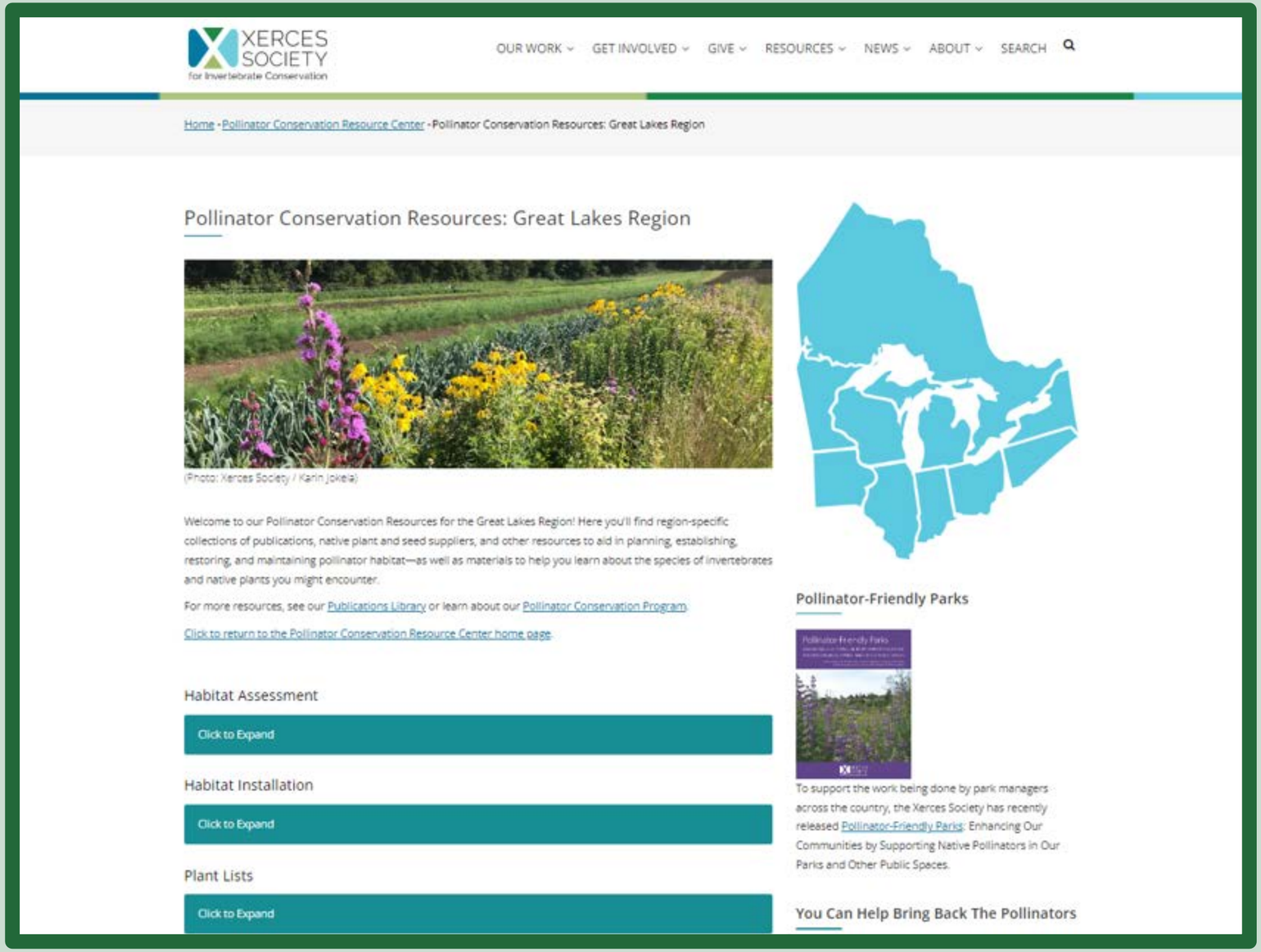
State: Wisconsin
http://www.restorationnurseries.com/
nurseryservice@appliedeco.com
(608) 897-8641

