

# Bee Friendly Gardening

Sara Wittenberg

Bee Friendly Gardening Coordinator,  
Pollinator Partnership



  
**BEE FRIENDLY GARDEN**  
This garden is managed to provide habitat for bees and other pollinators.  
BeeFriendlyGardening.org

**POLLINATOR PARTNERSHIP**

Protect their lives. Preserve ours.

# So... what can you do?

- 1. Keep** the natural habitat you already have
- 2. Create/enhance** habitat in other areas of your yard or garden
- 3. Reduce** the use of pesticides

# Strategy 1: Keep what you have

- **Natural areas:**  
Conservation areas, wetlands, and wood lots
- **Semi-natural areas:**  
fence lines, riparian buffers, pastures, and roadsides

*Asters and goldenrods along a drainage ditch on the Rocky Lane Farm, Peterborough County, ON.*

*Photo: Susan Chan*

# Keep the Habitat You Have

- Non-invasive native plants
- Hedgerows + evergreens
- Dead + downed wood
- Brush + rock piles
- Leaf litter
- Hollow/pithy stems
- Bare patches of ground

Consider changing your management practices:

- Limit mowing
- Limit tilling

BEES: 90% solitary  
70% ground  
30% stem/cavity



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# 70% Native Bees are Ground Nesters

- Nest in bare or sparsely vegetated soil
- Use abandoned holes or dig themselves
- Sunny, south-facing stream banks, mud cliffs, flat ground
- May utilize base of bunch grass/vertical structure
- Nests may be single short tunnel to complex branching systems



# 30% Native Bees are Cavity Nesters

## Natural Nest Sites -

- Chew out pith of dead stems/twigs (e.g. blackberry, elderberry)
- Abandoned burrows of boring beetles in snags/stumps

## Artificial Nest Sites -

- Bundles of reeds
- Wood blocks



# Create the Habitat You Want

## Private Land Programs

There are many programs in which landowners can enroll, some are for large acreage, and some are for small, but all of them provide important habitat for monarchs, pollinators, and many other species throughout our state!

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# Create the Habitat You Want

Pollinator habitat  
can also mitigate  
other environmental  
concerns



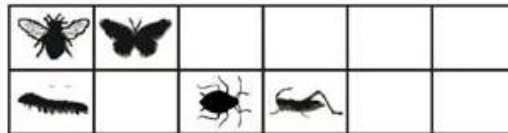
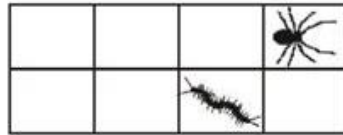
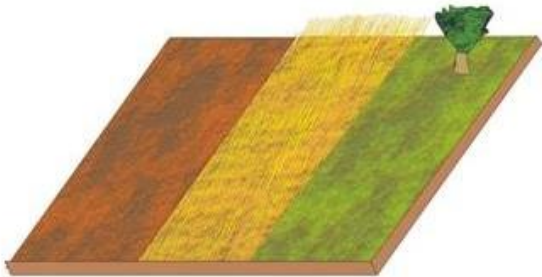
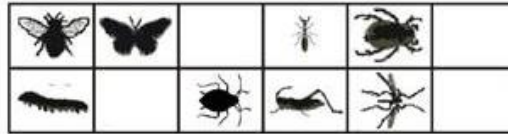
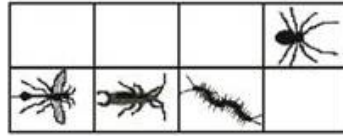
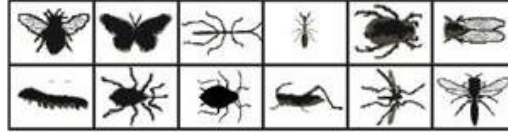
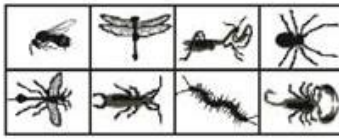
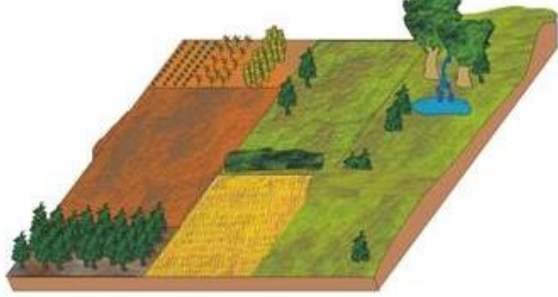
Rory Crowley



Rain Dog Designs, Gig Harbor, WA

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**More  
Habitat  
Diversity  
=  
More  
Biodiversity**

# Specialist Insects





**Common Milkweed**  
*Asclepias syriaca*  
Well drained soils.  
Photo by Louis-M. Landry



**Swamp Milkweed**  
*Asclepias incarnata*  
Damp, marshy areas.  
Photo by Janet Allen



**Butterfly Weed**  
*Asclepias tuberosa*  
Well drained soils.  
Photo by Thomas Muller, Lady  
Bird Johnson Wildflower Center



**Whorled Milkweed**  
*Asclepias verticillata*  
Prairies and open areas.  
Photo © Kim Davis & Mike Stangeland

# Milkweed!

Milkweed is an important part of the monarch life cycle. They depend on them as host plants.

