



Monarch Butterfly 11-150 miles



Planting for Pollinators

Guiding Principles and Design Concepts
for Residential Pollinator Habitat

Rusty-Patched Bumble bee 900-1800 ft



typical
pollinator
foraging
ranges

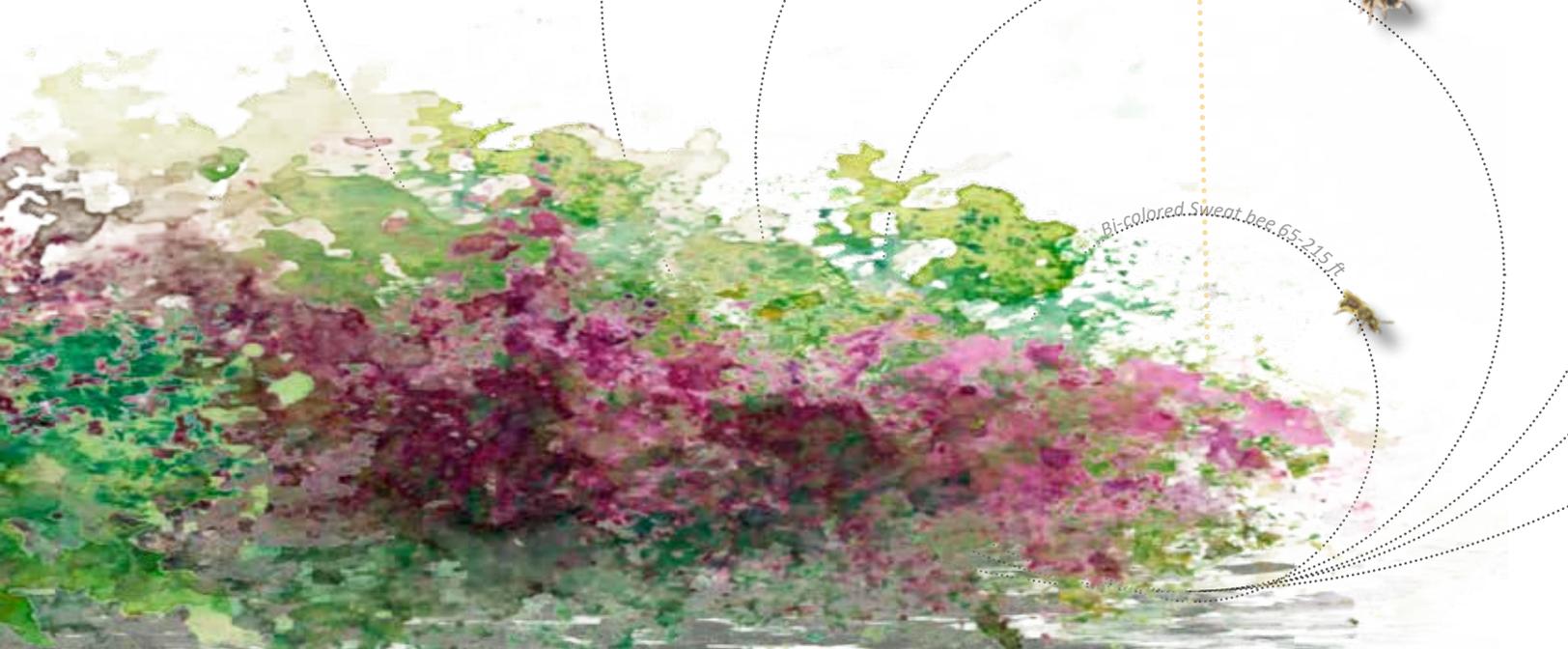
Eastern Tailed Blue 750-1500 ft



Small Mining bee 65-246 ft



Bi-colored Sweat bee 65-215 ft



Introduction:



The Lawns to Legumes program

Goals:

1. **Create critical pollinator habitat in residential yards.**
2. **Build public support for high-quality residential pollinator habitat.**

The good news is our mandate to provide critical habitat for the Rusty-Patched Bumblebee will also support Minnesota's other pollinators and wildlife, and improve air and water quality.

Creating and maintaining enough high quality plantings to support declining pollinator populations is an enormous effort. We need to change public perception of residential landscapes. We want Minnesotans to embrace pollinator habitat in our yards!

Before you begin a pollinator planting project...



You may have heard that native plantings are a lot of work to create and establish. This is true, but they are also enormously rewarding. Consider the following:

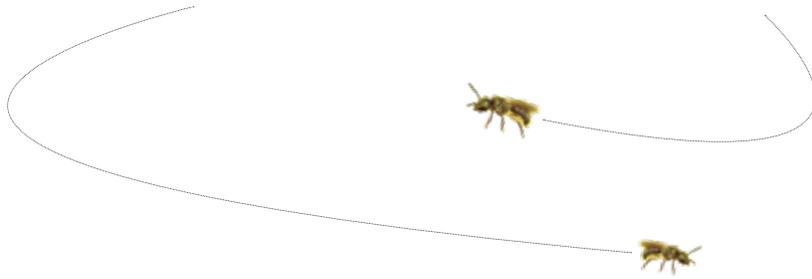
- ***This type of project involves a time commitment. Creating and especially MAINTAINING your project will take time, especially in the beginning while your plants are becoming established.***
- ***Your commitment to maintain your planting promotes this effort in your community. You are demonstrating residential pollinator habitat to your neighborhood.***
- ***Your efforts add up! As a part of this statewide campaign to help protect Minnesota's Pollinators, more people who plant for pollinators means greater habitat connection.***

Messiness is OK...When its well-planned and intentional. Sometimes, a less-ordered look better supports pollinators!

It is important to know your aesthetic goals before you begin a planting. Pollinator projects should be planned to fit into the context of their surroundings. When planting for Pollinators, however, keep in mind that what we might think is messy is important for their survival.

- ***Are you ready to accept a slightly less groomed yard if it has clear environmental benefits?***
- ***What type of habitat will you provide?***
- ***How large will your project be?***





The Xerces Society
On the risk of stings:

Most bees are not aggressive and will not sting unless handled improperly. Bees are very docile when handling flowers.

...wild native bees are far less defensive than European honey bees or social wasps.

What about stings? Is pollinator habitat dangerous?

- **Most wild native bees are unlikely to sting unless threatened.**
- **Wear your shoes...the most threatening thing you can do is STEP on a bee.**
- **Don't confuse Bees and Wasps*. Wasps are minor pollinators, your planting is more likely to attract bees, butterflies and moths than the wasps you might see flying around an open trash can.**



*Wasps are important predators of garden pests, when you do see them it is not a bad thing!

What if I am not a Homeowner?

You don't have to be a homeowner to participate in this program! The funding was allocated to residential properties (unfortunately this doesn't include businesses, schools or churches). But there are ways to participate even if you don't own your land.

If you Rent your home:

- **Ask your landlord for permission to create a Pocket Planting.** You will need to assure them that you will be responsible for the maintenance of the planting. The benefits to your landlord are reduced maintenance and beautification of their property.
- **Use a Community Garden Plot:** This also benefits other plots in the community garden-your planting may increase their pollination rates! You will need to check if the garden is zoned for residential use.
- **Help a neighbor.** Maybe there is someone in your neighborhood who you could partner with to create pollinator habitat in their yard?
- **Plant in pots!** You can create a garden on a balcony or outside an apartment with large pots. There are plants that will overwinter in pots with some protection, as well as annuals that are good foraging for pollinators. Be sure to protect your potted garden from wind so that pollinators can access it!

We Want YOU!

**Participate, Create pollinator plantings and
Contribute to the health and survival of our pollinators!**





This guide is intended to help residents, skilled gardeners to those without gardening skills, plan, install and maintain pollinator habitat in their yards.

Our hope is that there is new and helpful information here for anyone planning a pollinator habitat project.
Thanks for supporting pollinators!

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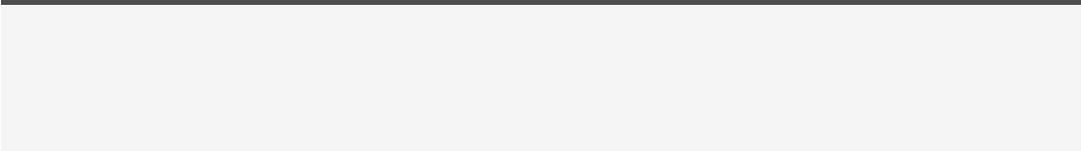
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Pollinators play an essential role in food production as well as pollinating native plants. There are more than 450 native bee species in Minnesota, but pollinator populations also include butterflies, moths, beetles and native flies.

The decline of their populations, and beneficial insect populations worldwide has led to significant concern by conservation professionals, legislators and the public. Pollinators are essential to healthy ecological systems.