Available Species

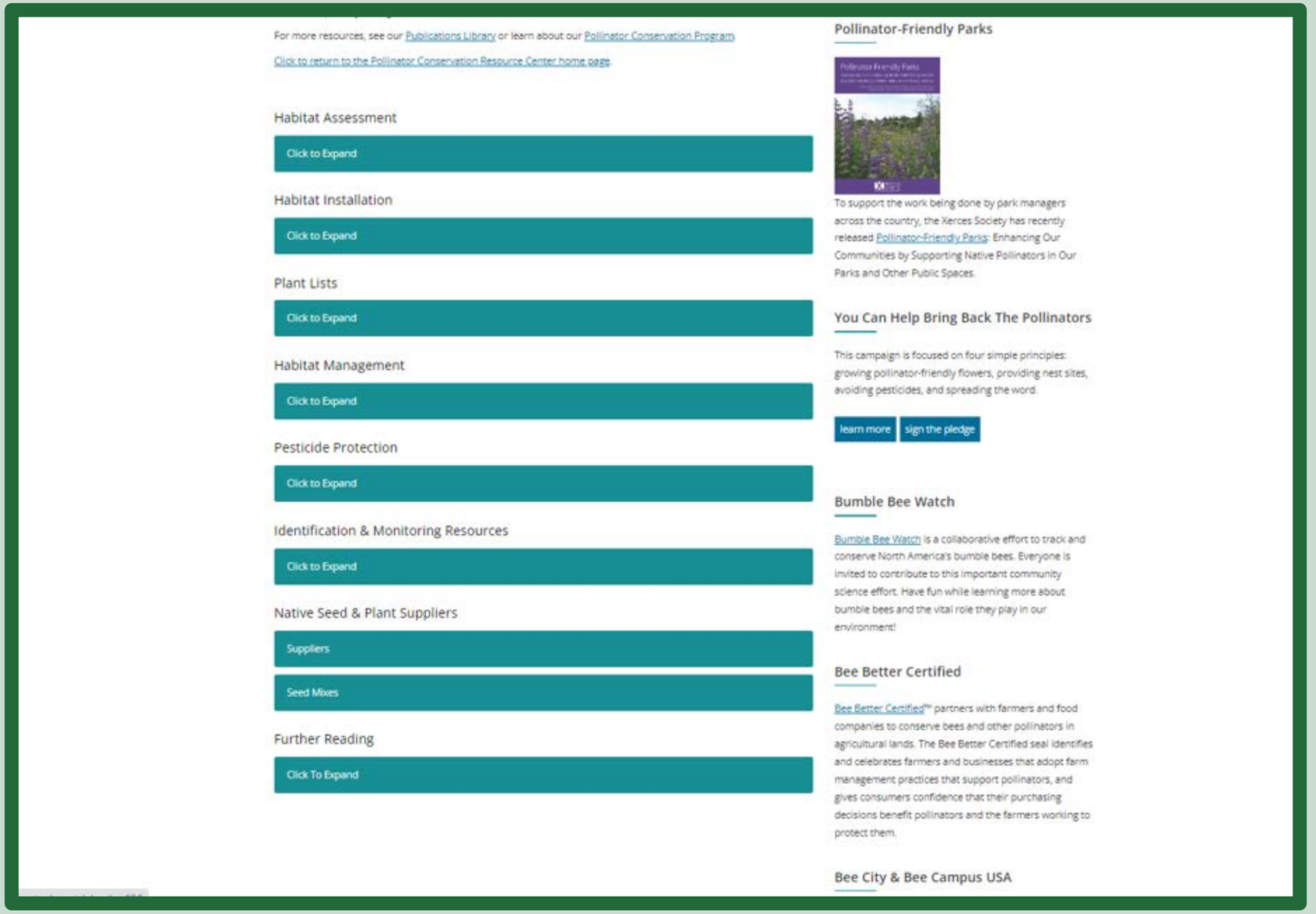
Asclepias exaltata (poke milkweed) Seed, Live plant
Asclepias incarnata (swamp milkweed) Seed, Live plant
Asclepias speciosa (showy milkweed) Seed, Live plant
Asclepias syriaca (common milkweed) Seed, Live plant
Asclepias verticillata (whorled milkweed) Seed, Live plant
Asclepias hirtella (green milkweed) Seed, Live plant
Asclepias purpurascens (purple milkweed) Seed, Live plant
Asclepias sullivantii (prairie milkweed) Seed, Live plant
Asclepias tuberosa (butterfly milkweed) Seed, Live plant

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

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



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



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

XERCES SOCIETY for Invertebrate Conservation

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Home - Endangered Species Conservation - Species Profiles: At-Risk Invertebrates

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 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

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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