- Females only deposit eggs on the leaves of milkweed plants.
- Caterpillars won't eat anything other than milkweed.
- The toxic milky sap of the milkweed plant gives monarchs their bad taste, which helps deter predators.

# Milkweed Specialists

Monarch Caterpillars



Milkweed Beetles



Milkweed Bugs



Milkweed  
Tussock Moths



# Create the Habitat You Want

**(1) Food/Floral Resources**

**(2) Nesting Habitat (bare ground for bees,  
hollow stems for bees, host plants for  
butterflies/moths)**

**(3) Protection from Pesticides**

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# Integrated Pest Management

- ✓ Implement IPM strategies in your garden
  - understand your system
  - beneficial insects
  - redefine “pests”
  - monitoring
- ✓ Be mindful of/minimize the use of pesticides



Integrated Pest Management:  
Science-based **process** to solve pest  
problems while minimizing risks to  
people and the environment

# Habitat Planning is key to success:

---



Determine project goals



Site selection



Plant species selection



Site preparations



Habitat Installation



Ongoing maintenance

# Pre-Planting: Site Prep



## SITE PREP SO IMPORTANT!!!

- Don't skimp here
- It's all about the soil
- Prepare your canvas
- Weed/invasives removal
- Good seed to soil contact if sowing seed





# Pre-Planting: Site Prep



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## Compost versus Mulch



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# Pre-Planting: Site Prep



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# Site Prep Methods

Sheet mulching

Lasagna gardening

Solarization

Sod removal

Tilling

# Site Prep: Sheet Mulching



# Site Prep: Sheet Mulching

1) Lay base – cardboard and/or paper

2) Planting method

a) Plant into existing soil (under base layer)

b) Plant on top of base layer (into layer of compost/soil you have added)

3) Add mulch



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# Site Prep: Lasagna Gardening



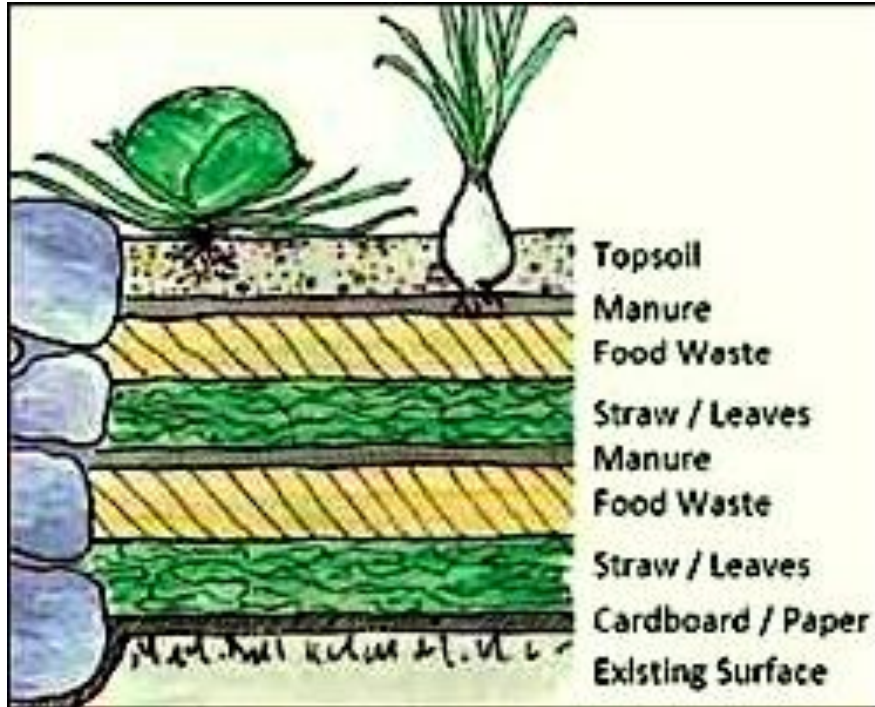
[Loveandlemons.com](http://Loveandlemons.com)