Contributors to pollinator decline include:

- Habitat Loss
- Insecticides and Fungicides
- Introduced Parasites and Pathogens
- Climate Change

Planting for pollinators has additional benefits including habitat for other species, stormwater infiltration, soil microbial health, and carbon sequestration. And there are benefits for our communities, experiences with pollinators and the flowers they rely on, enrich our lives.



Pollinator Perspective: What's Missing?

A typical turf lawn and foundation planting doesn't support pollinator needs.



**Rusty-Patched
Bumble Bee**
Bombus affinis

Photo courtesy of Heather Holm

- **Native Plants** Wild bees overwhelmingly prefer native plants. Studies have found that native plants in residential gardens help enhance wild bee populations and diversity. (*Pardee. 2014*)
- **Blooms Through the Season:** there are few or no blooming plants in many yards, and many that only provide a brief time period of bloom like the ones in this yard. **(see below)**
see appendix Plant Lists
- **Nesting:** Many nesting needs are overlooked or eliminated due to the way we manage our yards. Ground nesting and cavity nesting bees need specific conditions to survive and reproduce. *see Xerces Society Nesting fact sheet*
- **Protection from Insecticides and Fungicides:** Most of us wouldn't intentionally spray bumble bees or butterflies with insecticides, but may use chemicals harmful to pollinators without making a connection to the harm they cause to other creatures. For better choices: *see appendix Integrated Pest Management*



Pollinator Perspective: Safety

These tips will help keep you and your pollinators happy and safe in your yard:



Rusty-Patched Bumble Bee

Photo courtesy of Heather Holm

A raised leg is the first line of defense for Bumble bees.

- **Be Calm:** We don't want to sting you! Most of us will only sting if we feel threatened. Don't swat at us, just remain calm and slowly move away.
- **Wear your shoes!** Especially if you have a bee lawn you may have pollinators underfoot. Avoid walking barefoot through this part of your yard. This may be the most common way to get stung, and we don't like it either!
- **Plant away from doors:** There is less chance of a negative encounter if your pollinator habitat is not in a highly trafficked area.
- **Avoid strong scents and bright colored clothes** You are more likely to be visited by bees or wasps if you look and smell like a flower while you are in your garden.
- **Observe:** Now that you are more comfortable around us, notice that we are not very interested in you, just your flowers.

**Wild Bees...
Not so wild?**

**Honey Bees,
Paper Wasps and
Yellow Jackets
tend to cause
most severe
allergic reactions.**

**Most native
pollinators are
pretty docile.**

**I'm actually just a beetle
pretending to be a bee.
Shhh..**

**I came here for two things:
pollen and nectar.
..looks like we're running
out of nectar... Oh wait,
there's more over here!**

What type of Project is Right for You ?

The most important pollinator habitat project you can create is one that is long-term. Providing reliable food and nesting resources year after year will best support Minnesota pollinator populations.

Planning how you can best maintain your project will help ensure success. See the chart below to decide what type of project works best for you and your neighborhood.



Guide to Project Types:

	pockets of habitat:* 22	flowering trees and shrubs: 24	pollinator lawn: 26	pollinator meadow: 28
type	native plants (potted)	shrubs and trees (potted)	pollinator lawn (from seed)	native plants (seeds or potted)
difficulty	•••	•	••••••*	•••••••
cost	•••	••••••••	••	•••••
installation	<ul style="list-style-type: none"> • sod removal • sheet mulching 	<ul style="list-style-type: none"> • dig holes • plant trees/shrubs 	<ul style="list-style-type: none"> • over-seed • remove lawn and re-seed 	<ul style="list-style-type: none"> • solarization • sheet mulching • remove lawn + re-seed
maintenance	<ul style="list-style-type: none"> • weed, especially in first few years • divide plants as they outgrow their space 	<ul style="list-style-type: none"> • some may need winter protection from rabbits • prune annually 	<ul style="list-style-type: none"> • weed, especially in first few years • over-seed to promote more flowers • raise mower height 	<ul style="list-style-type: none"> • weed, especially in first few years • mow twice yearly
benefits	<ul style="list-style-type: none"> • easier to maintain • best habitat value for the least amount of effort • a great way to start gardening! 	<ul style="list-style-type: none"> • easiest to maintain • adds habitat value + neat appearance • best for smaller lots + preference for a managed look 	<ul style="list-style-type: none"> • can be difficult to establish • less habitat value than a native planting • less mowing than a traditional lawn 	<ul style="list-style-type: none"> • most work to maintain • best habitat value • best for larger lots

*recommended for new gardeners

*it can be difficult to establish flowering plants in a dense turf lawn

Pollinator Needs: Food

Native plants provide the best pollen and nectar sources for our pollinators. Foraging ranges differ for pollinators. Providing connections in the form of corridors and patches can help support pollinator diversity in an urban setting.

Minnesota's State Bee



Rusty-Patched Bumble Bee

Bombus affinis
Photo courtesy of Heather Holm

Most of its native prairie habit is now farmed or developed, contributing to its current endangered species status.

Urban habitat has become increasingly important for the Rusty-Patched Bumblebee.

- **Pollinators are active early in the spring and into the autumn. They need continuous blooms from April to October.**
- **Pollen and nectar close to bumble bee nests** are critical to the number of queens the hive produces. Pollinator populations can grow or shrink based on available food resources.
- **Recommended native plant species:** *see appendix*
- **Foraging pollinators are at risk from human activities:**
 - limit or avoid insecticide and fungicide use** and plants treated with pesticides
 - provide native plants, the best food sources**
Many landscaping standards have lost much of their value for pollinators-these include double flowered cultivars and plants bred for decorative foliage like hostas.

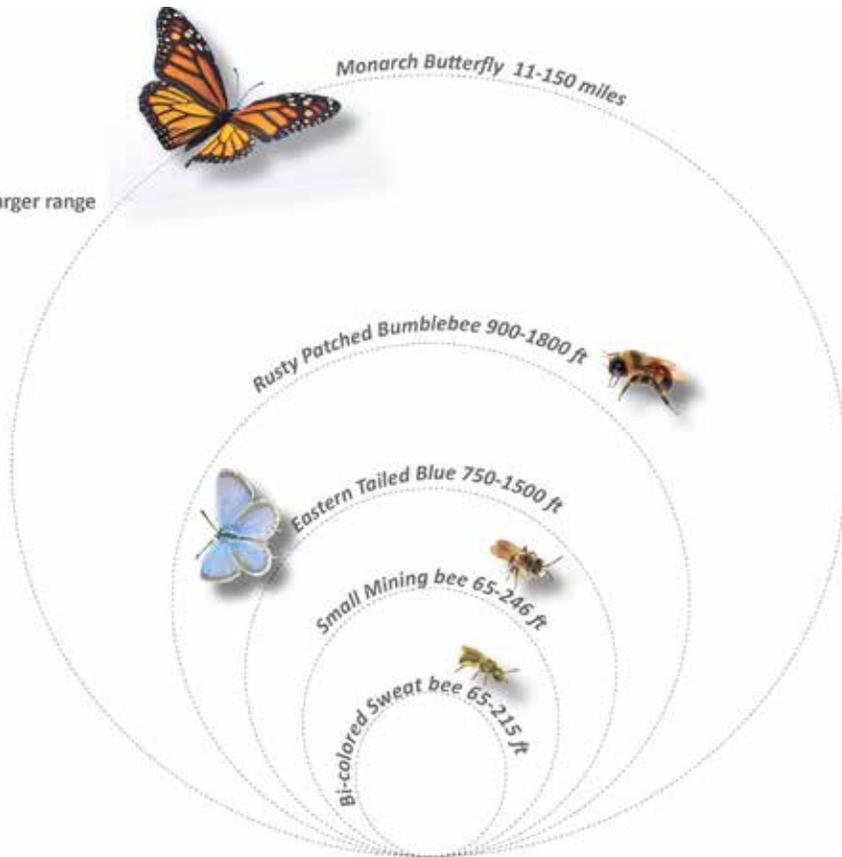


Pollinator Needs: Nesting

Human expectations of an attractive yard can conflict with pollinator's nesting and hibernating needs. Try to create some specific habitat for pollinators to nest and overwinter in.

POLLINATOR FORAGING RANGES

Larger Pollinators = larger range



Pollinators also need ample habitat for shelter, nesting and overwintering.

This includes the dead stems of flowering plants, branches of flowering shrubs and trees, bare ground, leaf litter, dead wood and unmown grassy areas (that ideally include native bunch grasses).

Ground nesting bees need bare or sparsely vegetated soil that is loose and well drained and in a sunny location.



plant debris: tree and stem cavity nesting bees



crevices + bare earth: ground nesting needs photo: Copyright © Heather Holm

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.