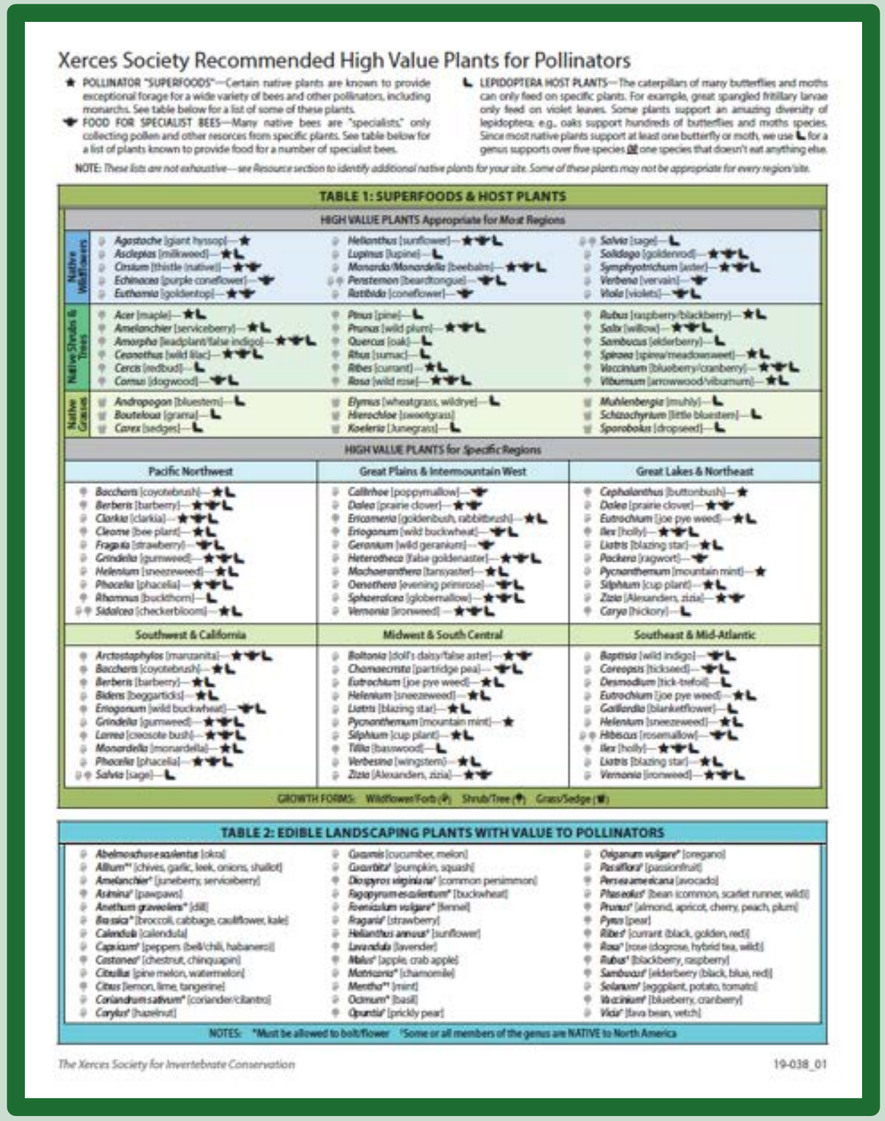
Landscaping for pollinators is one of the easiest ways for urban, suburban, and rural residents to directly benefit local wildlife. Schoolyards, community gardens, back yards, corporate campuses, rain gardens, and neighborhood parks all have the potential to meet the most basic needs of pollinators, 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 L for a genus supports over five species OR 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

Native Wildflowers	*Agastache* [giant hyssop] ★ *Asclepias* [milkweed] ★L *Cirsium* [thistle (native)] ★ *Echinacea* [purple coneflower] ★ *Eutrochium* [goldentop] ★	*Helianthus* [sunflower] ★L *Lupinus* [lupine] L *Monarda/Monardella* [beebalm] ★L *Penstemon* [beardtongue] ★L *Rudbeckia* [coneflower] ★	*Salvia* [sage] L *Solidago* [goldenrod] ★L *Symphyotrichum* [aster] ★L *Verbena* [vervain] ★ *Viola* [violets] ★L
Native Shrubs & Trees	*Acer* [maple] ★L *Amelanchier* [serviceberry] ★L *Amorpha* [leadplant/false indigo] ★L *Ceanothus* [wild lilac] ★L *Cercis* [redbud] L *Cornus* [dogwood] ★L	*Pinus* [pine] L *Prunus* [wild plum] ★L *Quercus* [oak] L *Rhus* [sumac] L *Ribes* [currant] ★L *Rosa* [wild rose] ★L	*Rubus* [raspberry/blackberry] ★L *Salix* [willow] ★L *Sambucus* [elderberry] L *Spiraea* [spirea/meadowsweet] ★L *Vaccinium* [blueberry/cranberry] ★L *Viburnum* [arrowwood/viburnum] ★L
Native Grasses	*Andropogon* [bluestem] L *Bouteloua* [grama] L *Carex* [sedges] L	*Elymus* [wheatgrass, wildrye] L *Hierochloe* [sweetgrass] *Koeleria* [Junegrass] L	*Muhlenbergia* [muhly] L *Schizachyrium* [little bluestem] L *Sporobolus* [dropseed] L