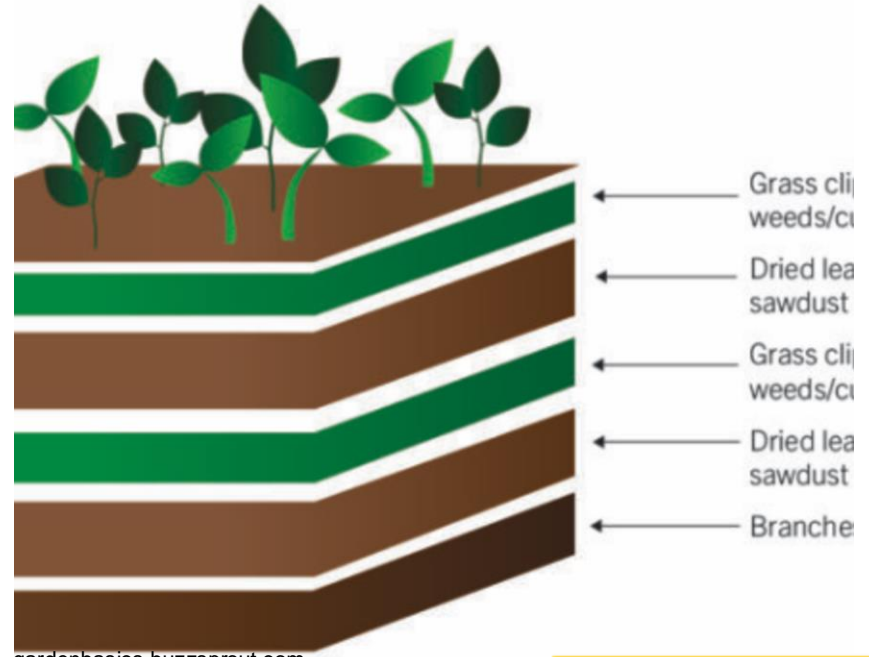
[Thespruceeats.com](http://Thespruceeats.com)

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# Site Prep: Lasagna Gardening



[Instructables.com](http://Instructables.com)



[gardenbasics.buzzsprout.com](http://gardenbasics.buzzsprout.com)

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# Site Prep: Lasagna Gardening



JULY 3

PLANT GRO



Rootsnursery.com

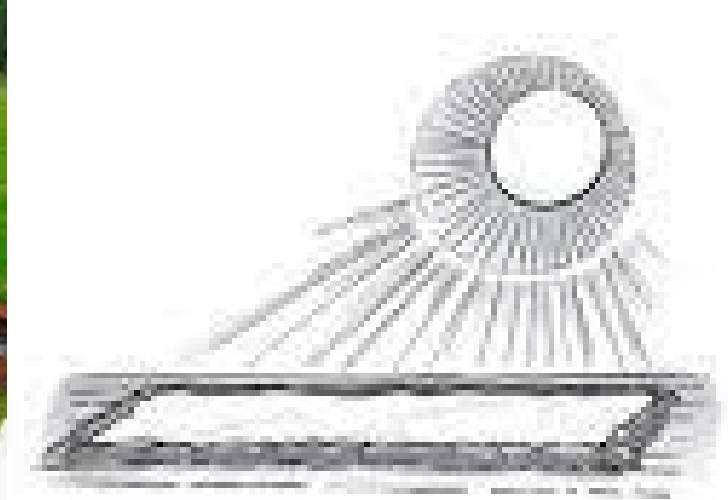
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# Site Prep: Solarization



landscapeontario.com



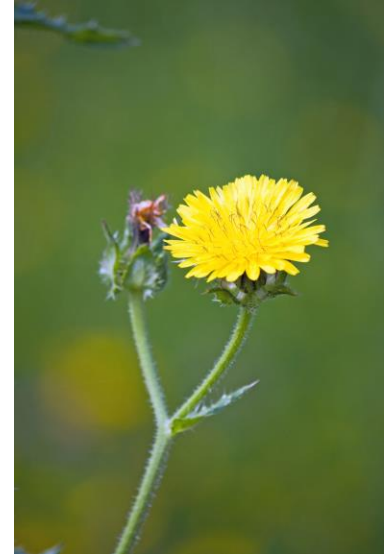
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# Site Prep: Solarization



WINNER:  
6 week treatment with  
clear plastic

EXCEPTION:  
Dandelions



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# Site Prep: Sod Removal



# Site Prep: Tilling



[Lawrencetoolrental.com](http://Lawrencetoolrental.com)

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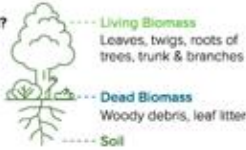
# Carbon Storage in Earth's Ecosystems

Achieving net-zero by 2050 depends on the Earth's natural carbon sinks.

Forests play a critical role in regulating the global climate. They absorb carbon from the atmosphere and then store it, acting as natural carbon sinks.