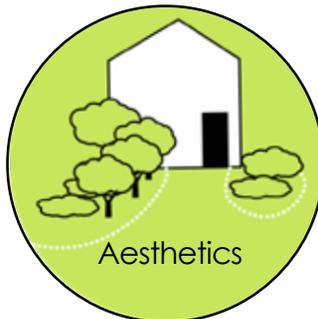
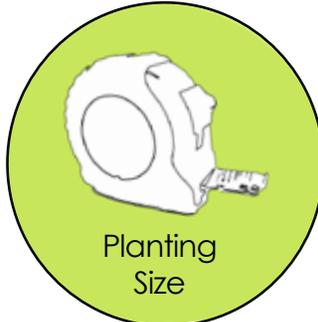


Always protect pollinator habitat from insecticide and fungicide use to prevent harmful exposure.

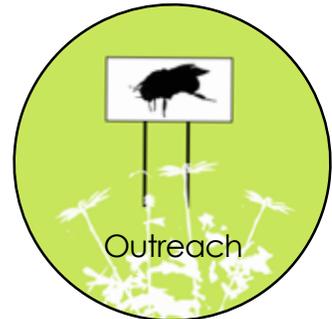
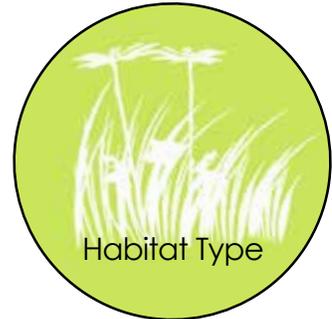
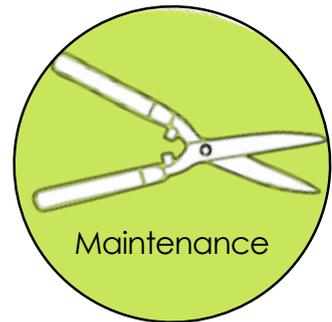
PRIORITIZE THESE SITES



DESIGN CONSIDERATIONS



LONG TERM CONSIDERATIONS



Assessing Site Conditions Residential Habitat

Development, roads and tilled fields have decreased food and nesting sources for many pollinator species. Creating habitat corridors that connect existing natural areas and quality habitat is key to supporting pollinators in Minnesota. Your yard can be an important part of these corridors!

Imagine your neighborhood from a pollinator's perspective:

How far does a pollinator need to fly from its nest to food and water sources?

A wide range of habitat will support small bees that have short flight distances as well as larger pollinators.



Resource availability throughout the year + How YOU can help

winter

hibernation habitat (varies by species)



wait to cut plantings until May, leave 12" stems for nesting until June

spring

early pollen and nectar + nesting habitat



provide critical early blooms willows and fruit trees

summer

abundant pollen and nectar



plant for continuous bloom to create consistent food resources

autumn

abundant pollen and nectar + hibernation habitat



leave plant material, leaves, stems, woody debris in your yard to support hibernation

active season

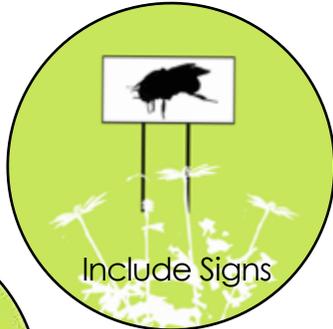
water source



provide water: clean, shallow, and close to food and nests

Planting Design: Creating a Sense of Order

Cues of Care: Carefully planned additions to the landscape can indicate that a garden is intentional and maintained.



- **Create Borders:** by mowing edges or creating pathways with mulch or ground cover in the areas immediately adjacent to sidewalks, driveways, and property lines.
- **Orderly Framework:** borders prevent plants from obstructing traffic and falling into the neighbors' properties or onto the sidewalk, and serve as a frame to create tidiness and human intention.
- **Add Architectural Features:** and human elements such as fences, lawn ornaments, wildlife houses and feeders, and keep features well maintained.
- **Include Signs:** to communicate with your neighbors about your project and promote pollinator and natural habitats. *see sign option featured in the appendix*



Sourcing Plants

Where you buy your plants is very important. Some nurseries treat their plants with insecticides and fungicides that are harmful to pollinators in your garden.



Avoid plants treated with Neonic insecticides and other harmful pesticides

- **Ask about pesticide use** and see the MN DNR's list of native plant retailers. *see DNR approved list*
- **Plants should be selected based on site conditions** such as soil type, sun exposure, and moisture levels. A good retailer can help you choose your plants if you know your garden's conditions. *see planting templates in appendix*
- **Choose high-quality plants** that will supply pollinators with abundant nectar and pollen. *see plant lists in appendix*
- **Lifecycle Support:** Include plants that support the larvae of pollinators such as milkweed for monarch butterflies. *extension.umn.edu/landscape-design/creating-butterfly-garden#common-butterflies-and-their-caterpillar-food-plants*
- **Select Carefully:** If non-native plants are chosen, select species that benefit pollinators. Do not plant noxious and invasive species



Mock Orange shrubs and Coral Bell cultivars are examples of non-native plants that have value to pollinators.

Plant Selection



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

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*



Top Ten MN Plants for Native Bumblebees:

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

Installation and Maintenance: Lawn and Garden Professionals

There are many options for residents who want to convert lawns to pollinator habitat but don't have time or expertise with yardwork. You may be able to hire a professional to help install and /or maintain your project.



- **Sustainable Lawn Care:** Look for companies that specialize in sustainable practices and have an understanding of good pollinator habitat. *see Wild Ones resources list*
- **Weeding Assistance:** If you choose to add garden habitat, plan for weekly weeding, especially in the first year. For a small garden this is typically 1/2 hour of weeding each week.
 - You can hire gardeners to weed your planting, typically on a bimonthly or monthly schedule.
 - Some gardeners offer ala carte weeding or installation as needed.
- **Design Assistance:** landscape architects and garden designers can create plans for pollinator plantings and plant lists for your specific site and needs. *see Wild Ones resources list*
- Some landscape design businesses also offer maintenance services.
- **Avoid maintenance contracts that include insecticide or fungicide use.** *see Wild Ones resources list*

maintenance is important to the success of your planting over time...

hiring a professional might be a way to learn and enjoy your garden.



Site Preparation: Plants, Shrubs and Trees



Containerized plants-not seeds- are usually used for rain gardens and smaller planting to help create a sense of order. Placing plants carefully where you want them can contribute to successful establishment of pollinator planting in urban areas.

Herbicide Application followed by tilling can also be used for preparing a garden bed, but several rounds of herbicide and tilling may be needed for sufficient control. There are other methods to prepare your planting:

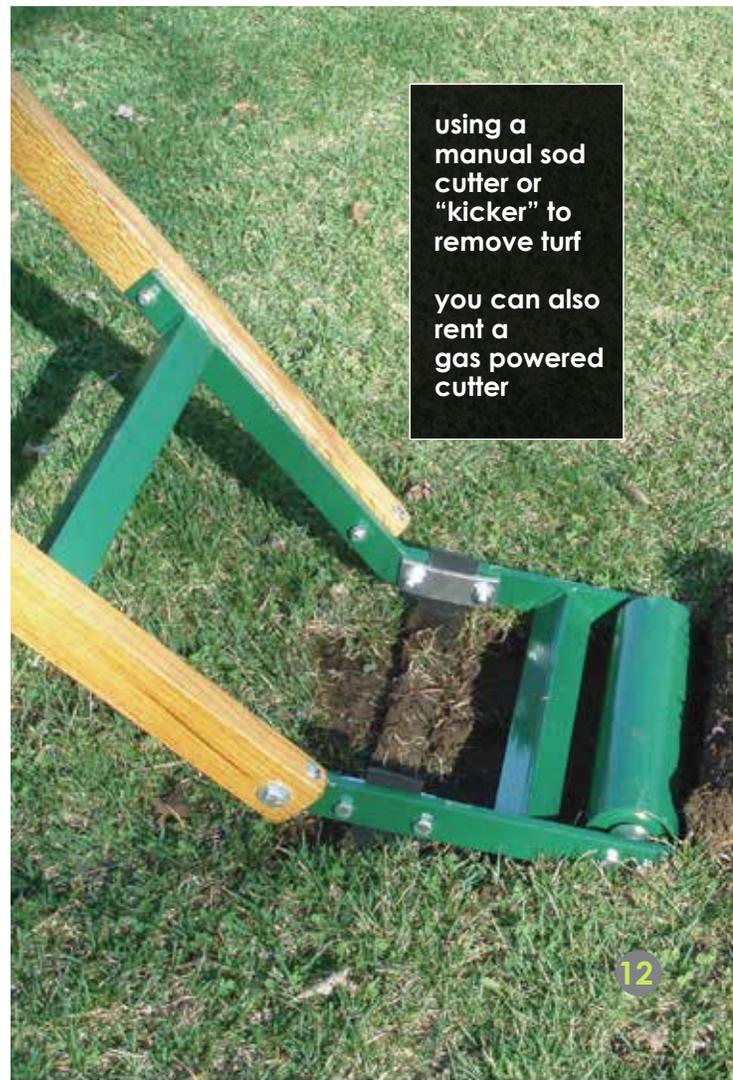
Alternatives to Herbicides: The Xerces Society has developed a guide to organic site preparation methods such as the use of clear plastic to control weeds *solarization shown below* *instructions: see appendix.*

- **Sod Removal:** it is a good idea to cut away the sod prior to planting to effectively remove weed roots and seeds. This can be accomplished with sod cutters, sod kickers or shovels for smaller areas.

sod kicker shown below

- **Sheet Mulching:** Layering cardboard and mulch to suppress existing vegetation is a way to make pollinator bed prep easier.