HIGH VALUE PLANTS for *Specific* Regions

Pacific Northwest	Great Plains & Intermountain West	Great Lakes & Northeast
Baccharis [coyotebrush] ★L *Berberis* [barberry] ★L *Clarkia* [clarkia] ★L *Cleome* [bee plant] L *Fragaria* [strawberry] L *Grindelia* [gumweed] ★L *Helenium* [sneezeweed] ★L *Phacelia* [phacelia] ★L *Rhamnus* [buckthorn] L *Sidalcea* [checkerbloom] ★L	*Callirhoe* [poppymallow] ★ *Dalea* [prairie clover] ★ *Ericameria* [goldenbush, rabbitbrush] ★L *Eriogonum* [wild buckwheat] ★L *Geranium* [wild geranium] ★ *Heterotheca* [false goldenaster] ★L *Machaeranthera* [tansyaster] ★L *Oenothera* [evening primrose] ★L *Sphaeralcea* [globemallow] ★L *Vernonia* [ironweed] ★L	*Cephalanthus* [buttonbush] ★ *Dalea* [prairie clover] ★ *Eutrochium* [joe pye weed] ★L *Ilex* [holly] ★L *Liatris* [blazing star] ★L *Packera* [ragwort] ★ *Pycnanthemum* [mountain mint] ★ *Silphium* [cup plant] ★L *Zizia* [Alexanders, zizia] ★ *Carya* [hickory] L
Southwest & California	**Midwest & South Central**	**Southeast & Mid-Atlantic**
Arctostaphylos [manzanita] ★L *Baccharis* [coyotebrush] ★L *Berberis* [barberry] ★L *Bidens* [beggarticks] ★L *Eriogonum* [wild buckwheat] ★L *Grindelia* [gumweed] ★L *Lomea* [creosote bush] ★L *Monardella* [monardella] ★L *Phacelia* [phacelia] ★L *Salvia* [sage] L	*Boltonia* [doll's daisy/false aster] ★L *Chamaecrista* [partridge pea] ★L *Eutrochium* [joe pye weed] ★L *Helenium* [sneezeweed] ★L *Liatris* [blazing star] ★L *Pycnanthemum* [mountain mint] ★ *Silphium* [cup plant] ★L *Tilia* [basswood] L *Verbesina* [wingstem] ★L *Zizia* [Alexanders, zizia] ★L	*Baptisia* [wild indigo] ★L *Coreopsis* [tickseed] ★L *Desmodium* [tick-trefoil] L *Eutrochium* [joe pye weed] ★L *Gaillardia* [blanketflower] L *Helenium* [sneezeweed] ★L *Hibiscus* [rosemallow] ★L *Ilex* [holly] ★L *Liatris* [blazing star] ★L *Vernonia* [ironweed] ★L

GROWTH FORMS: Wildflower/Forb (🌿) Shrub/Tree (🌳) Grass/Sedge (🌾)