### Where is Carbon Stored?

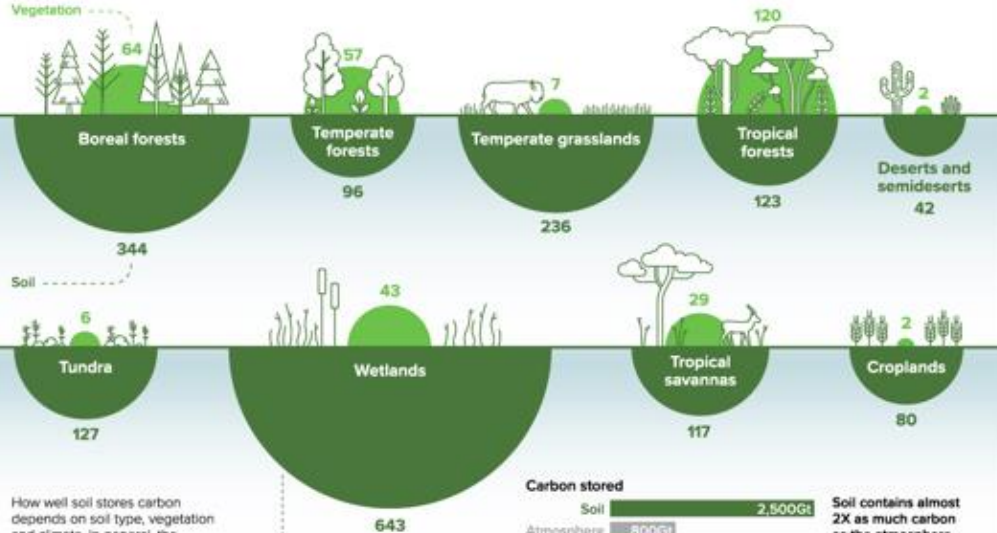
There are various carbon pools in a forest ecosystem.



## Carbon Storage Tonnes of Carbon

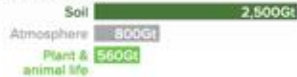
The world's forests absorb around **15.6 gigatonnes** of CO<sub>2</sub> each year. That's around 3X the annual CO<sub>2</sub> emissions of the United States.

However, around **8.1 gigatonnes** of CO<sub>2</sub> leaks back into the atmosphere due to deforestation, fires and other disturbances.



How well soil stores carbon depends on soil type, vegetation and climate. In general, the **wetter and colder**, the better.

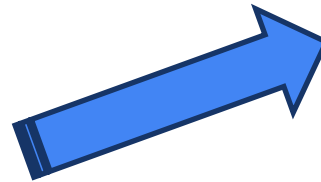
### Carbon stored



Soil contains almost **2X** as much carbon as the atmosphere and living flora and animals combined.

# Site Prep: Tilling

Soil contains almost **2X** as much carbon as the atmosphere and living flora and animals combined.



Average stored carbon in tonnes per hectare at a ground depth of one meter  
Sources: IPCC, NASA

# Pre-Planting: Site Prep

RAISED BEDS/CONTAINER GARDENING



ACCESS TO WATER



# Pre-Planting: Pathways/Borders



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# Pre-Planting: Layout





# Pre-Planting: Layout



# Pre-Planting: Layout



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# Pre-Planting: Supplies



Alfo Medeiros - pexels.com

Vecteezy.com



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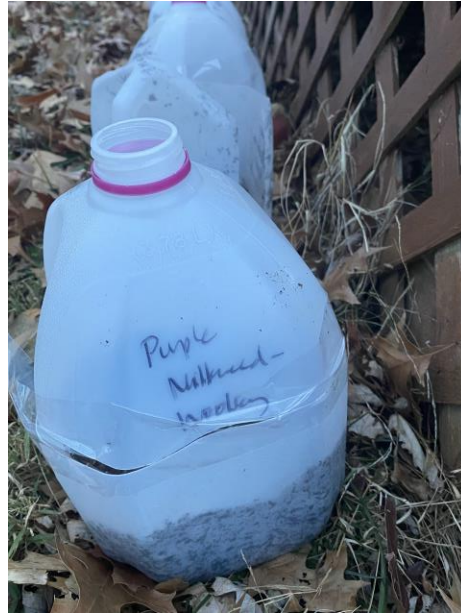
# Pre-Planting: Plants



[morguefile.com](http://morguefile.com)

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# Pre-Planting: Plants



# Pre-Planting: Arrangement



# Planting



[www.freepik.com](http://www.freepik.com)