Renaissance Soils sheet mulching instructions: see appendix



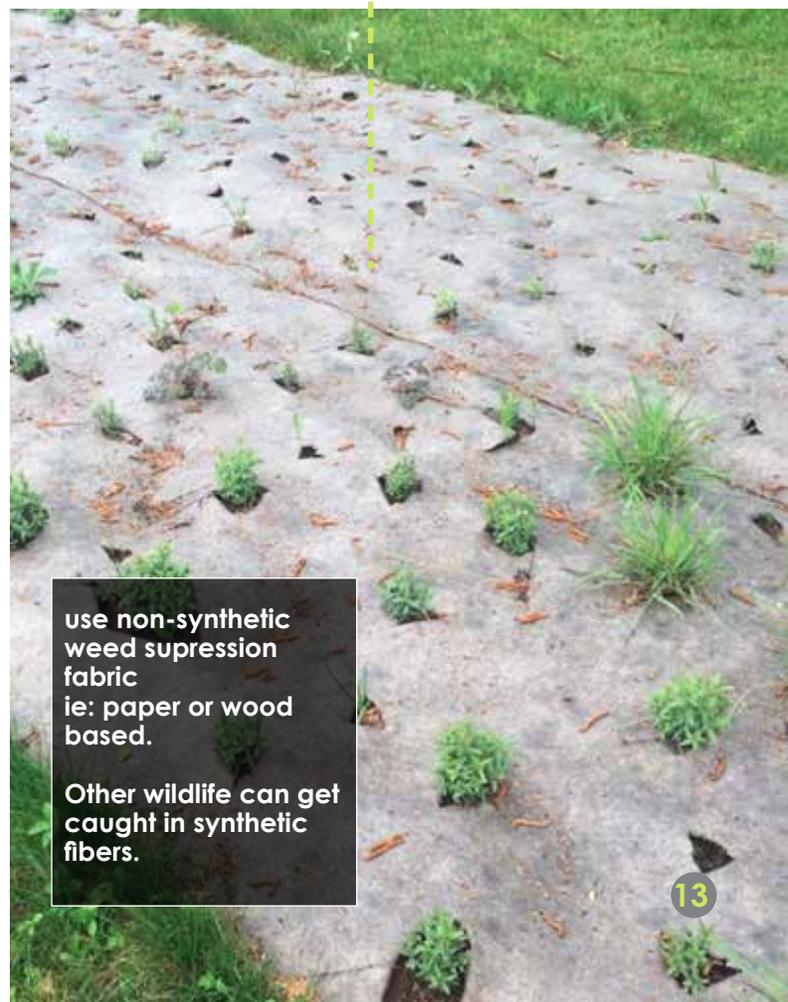
Site Preparation : Plants, Shrubs and Trees

Save your soil!

Preventing erosion and preserving soil moisture are important to the health of your new planting. Assemble all the materials you will need ahead of time, and have a plan for where you will install each plant.



- **Prevent soil erosion and loss of soil moisture:** Don't remove existing vegetation until you are ready to plant. This shouldn't be more than a few days, and ideally is the same day.
- **Erosion control: may be needed for areas with steep slopes.** Containerized plants can be installed directly into erosion fabric by cutting holes for planting. Avoid synthetic fibers.
- **Weed Suppression Fabric (below)** Paper or natural fiber fabric can be helpful for long term maintenance, but make sure to provide nearby areas of open soil for nesting habitat.
- **Mulch:** If you choose not to use a weed suppression fabric, plan to mulch your plants immediately after planting. This prevents new weed seeds from sprouting and conserves soil moisture for your plants.
- **Opt for un-dyed mulch** it is less likely to contain chemicals which might harm pollinators.



Site Preparation: Seeds

Preparing an area for sowing seed requires a different approach than site prep for containerized plants. Small seedlings can't compete with weeds the way larger plants do. Careful preparation can create the best conditions for your newly seeded garden.



Herbicide Application followed by tilling can be used for preparing a garden bed, but several rounds of herbicide and tilling may be needed for sufficient control. If you want to avoid herbicides see the following options:

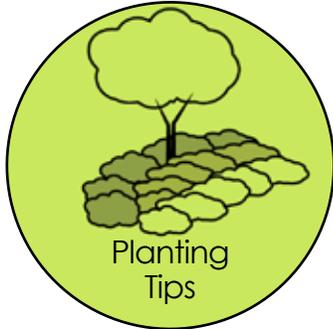
Alternatives to Herbicides:

- **Solarization:** The Xerces Society has developed a guide to organic site preparation methods such as the use of clear plastic to control weeds *solarization shown below instructions: see appendix.*
- **Sheet Mulching:** Layering cardboard and mulch to suppress existing vegetation is a way to make pollinator bed prep easier. Unlike the method for containerized plants, the cardboard and mulch will need to be removed before seeding. *Renaissance Soils sheet mulching instructions: see appendix*
- **Cover crops** are effective at improving soil health prior to planting and are a good option to prepare projects for planting seed in the fall which is the most common timing for pollinator projects.

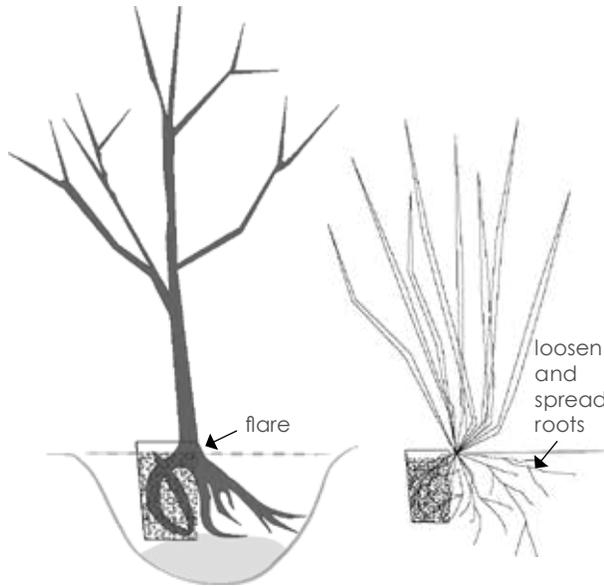


Planting: Plants

Containerized plants-not seeds- are the best choice for new gardeners and smaller gardens. They allow more control over layout and design of your garden, mature and bloom faster and have a higher survival rate. Here are some important planting tips:



Containerized plants, trees and shrubs are planted in similar ways. The most important elements of planting are digging a large enough hole for your plants, and planting at the right depth.



- Dig a hole as deep and 2-3 sizes wider than the pot.
- Remove the pot.
- Loosen roots and remove any roots that have grown in a circle around the base of the plant.
- The soil level should be just below the flare of the tree or shrub and the base of your plant.
- Mulch around the plant, but don't place mulch against the stem or trunk
- Water immediately after planting, then once a week for the first summer.

Do Not Fertilize: native plants are well-adapted to poor soils. Non-natives can be amended with 1/2 " of compost annually.



On planting day, it's a good idea to place your containerized plants in the layout you have planned. This lets you visualize your design and make changes as needed.