TABLE 2: EDIBLE LANDSCAPING PLANTS WITH VALUE TO POLLINATORS

Abelmoschus esculentus [okra] *Allium*** [chives, garlic, leek, onions, shallot] *Amelanchier** [juneberry, serviceberry] *Asimina** [pawpaws] *Anethum graveolens** [dill] *Brassica** [broccoli, cabbage, cauliflower, kale] *Calendula* [calendula] *Capsicum** [peppers (bell/chili, habanero)] *Castanea** [chestnut, chinquapin] *Citrullus* [pine melon, watermelon] *Citrus* [lemon, lime, tangerine] *Coriandrum sativum** [coriander/cilantro] *Corylus** [hazelnut]	*Cucumis* [cucumber, melon] *Cucurbita** [pumpkin, squash] *Diospyros virginiana** [common persimmon] *Fagopyrum esculentum** [buckwheat] *Foeniculum vulgare** [fennel] *Fragaria** [strawberry] *Helianthus annuus** [sunflower] *Lavandula* [lavender] *Malus** [apple, crab apple] *Matricaria** [chamomile] *Mentha*** [mint] *Ocimum** [basil] *Opuntia** [prickly pear]	*Origanum vulgare** [oregano] *Passiflora** [passionfruit] *Persea americana* [avocados] *Phaseolus** [bean (common, scarlet runner, wild)] *Prunus** [almond, apricot, cherry, peach, plum] *Pyrus* [pear] *Ribes** [currant (black, golden, red)] *Rosa** [rose (dogrose, hybrid tea, wild)] *Rubus** [blackberry, raspberry] *Sambucus** [elderberry (black, blue, red)] *Solanum** [eggplant, potato, tomato] *Vaccinium** [blueberry, cranberry] *Vicia** [fava bean, vetch]

NOTES: *Must be allowed to bolt/flower **Some or all members of the genus are NATIVE to North America

https://www.xerces.org/sites/default/files/publications/19-038_01_HAG_Yard-Park-Garden_web.pdf

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- https://pollinators.wisc.edu/

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»

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»

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

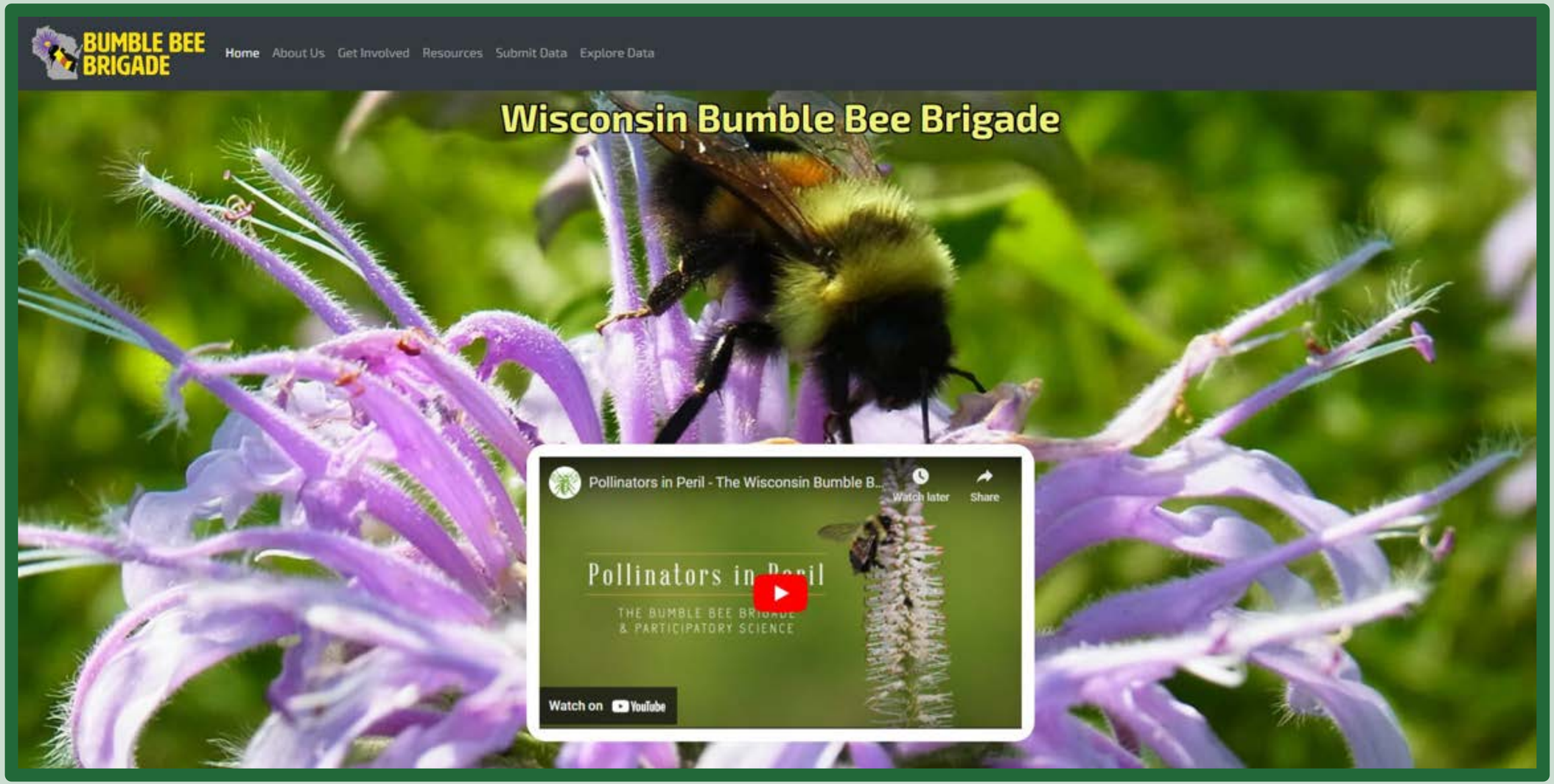
We hope this assessment gave you ideas for how to create a healthy pollinator habitat on your site. You can use your scores in each category to focus your next steps:

Food Habitat: 13 / 17 points
Nesting Habitat: 10 / 10 points
Insecticide Use: 6 / 6 points

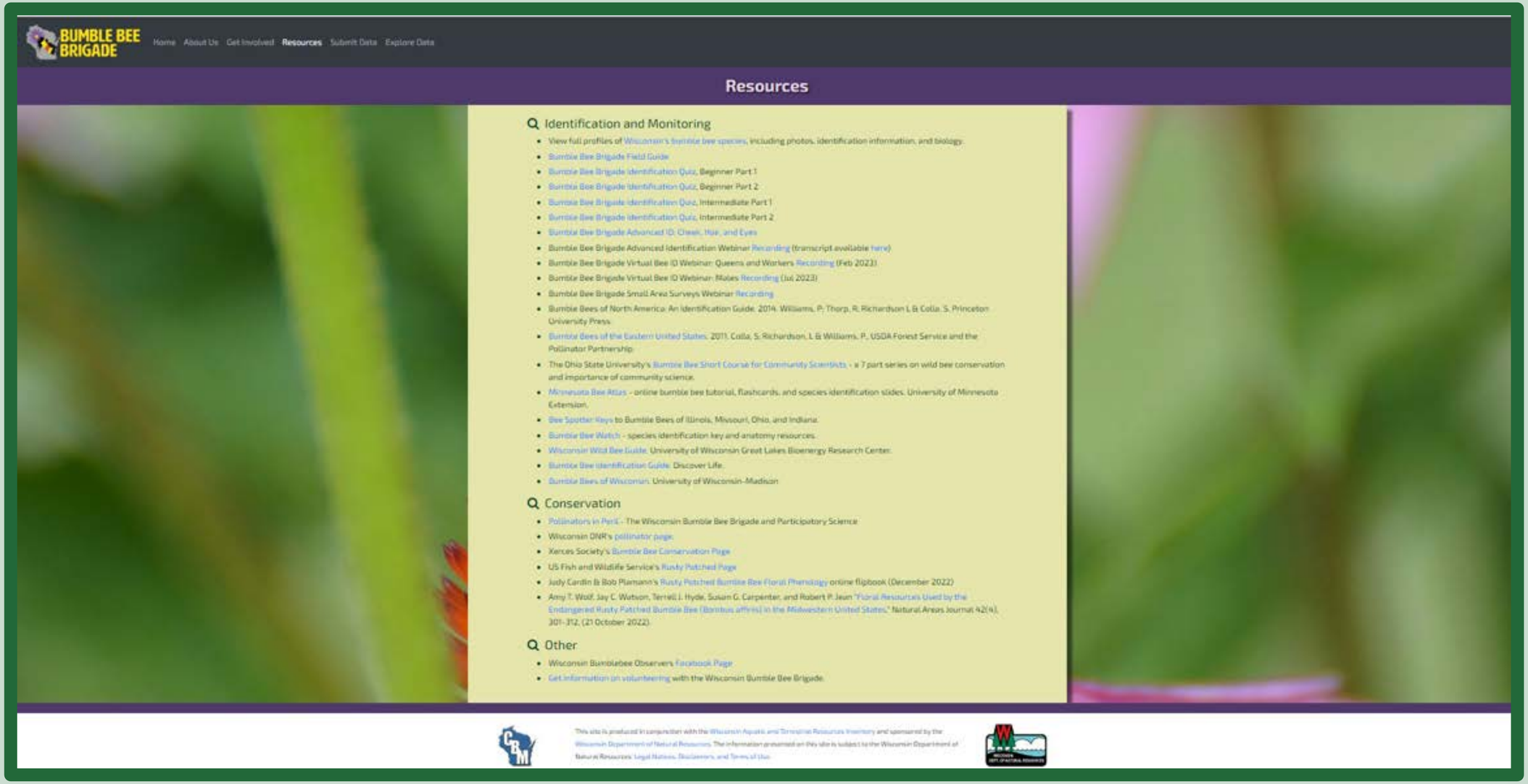
Download our two-page Pollinator Habitat Guide or return to our website at www.pollinators.wisc.edu/habitat to learn how to improve your food habitat, nesting habitat and insecticide use on the site.