Lara Jameson - pexels.com



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# Post-Planting Maintenance



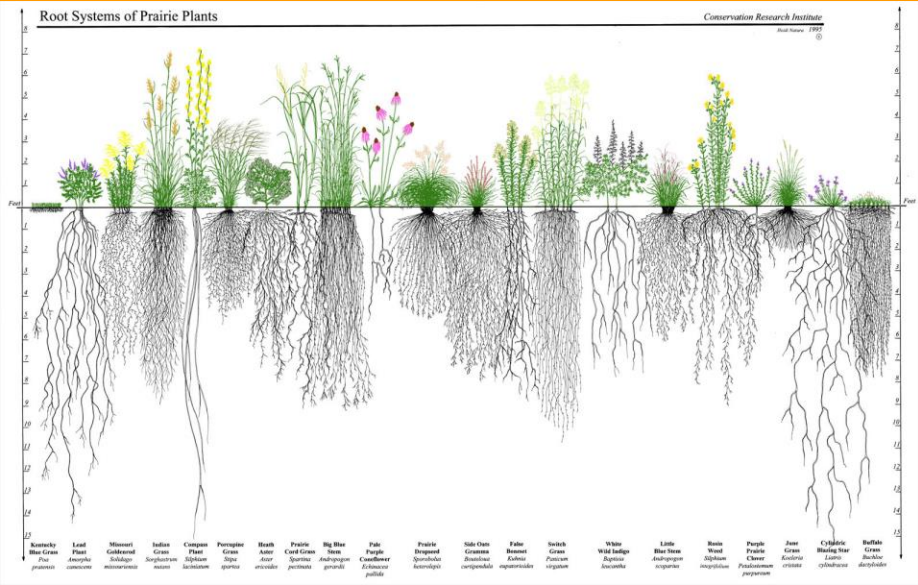
freepik.com



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# Post-Planting Maintenance



Root Systems of Prairie Plants by Heidi Natura;  
published by Conservation Research Institute

Exposed: The Secret Life of Roots  
US Botanic Garden



# Post-Planting Maintenance



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# Seasonal Maintenance (or not!)



SAVE THE STEMS

Chop and  
Drop

Let Logs Lie

Celebrate  
Snags



Sleep, Creep, Leap

Leave the Leaves

## Plants used for nesting

Scientific name	Common name
<i>Agastache</i>	hyssop
<i>Andropogon gerardii</i>	big blue stem
<i>Arnoglossum atriplicifolium</i>	pale Indian plantain
<i>Artemisia</i>	native sages
<i>Asclepias incarnata</i>	swamp milkweed
<i>Baptisia australis</i>	blue wild indigo
<i>Echinacea</i>	cone flowers
<i>Eupatorium perfoliatum</i>	common boneset
<i>Cirsium</i>	native thistles
<i>Eutrochium</i>	Joe Pye weeds
<i>Helianthus</i>	sunflower
<i>Heliopsis helianthoides</i>	smooth oxeye, early sunflower
<i>Liatris</i>	blazing stars
<i>Monarda fistulosa</i>	wild bergamot, bee balm
<i>Panicum virgatum</i>	switchgrass
<i>Pycnanthemum</i>	mountain mints
<i>Ratibida pinnata</i>	pinnate prairie coneflower
<i>Rhus</i>	sumacs
<i>Rosa</i>	roses
<i>Rubus</i>	raspberries
<i>Sambucus</i>	elderberry
<i>Silphium perfoliatum</i>	cup plant
<i>Solidago</i>	goldenrods
<i>Sorghastrum nutans</i>	indiangrass
<i>Symphotrichum</i>	asters
<i>Thalictrum</i>	meadow rues
<i>Vernonia fasciculata</i>	prairie ironweed
<i>Veronicastrum virginicum</i>	Culver's root
<i>Zizia aurea</i>	golden Alexander

## How to Create Habitat for Stem-nesting Bees



### WINTER

Leave dead flower stalks in-tact 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-occurring open stems, start a nest, then lay an egg on the pollen balls. Larvae eat the pollen.



### SUMMER

New growth of the perennial hides the stem stubble.



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



### FALL



### WINTER

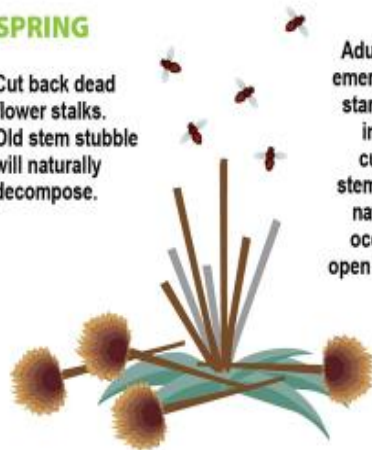


Bees hibernate in stems during the winter.



### 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.



Courtesy of Heather Holm

# The “Why”



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# The “Why” Explained



# My Garden



# My Garden Evolution



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# My Garden Evolution



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# My Garden Evolution



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# My Garden



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# My Garden - Host Plants



Dutchman's Pipevine  
- NCState Extension



3 Milkweeds



Passionflower



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# My Garden - Food



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# My Garden - Food (Us/Pollinators)



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# Growing Food



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# Growing Food

GARDEN PLANT	NATIVE POLLINATORS	NATIVE COMPANION PLANTS
<b>strawberries</b>	<b>small-medium sized bees</b> <i>Augochlorella, Augochlora, Lasioglossum, Halictus, Osmia, Ceratina, Andrena</i>	New Jersey tea, ragworts ( <i>Packera</i> spp.), <i>Phacelia</i> spp., pale beard-tongue, wild hyacinth, common cinquefoil, golden alexanders
<b>blackberries and raspberries</b>	<b>small-medium-large bees</b> <i>Andrena, Halictus, Lasioglossum, Augochlorella, Augochlora, Hoplitis, Osmia, Ceratina</i> , bumblebees	New Jersey tea, indigo bush, hawthorns, wild hyacinth, Jacob's Ladder, pale beard-tongue
<b>blueberries</b>	<b>medium-large bees</b> <i>Andrena</i> , bumblebees, <i>Colletes, Augochlora, Augochloropsis, Lasioglossum, Osmia, Habropoda, Eucera, Anthophora</i>	redbud, plums, blue star, blue-eyed Mary, wood betony, Virginia bluebells, wild hyacinth, wild geranium, horsemint
<b>apples, peaches, pears, and plums</b>	<b>medium-large bees</b> <i>Andrena, Colletes, Halictus, Lasioglossum, Augochlora, Augochlorella</i>	major attractions on their own because of their size and conspicuousness