Planting: Seeds



If you are planning a large pollinator meadow, you could include some of these annual species that are attractive to pollinators:

basil, borage, calendula, coleus, dill, nasturtium, nicotiana, partridge pea, portulaca, annual salvia, tithonia, verbenas, and zinnias

plant lists: see appendix

It can take much longer to establish native plants from seeds, and it can be difficult for new gardeners to distinguish weedy plants from desired species. Containerized plants tend to be the best choice for smaller plantings. However, seed mixes can be a cost efficient way to introduce diversity in larger pollinator plantings

- **Buy Locally Produced Native Seeds:** this helps protect nearby native plant communities and provides plant species that are sure to be compatible with local insect populations.
see Wild Ones resources list in appendix
- **Sow in Spring, Early Summer or Late Fall:** pollinator seed mixes benefit from exposure to winter conditions to help break seed dormancy.
- **Seed to Soil Contact:** spread seeds on top of the soil surface and lightly rake them into the soil to achieve good soil contact. Be careful to plant the tiny flower seeds near the soil surface.
- **After Sowing:** Lightly pack the soil surface after you have spread the seed. You do not need to provide native plant seedlings with supplemental watering as long as they receive about one inch of rainfall a week.
- **Do Not Fertilize:** native plants are well-adapted to poor soils.

This planting is a good example of a large pollinator meadow.

Seeds can be a good way to establish large plantings, but offer less control of plant placement.

Managing Gardens for Pollinators

Management can be one of the most important factors in a planting's long-term success.



- **Allow Bare Soil:** keep an area in a well-drained, south-facing planting bed bare, and mulch free to support ground nesting pollinators—they make up 80% of native bees.
- **Mulch Sparingly:** If it is needed for weed suppression and erosion control, only apply mulch the first few years until plants fill in and are established.
- **Create Overwintering Areas:** Leave some woody debris near your planting and leave plant material standing through the winter.
- **Leave Standing Stems until June:** when cutting back wildflower stems in the spring. Leave standing stubble 12"-18" tall to provide nesting sites for stem-nesting bees to lay their eggs in. This "stubble" will break down naturally with time.
- **Incorporate clean water** in your yard by adding bird baths, saucers, water features, or rocks with shallow indentations, and change the water frequently to prevent mosquito larvae from hatching.



Nesting/ Overwintering Needs:

1. Woody debris
2. Standing stems 12" or longer
3. Exposed, loose soil

If you chose to use a 'Bee Hotel' or a nesting box, it is vital to clean it out each year to prevent the spread of parasites!

Managing Bee-Lawns for Pollinators

Bee Lawns and mow-able pollinator friendly plant species need specific management techniques:



- **Adjust Mowing Frequency, Timing:**

Wait to mow until lawns are 4 1/2" and raise the mowing height to 3" or higher. Especially important early in the season when pollinator food sources are limiting, by allowing dandelions and clover to flower in turf areas.

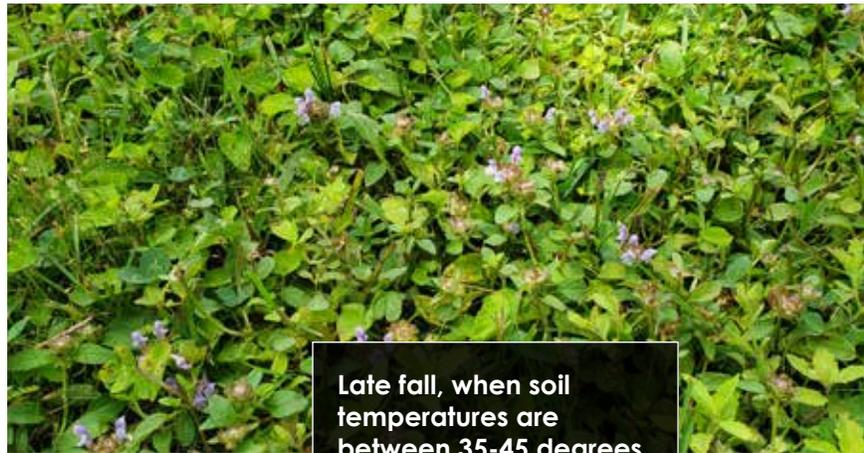
- **Overseeding:** Scalp your lawn: cut grass to 1" height or less and broadcast a specific bee lawn mixture of flowers such as White Dutch clover, Creeping thyme, Self heal and Ground plum and Violets.

- **Aeration or Compost Addition:** can aid seed-to-soil contact and germination rates. Broadcast 1/2" of compost across the whole yard and seed into that layer. Use approximately 6 yards of compost for a standard sized yard (>4,000 ft²).

- **Limit Herbicide Use:** Plan to spot weed manually if needed, herbicides will negatively affect your flowering lawn species.

- **Pass on Fertilizer:** Bee lawns with clover shouldn't need additional fertilizer as clover fixes nitrogen in soils.

pollinator lawn maintenance instructions: see appendix



Late fall, when soil temperatures are between 35-45 degrees Fahrenheit is the best time to overseed your bee-lawn.



Raise the blade height on your mower to 3" or higher.

Managing Other Insects for Pollinators

An Integrated Pest Management (IPM) approach can help prevent and reduce pesticide applications by correctly identifying pests and determining acceptable thresholds for economic and aesthetic loss.



- **Don't Spray!** These are plantings *for* insects. Think of the larger ecosystem benefits that your planting offers: besides supporting pollinators, you are providing food for birds, other beneficial animals like amphibians and bats, and supporting cleaner air and water.
- **Choose Disease Resistant Plants:** Native plants and proven cultivars tend to have less disease issues than non-native hybrids, leading to fewer long-term maintenance issues.
- **Avoid Pesticides:** Opt for plants that have not been treated with systemic insecticides and other pesticides. Ask your nursery if any insecticides have been used.
- **Use a Tiered Approach:** If management is needed, use non-chemical methods first, such as mechanical, cultural, and biological controls.
- **Employ Caution + Timing:** If these are unsuccessful and pesticide use is warranted, select the least toxic option, follow pesticide labels exactly, and avoid applications when pollinators are active.

Integrated Pest Management: see appendix



Monitoring Your Project

One of the most rewarding parts of a pollinator plantings is observing the different types of insects that benefit from a project.



- **Record Keeping:** consider documenting the seed mixes and plants that were used for a project. Record the timing of planting and management and observations about insects that used the plantings.
- **Phenology:** note seasonal variations in plant emergence, first pollinator sightings and climatic changes.
- **Spur Community Action:** Your project can be a catalyst for engaging the public in the larger pollinator conversation. This can promote community support for your efforts as well as inspire others to take action on this issue.
- **Tell Your Story-**There are many programs to track your habitat efforts:
 - Bumble Bee Watch
 - Monarch Larva Monitoring Project
 - Monarch Watch
 - Journey North
 - Minnesota Bee Atlas



Neighborhood Outreach

Talk to your neighbors about your project, increase awareness of declining pollinator populations and the important role of urban habitat creation and connections.



- **Neighborhood Conversations:** Research has shown that changes in landscapes are more likely to be accepted if neighbors are demonstrating the new practices.
- **Signs:** pollinator gardens and plantings are likely to attract attention from neighbors and passersby. This can be an opportunity to educate and inform your community of the purpose of the pollinator habitat, and possibly spark interest in others to create their own.
- **Social Media:** provides instant exposure that promoting your project and promoting the larger conversation of critical pollinator habitat.
- **Host a Native Plant Garden Tour** and share what you have learned!
- **Start a Plant Swap** in your community, either via social media or create an event.



Community involvement can encourage neighborhood investment in the success of your project.



Greater Community Outreach

Local politicians, land managers, community planners, educators, landscape business and parks staff might not realize how important pollinator habitat is. Your efforts can make a difference in local ordinances and regulations.



- **Pollinator Initiatives:** Many community groups, conservation organizations, state and local agencies, and universities have extensive information about pollinator efforts and other forms of outreach.
- **Encourage your city or organization to sign a resolution** supporting pollinators, some examples are the Xerces Society's Bee City, USA and Bee Campus, USA programs.
- **Social Media:** can be a platform for showing support for greater community efforts in support of pollinator habitat. Promote your project to community leaders and ask them to support similar efforts.
- A **Press Release** can provide exposure of your project to the public who might not be reached by social media, agencies, and companies near and far. For home gardens, local newsletters or newspapers can inform your neighbors of your project.
- **Public Events,** workshops and summits can be great places to talk about ways to increase the impact of creating pollinator habitat and share information and best practices.



There are a lot of fun ways to ask your community to support pollinators!



Pocket Planting: Native Plants

A Boulevard or Alley can be a good way to begin creating pollinator habitat on an urban lot. Start small and expand the areas over time. Ask for help: Sustainable landscape experts, Master Gardeners or neighborhood gardeners might have suggestions for their favorite native plants.