If you provided your email address, a copy of your scores and responses will be sent to you at **oreillyn@uwm.edu**.

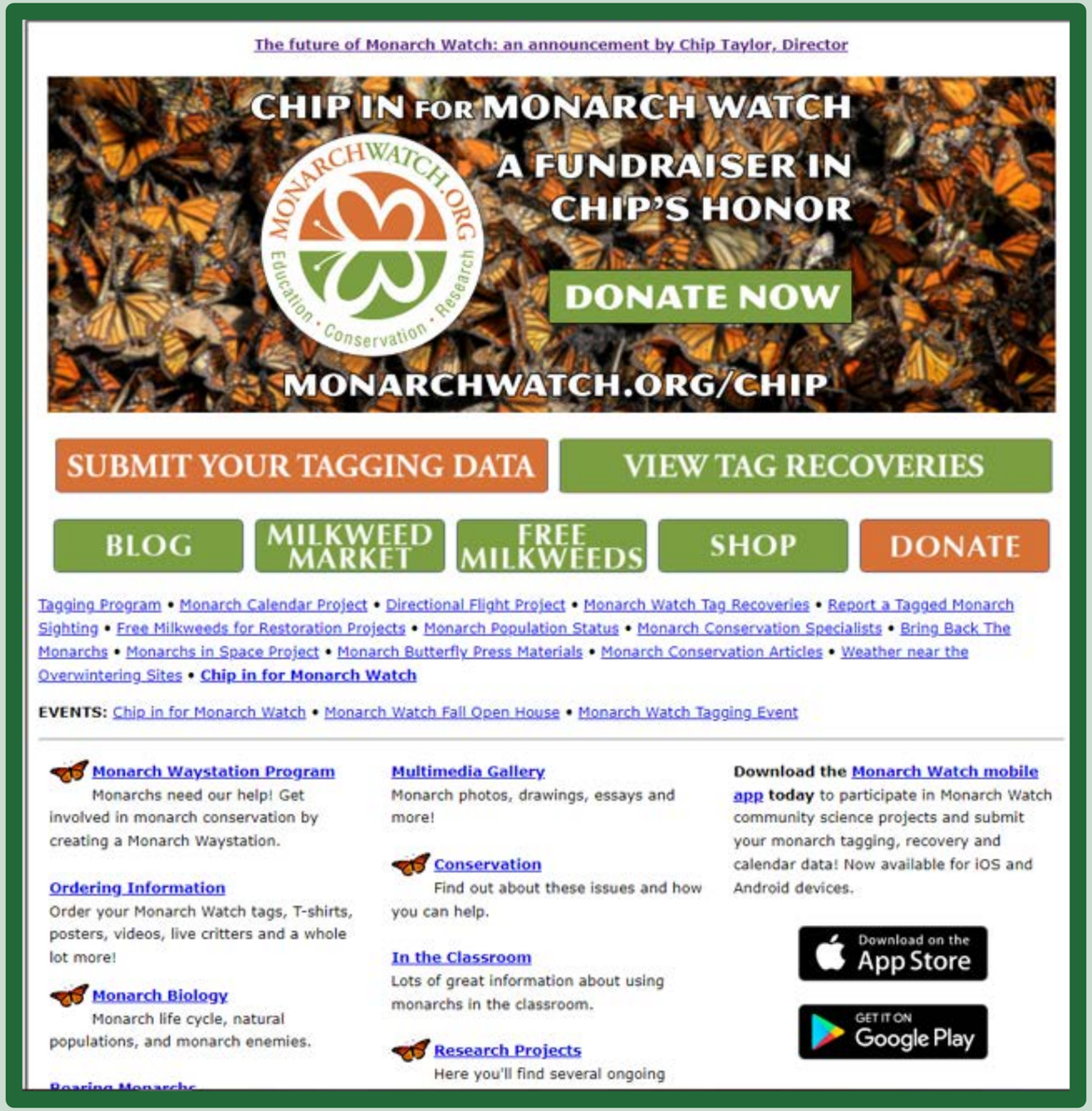
Once you established your garden you can see who visits and do some ***citizen science monitoring***



- https://wiatri.net/inventory/BBB/



- https://wiatri.net/inventory/bbb/resources/



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.