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This list was created by native bee specialist Mike Arduser for the Grow Native! program



# Growing Food

GARDEN PLANT	NATIVE POLLINATORS	NATIVE COMPANION PLANTS
tomatoes	<b>medium-large bees</b> bumblebees, <i>Augochloropsis</i> , <i>Lasioglossum</i> , <i>Anthophora</i>	foxglove beardtongue, pale purple coneflower, blue wild indigo, wild bergamot, purple prairie clover, germander, leadplant, tall coreopsis, obedient plant
peppers	<b>medium-large bees</b> <i>Halictus</i> , <i>Agapostemon</i> , <i>Augochlora</i> , <i>Augochlorella</i> , <i>Melissodes bimaculatus</i> , bumblebees	same as tomatoes (above)
eggplant	<b>medium-large bees</b> bumblebees, <i>Augochloropsis</i> , <i>Lasioglossum</i>	same as tomatoes (above)
green beans	<b>medium-large bees</b> <i>Megachile</i> , bumblebees	leadplant, purple prairie clover, butterfly milkweed, common milkweed, germander, prairie blazing star, wild bergamot

This list was created by native bee specialist Mike Arduer for the Grow Native! program

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# Growing Food

<b>squashes</b>	<b>large bees</b> squash bees ( <i>Peponapis</i> , <i>Xenoglossa</i> ), bumblebees, <i>Melissodes bimaculatus</i>	leadplant, purple prairie clover, germander, butterfly milkweed, common milkweed, wild bergamot, native thistles, sunflowers, tall coreopsis
<b>cucumbers</b>	<b>medium-large bees</b> <i>Halictus</i> , <i>Agapostemon</i> , <i>Augochlora</i> , <i>Augochlorella</i> , <i>Melissodes bimaculatus</i> , bumblebees	same as squashes
<b>zucchini and melons</b>	<b>medium-large bees</b> squash bees ( <i>Peponapis</i> , <i>Xenoglossa</i> ), bumblebees, <i>Melissodes bimaculatus</i>	same as squashes
<b>okra</b>	<b>medium-large bees</b> bumblebees, <i>Melissodes bimaculatus</i> , <i>Ptilothrix bombiformis</i>	ironweeds, prairie blazing star, woundwort, common milkweed, native thistles, sunflowers, tall coreopsis, native hibiscus

This list was created by native bee specialist Mike Arduer for the Grow Native! program

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# All Sizes Matter

Container Garden



K. Miskelly

Home Garden



Demonstration Site/  
Community Garden



Restoration Site



# Your Yard Matters!

Amber Barnes



By adding pollinator habitat  
to your space you are  
increasing connectivity and  
helping wildlife!



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# YOUR YARD = BIG IMPACT

## YOUR YARD + NEIGHBOR'S YARD = BIGGER IMPACT



*Megachile*/leafcutter – Jim McCulloch



Rusty-Patched Bumblebee –  
Rich Hatfield (Xerces Society)

### Can they find:

- \* Food?
- \* A place to raise their young?
- \* A pesticide-free environment?



*Osmia lignaria* [www.fs.usda.gov](http://www.fs.usda.gov)

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# NEIGHBORHOODS CAN CREATE CONNECTIVITY

Wildlife corridors are defined as **narrow strips of land that differs, usually in terms of dominant vegetation, from the surrounding area.** They serve as traveling avenues for wildlife species between two similar yet fragmented habitat areas, and provide important sources of food and cover for many species.



# Together, we can enhance and reconnect the landscape

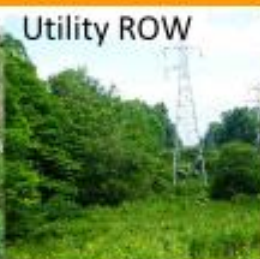
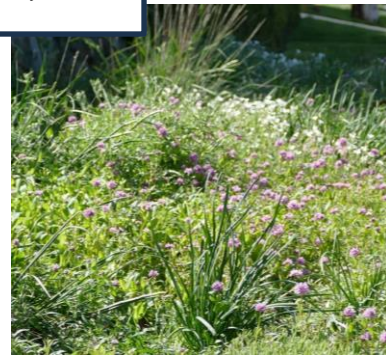


Photo credit: Hugh Venables



K. Miskelly





# Pollinator Partnership Programs & Resources



Bee Friendly Gardening (BFG) is a membership program from Pollinator Partnership working with the public to help protect, preserve and promote pollinator health.