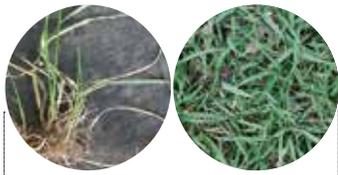
- **Start Small** you can add to your garden over time. Its important to plan a planting that you will have enough time to maintain. Plan for a half an hour of maintenance a week for the first growing season.
- **Create Borders** this helps prevent the landscape from looking untidy. Mulch, edging, stones or low groundcovers work well to create a border.
- **Be Patient** It often takes a while for native plants to look their best, but when they do, it's worth it!
- **Choose Plants and Layout Carefully**
Keep taller plants to the back of planting. Smaller cultivars of native plants may be appropriate. As with all pollinator plantings, try to provide blooms throughout the season.
- **Check with Your City** to ensure that your plan meets vegetation ordinances.

Joe Pye Weed
Ironweed
Rattlesnake Master
Bee Balm
Little Bluestem
Blazingstar
Coneflowers
Black-Eyed Susan

Pocket Planting

The best ways to start a small pollinator bed are either removing sod or existing vegetation by hand or sheet mulching. See tips and timelines below to choose the method best for you.

•**Sheet Mulching** is a good option for converting turf or existing plants that don't have deep roots. Most weeds and seeds can be suppressed with sheet mulch, but avoid this option for areas with tree seedlings, or plants like quack-grass, lily of the valley, snow on the mountain or creeping bellflowers.



quackgrass: roots and plant



creeping bellflower: plant + rhizomes



lily of the valley

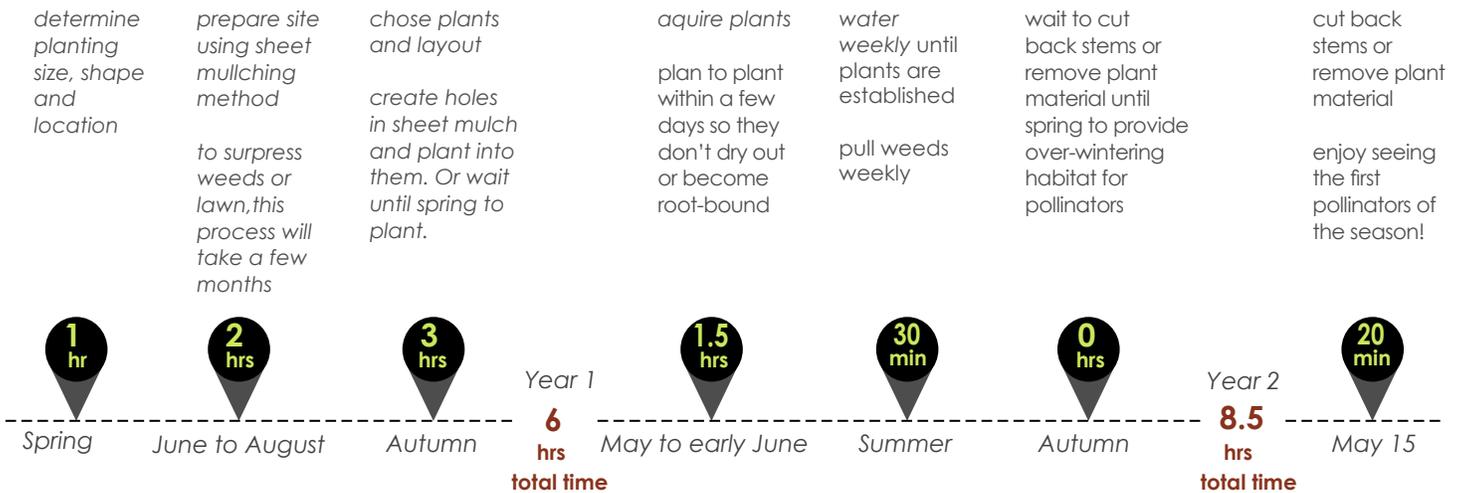


snow on the mountain



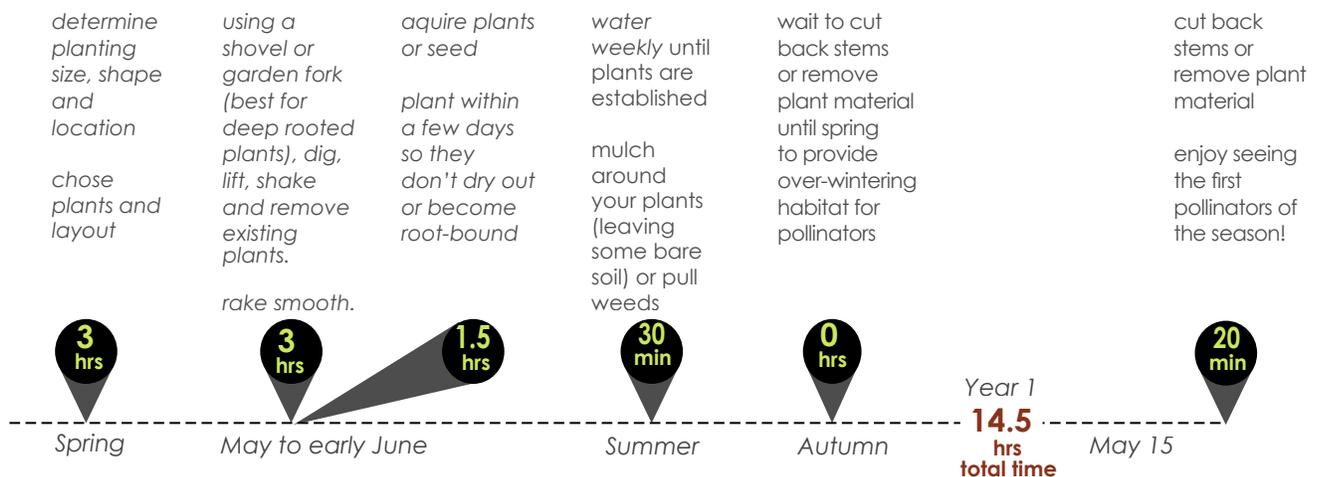
tree seedlings

SHEET MULCHING TIMELINE:



•**Hand Digging** will be most successful for areas with existing deep rooted plants (see above). It is the fastest timeline for installing a pollinator bed, but the most physical labor. Be sure to remove all the root material if you have the plants pictured above. They will resprout from any root fragment.

HAND DIGGING TIMELINE:



Add Flowering Trees and Shrubs

Native flowering Trees and shrubs can offer a lot of benefits to pollinators, both as food sources and habitat.



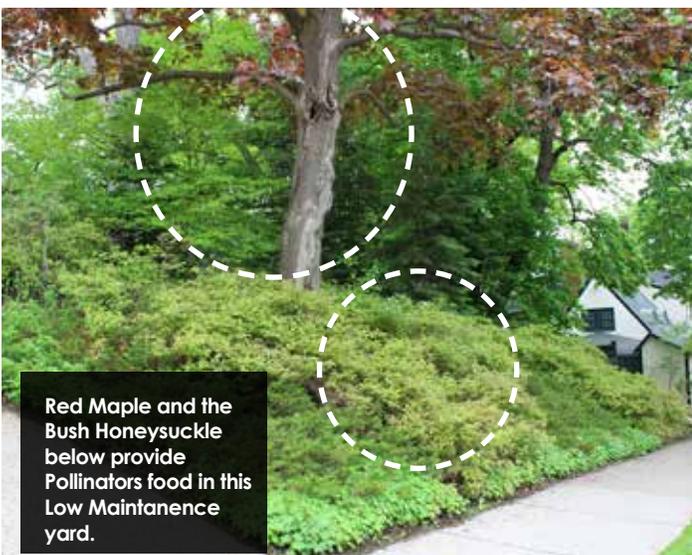
- **The early spring blooms** of flowering shrubs and trees are a great way to provide food for pollinators when resources are limited.
- **Choose native shrubs and trees** when possible.
- **Wait to prune shrubs until after blooming.** Prune for nesting, leave some woody debris and allow some old canes of currants and raspberries to remain.
- **Pruning is a once a year task** that keeps shrubs and small trees looking their best. Not sure how to prune your trees and shrubs? Hire a professional or consult UMN Extension for tips.



Buttonbush has year round visual interest and is a favorite of the Rusty Patched Bumblebee and Butterflies



One flowering tree can provide as much bee forage as an entire garden.



Replacing a steep slope with shrubs is a great way to reduce maintenance time.



Shrubs and trees can be great for adding habitat that is managed and neat looking.