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Table 1. Typical Maintenance Activities for Bioretention Areas

Source: Center for Watershed Protection, 2001

Activity	Frequency
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**

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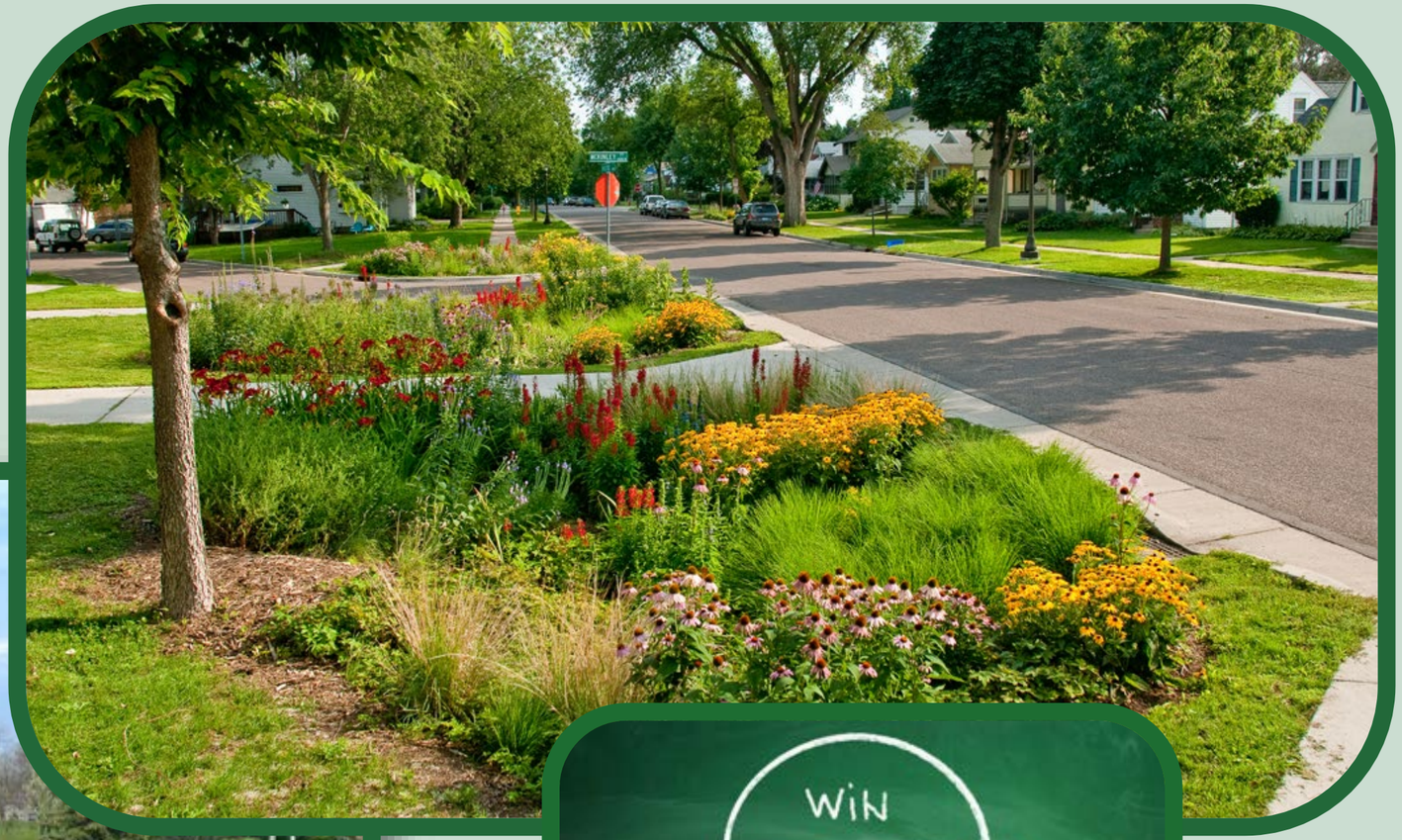
Let go from seas of mowed lawns to seas of flowers and habitat and better water quality



THANK YOU

GREEN INFRASTRUCTURE AS WILDLIFE HABITAT

CONTACT ME

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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