[bfg@pollinator.org](mailto:bfg@pollinator.org)

<https://www.pollinator.org/bfg>





# BEE FRIENDLY GARDEN

This garden is managed to promote bees and other pollinators.

[BeeFriendlyGardening.org](https://BeeFriendlyGardening.org)

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## BEE FRIENDLY GARDENING™ IS FOR EVERY LANDSCAPE!

### GARDENERS

Add pollinator plantings in gardens or containers and forego pesticides at home

### NEIGHBORHOODS

Work with HOAs to turn common areas into pollinator meadows

### COMMUNITY FOOD GARDENS

Help alleviate food insecurity and increase yields by adding pollinator plantings

### CITIES AND PARK DEPARTMENTS

Reduce microclimate extremes and heat-related deaths by incorporating green spaces

### LANDSCAPERS

Alter practices to incorporate BFG techniques into landscape designs

### PUBLIC GARDENS AND PARKS

Replace exotic plants with beneficial natives and install interpretive signs

### SCHOOLS AND COLLEGE CAMPUSES

Be a platform for change by using green space to educate others about habitat

### PLACES OF WORSHIP

Engage congregations in outreach and missions through community and pollinator gardens

### RIGHTS OF WAY

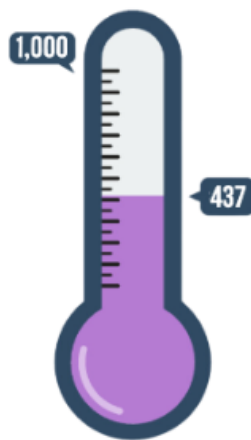
Transportation/Utility/Communication industries can turn barren corridors into rich native plant oases

### BUSINESSES

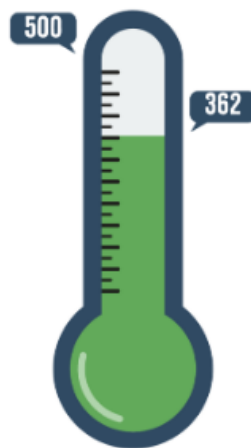
Adopt pesticide-free strategies and transform public-facing outdoor spaces into BFG demonstration areas



## 2024 BFG MEMBER GOAL



## 2024 GARDEN GOAL



## BFG Membership Criteria

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- Pay the recurring annual \$20 membership subscription

## Benefits Of Being A BFG Member

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- Digital welcome packet with members-only resources
- Personalized Certificate of Membership
- Subscription to Bee Friendly Gardening monthly e-newsletter
- Access to exclusive BFG Member webpage, which includes priority/exclusive opportunities to free seeds, resources, campaigns, webinars and videos
- Invitation to the BFG Facebook Member Community
- Exclusive access to the BFG store where you can purchase hats, brochures, and more!
- Access to our online resource library to assist you with your pollinator-related garden projects
- Personalized planting guide and garden recipe card for your location
- 20% off Pollinator Partnership [consulting services](#)
- Chances to enter into drawings for pollinator/garden-related giveaways
- Opportunities to share your garden/story with other BFG members
- Help direct BFG programs via your input
- **Opportunity to register your BFG**

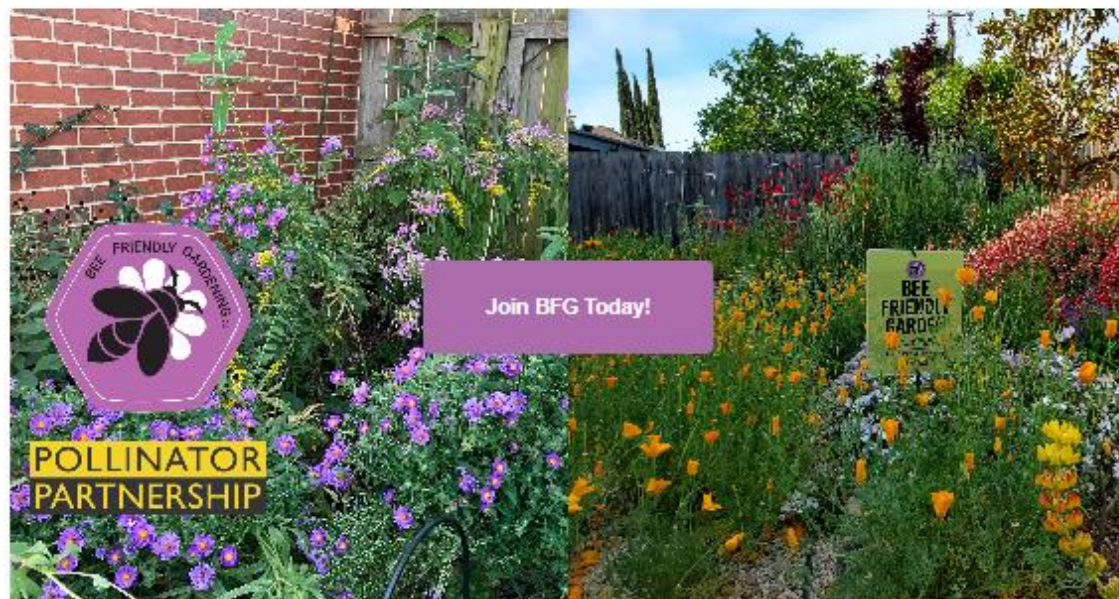
JOIN US



# BEE FRIENDLY GARDENING

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*Pollinators need us and we need pollinators. Help us make a difference!*