Flowering Trees and Shrubs

Top Ten Shrubs/ Trees for Native Bumblebees:

- Wild Currant species** *Ribes*
- Serviceberry** *Amelanchier spp*
- Buttonbush** *Cephalanthus occidentalis*
- Dwarf bush honeysuckle** *Derrilla spp.*
- Plums and cherries** *Prunus species*
- Willows** *Salix spp.*
- Spiraea** *Spiraea spp.*
- American basswood** *Tilia americana*
- Lead Plant** *Amorpha canescens*
- Cranberry** *Vaccinium macrocarpon*

plant lists: see appendix

ADD FLOWERING TREES AND SHRUBS TIMELINE:



Buttonbush has year round visual interest and is a favorite of the Rusty Patched Bumblebee and Butterflies



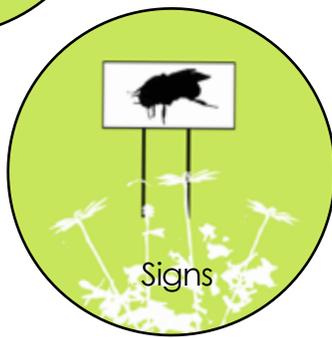
One flowering tree can provide as much bee forage as an entire garden.



Fruiting shrubs and trees offer multiple benefits to our yards: pollinator habitat, height and structure, food for people and other wildlife and seasonal interest from spring to fall.

Pollinator Lawn

This project varies in time and appearance. A pollinator lawn could be as simple as allowing existing clovers and violets to flower. But it is more beneficial to seed with a Pollinator lawn mixture.



- **Choose Carefully:** would your neighbors prefer a more managed look? Maybe a pocket planting would be a better option.
- **Seed into an Existing Lawn** this is more challenging but can be done. Follow the steps in these partner groups' guidance. *see Appendix: Bee Lawn fact sheets*
- **Pick the right Flowers** you may need a seed mixture that is right for the conditions of your yard. Some plants do better in shade, others full sun. Your soil conditions can also determine what will grow successfully in your yard.
- **Maintenance Determines Success** Bee lawns require specific management to benefit pollinators. (See timelines on next page.)

A sign can be a good way of letting your neighbors know what you are doing, it may help them to be more accepting of change AND show that you value pollinators.

Fine Fescues are lawn grasses with smaller leaves that allow flowering plants more space to grow.

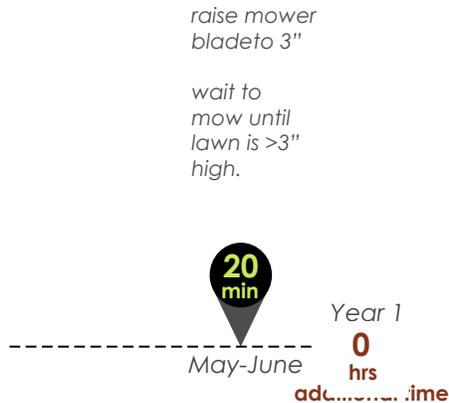
Self Heal and White Dutch Clover share this flowering swath

Pollinators benefit more from specific pollinator-mix plants than they do from simply allowing plants like dandelions and plantain to bloom.

Pollinator Lawn

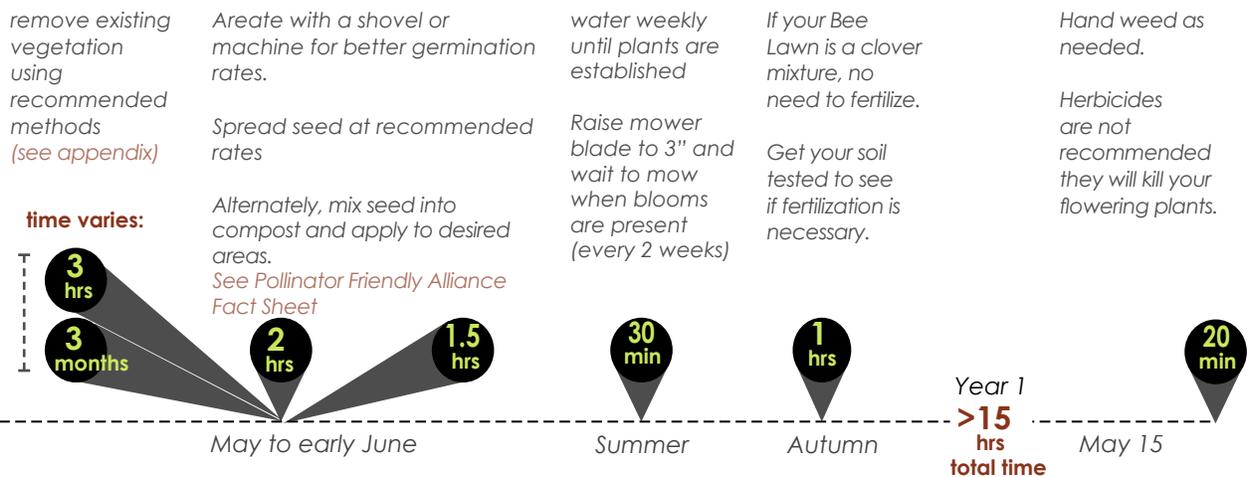
Guidance for creating a Pollinator lawn from Metro Blooms and the Pollinator Friendly Alliance can help you install your own project. Alternatively, some garden design and lawn care companies can help you establish your flowering lawn. *see Appendix: Bee Lawn fact sheets*

ALLOW LAWN TO FLOWER TIMELINE:



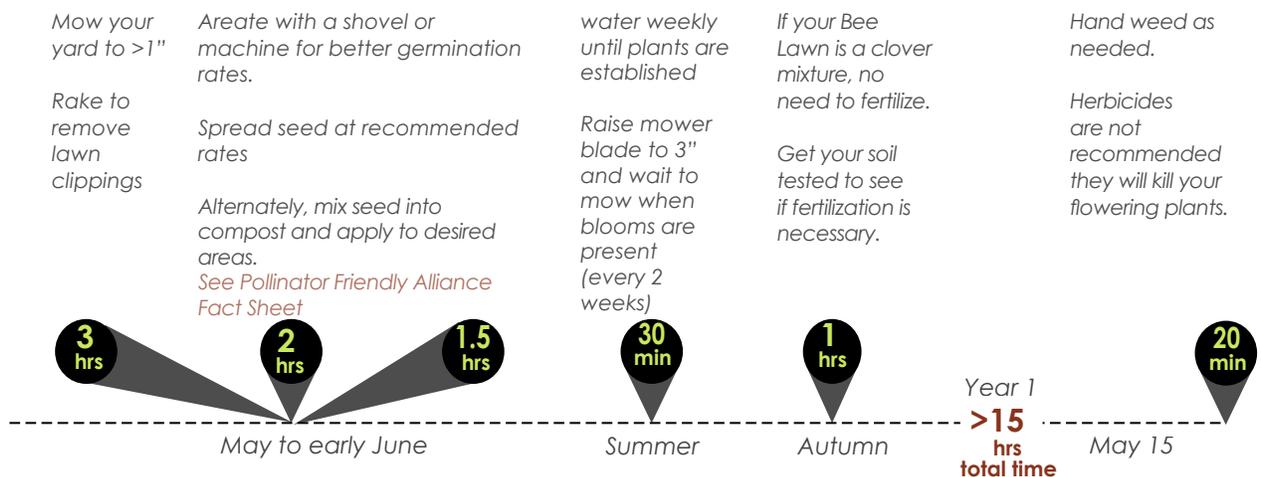
- **Install a Pollinator Lawn** -Starting from no lawn or completely replacing your lawn *see Appendix: Bee Lawn fact sheets*

INSTALL A POLLINATOR LAWN TIMELINE:



- **Overseeding Existing Lawn** allows flexibility but may be more difficult to establish.

OVERSEEDING TIMELINE:



Pollinator Meadow From Seed

One of the most beneficial for multiple reasons, creating a large native planting requires space, time to establish and regular maintenance to succeed. The best way to start this type of



- **Consider Your Site:** Most native wildflowers need full sun conditions, but there are woodland species with pollinator benefits too. Assess your soil type and moisture level.
- **Site Preparation is Key:** It is important to provide the best possible site preparation to prevent failure due to weed pressure, low seed germination and preventable maintenance issues.
- **Pick the Right Seeds** "Local eco-type" seeds are the best possible choice for your seeding project. It is also important to plan the species make-up and amount of
- **Maintenance Determines Success** Native plantings require specific management to become established enough to suppress weed species and to regenerate year after year (See timelines on next page.)

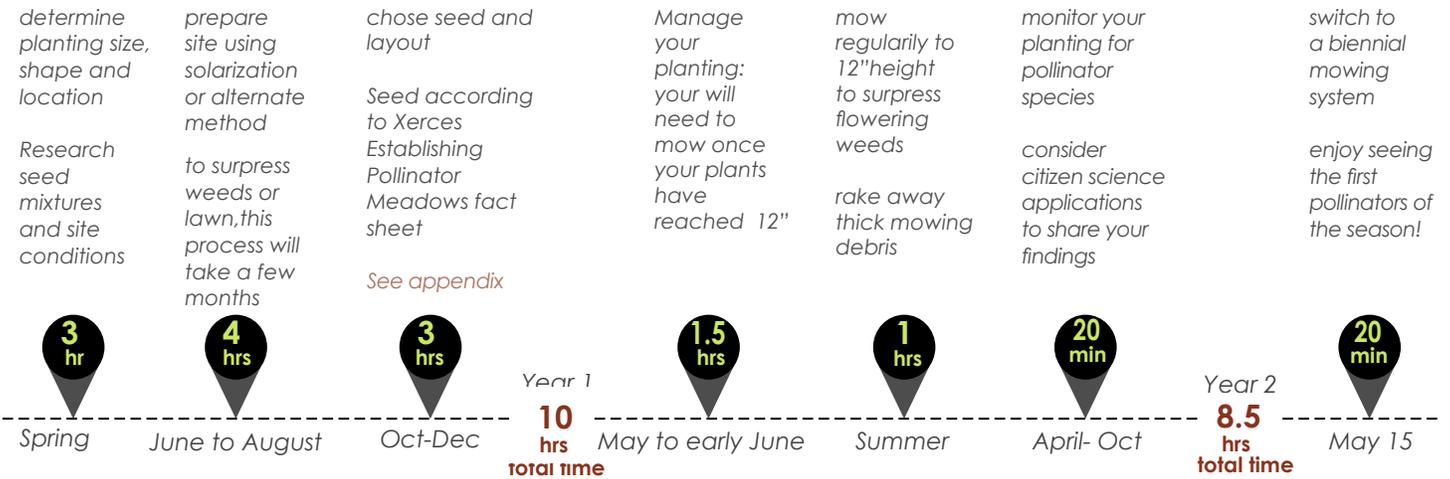


Pollinator Meadow From Seed

The best ways to start a large pollinator planting are either removing vegetation using solarization, herbicide or manual removal. See tips and timelines below.

- Solarization** is a good option for converting turf or existing plants without using herbicides. It is important to follow the directions carefully to ensure success. See [Xerces site prep fact sheet-appendix](#)

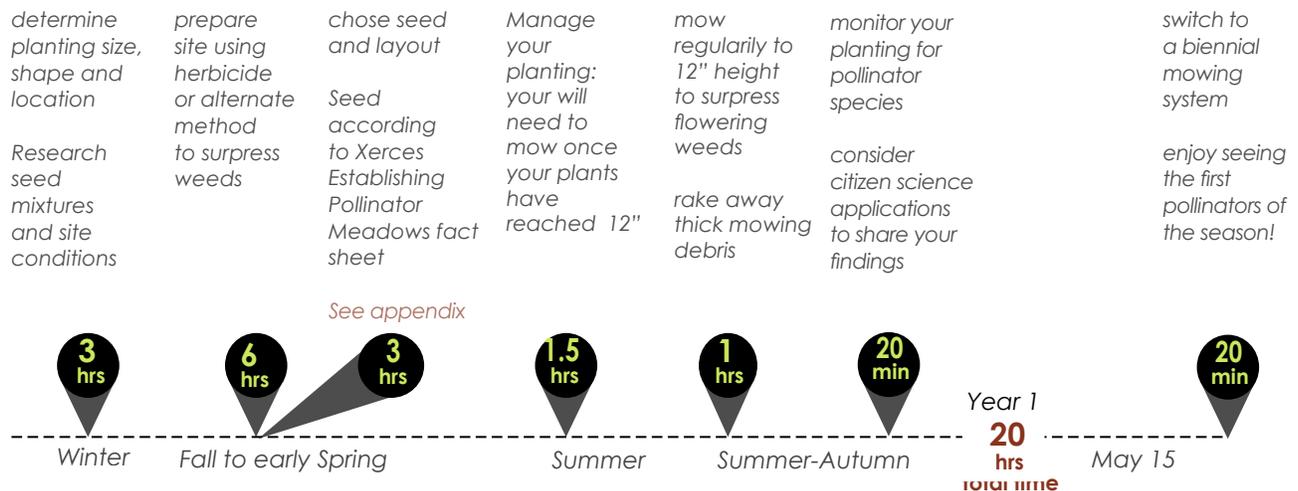
SOLARIZATION- NATIVE PLANTING TIMELINE:



- Herbicide or Hand Digging** will be most successful for areas with existing deep rooted plants (see below). It is the fastest timeline for installing a pollinator bed, but the most physical labor. Be sure to remove all the root material if you have the plants pictured below. Herbicide might be the most time efficient method.



HERBICIDE OR HAND DIGGING NATIVE PLANTING TIMELINE:



Links

Pollinator Needs:

University of Minnesota Bee Lab

<https://www.beelab.umn.edu/>

Minnesota DNR Resources

https://www.dnr.state.mn.us/pollinator_resources/index.html

Assessing Site Conditions:

Xerces Society Habitat Assessment Guides

<https://xerces.org/pollinator-conservation/habitat-assessment-guides/>

Xerces Society Pollinator-Friendly Parks Guides

<https://xerces.org/guidelines-pollinator-friendly-parks/>

Planting Design Examples:

Metro Blooms Garden Awards Archive

https://metroblooms.org/award_year/2015/

Plant Lists:

BWSR

<https://bwsr.state.mn.us/pollinator-toolbox-selecting-plants-and-seed-mixes>

Xerces Society Pollinator-Friendly Plant Lists

<https://xerces.org/pollinator-conservation/plant-lists/>

WILD ONES Native Plant Suppliers and Landscapers in MN

<http://www.wildonestvincities.org/p/resources.html>

DNR Native Plant Suppliers and Landscapers in MN

<https://www.dnr.state.mn.us/gardens/nativeplants/suppliers.html>

Site Preparation:

Xerces Society Organic Site Preparation

<https://xerces.org/guidelines-organic-site-preparation/>

Renaissance Soil

<https://renaissanceoil.com/resources/>

Managing Landscapes for Pollinators: Bee Lawns

Blue Thumb Pollinator-Friendly Lawn

<http://www.blue-thumb.org/turfalternatives/pollinator-friendly-bee-lawn/>

Managing Landscapes for Pollinators: Integrated Pest Mgmt

Xerces Society Pesticides in Your Garden

<https://xerces.org/pesticides-in-your-garden/>

Community Outreach: land managers, community planners, educators, landscape

Pollinator Friendly Alliance

<https://www.pollinatorfriendly.org/our-programs>

Contributors



Content:

Dan Shaw, Board of Water and Soil Resources

Larinda Befanz, Department of Administration

Ali Boese, Board of Water and Soil Resources

Sarah Foltz-Jordan, Xerces Society

Graphic Design:

Ali Boese, Board of Water and Soil Resources



Photo Credit

Page:

Intro Red Admirals at Berger Bank, Beltrami county BWSR staff

Why Plant for Pollinators-clockwise from top left-1 &2 Rich Harrison, 3 & 7 Heather Holm, 4,6 & 9 Ali Boese, 5 BWSR staff, 8 Candy Sarikoda

1. Rusty Patched Bumble Bee ?, Typical Turf Yard, Ali Boese
2. Plants, Trees and Shrubs, Ali Boese
3. Best Pollinator garden, Metro Blooms
4. Stem Nesting diagram, The Xerces Society, Ground Nesting Bee, Heather Holm
5. no photos
6. Base image, Google Earth, Ground Nesting Bee, Heather Holm, Goldenrod and Bumble Bee, Rich Harrison
7. no photos
8. An Orderly Planting, Ali Boese
9. Non-Native pollinator plants, Ali Boese
10. Plants, Trees and Shrubs, Ali Boese
11. Maintenance, Ali Boese
12. Cardboard layer,, BWSR staff, Sod Kicker BWSR staff
13. Volunteer planting,, Pollinator Friendly Alliance, Landscape Fabric, Dan Schutte
14. Solarization,, The Xerces Society, Cardboard layer, BWSR staff
15. Planting Event, Pollinator Friendly Alliance, Planting Details, Ali Boese
16. An Orderly Planting, Ali Boese
17. Johnson High School, Rich Harrison, Ground Nesting Bee, Heather Holm
18. clockwise from top left: Violets, Lily Shaw, Pollinator lawn, Ali Boese, Pollinator Swath,
19. Best Pollinator garden, Metro Blooms
20. Pocket Planting with Sign, Ali Boese
21. Volunteers, Metro Blooms
22. Pollinator Outreach, 1 & 2 Pollinator Friendly Alliance
23. Pocket Planing, Metro Blooms
24. Flowering Trees and Shrubs, Ali Boese
25. Flowering Trees and Shrubs, Ali Boese
26. Pollinator Swath,
27. Pollinator Lawn, Ali Boese
28. no photos
29. Wild Lupine Prairie, Paul Erdmann
30. no photos