Bee Friendly Gardening (BFG) helps people play a bigger role in the health of pollinators and the planet. More than 85% of U.S. households have an outdoor living space; by converting these areas to much-needed habitat, together we can have a big impact. Your space can provide support to pollinators and other wildlife - no lawn, garden, balcony, or window box is too small!

[CRITERIA & BENEFITS](#)

[REGISTER YOUR BFG](#)

[Not Sure What To Plant?](#)

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[PLANTING GUIDES](#)

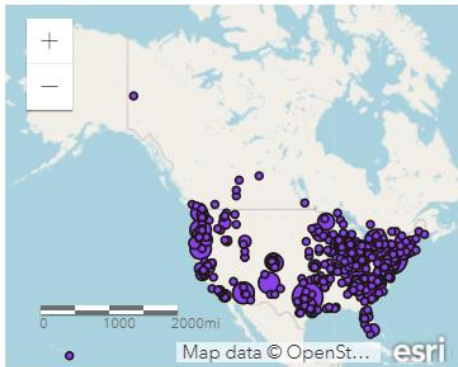
[Have A Smaller Space?](#)

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[GARDEN CARDS](#)

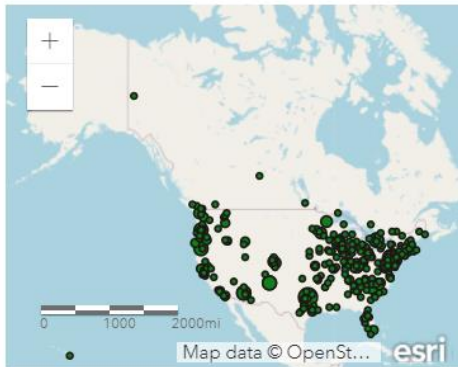
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## Bee Friendly Gardening Members



[VIEW LARGER MAP](#)

## Bee Friendly Gardens



[VIEW LARGER MAP](#)

POLLINATOR PARTNERSHIP  
QUICK REFERENCE GUIDE

**POLLINATOR  
PARTNERSHIP**  
Protect their lives. Preserve ours.



# CREATING A POLLINATOR GARDEN



*Site preparation is important for successful wildflower establishment.*

Wildflowers are beautiful, ecologically valuable additions to any garden. Their colors span the rainbow, and their varying heights, forms, and flower shapes offer endless possibilities. Wildflowers native to your area will provide the most benefit to pollinator communities, but garden plants can help too. Whether you have a small garden, a lawn space, or a few planters, with a little know-how, any area can be used to support pollinators.

## SITE SELECTION AND PREPARATION

Look for an area in your yard that is underutilized - bare garden patches, lawn that you don't need, or scrubby areas. Sunny areas are best but shade areas can support pollinators, too, with the right plants. To prepare the site you'll need to remove weeds or grass, thin out existing plants, or, if using seed, remove mulch (soil coverings such as wood chips or leaves). You have many options to prepare your site for wildflowers; hand pulling weeds, smothering, and solarizing are a few options. If you are planning to create habitat in planters, make sure you have some pots with soil and good drainage, and you are ready to go!



*Smothering a sod area before layering soil and planting.*

## SELECTING PLANTS

Native plants use less water, are adapted to local weather patterns, and support locally native pollinators. Non-native but non-invasive plant species can also provide benefits. Wildflowers, grasses, shrubs, vines, and trees can all be beneficial, so choose what fits your site best. If possible, aim for a mix of plant structures, a range in bloom times, and diverse flower shapes/colors. See the list of native pollinator plants for your region to start you on your plant selection journey.



[Add Observations to This Project](#)

## Stats





Totals

**981**  
Observations »



**225**  
Species »

**9**  
People »





### Most Observations

-  **clsstreett**  
667 observations
-  **cjblessing**  
172 observations
-  **velocitybir**  
45 observations
-  **qageek**  
31 observations

### Most Species

-  **cjblessing**  
80 species
-  **clsstreett**  
80 species

### Most Observed Species

-  **Common Eastern Bumble Bee**  
153 observations
-  **Monarch**  
84 observations
-  **Black Swallowtail**  
23 observations
-  **Western Honey Bee**





**Thank you!**

**Sara Wittenberg**  
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