Backyard Landscape
Best Practices for Pollinators
Conserving biodiversity in the backyard

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University of Minnesota, 2020

White-Lined Sphinx Moth
Photo by: Greg Lasley
Best Practices for a biodiverse backyard

This bulletin strives to educate residential landowners about ways to embrace environmental stewardship by using best practices for pollinators. Pollinators are keystone species in most terrestrial ecosystems and crucial for biodiversity in any landscape. However, they are at risk. Habitat alteration and fragmentation, pesticide use, and introduced diseases contribute to ongoing pollinator decline. In a world where green spaces are being replaced by urban sprawl and commercial agriculture, creating vital habitat corridors in residential areas and backyards is increasingly important for pollinator survival.

Rusty patched bumble bee (*Bombus affinis*) is an endangered species  
photo: Marcie Forsberg

Monarch butterfly (*Danaus plexippus*) is a threatened species  
photo: Laurie Schneider

A landscape rich with diversity of flowering plants is beautiful and supports biodiverse species such as pollinators, birds, beneficial insects and other wildlife. A biodiverse landscape also supports soil and plant health for natural control of pests and disease.  
ncipmhort.cfans.umn.edu

Pesticides are harmful to pollinators and beneficial insects.

- Insecticides are toxic and have lethal and sublethal effects on pollinators.
- Herbicides kill plants that insects use for food and shelter.
- Fungicides can be toxic to bees.
- Some additives in pesticide formulations increase toxicity of pesticides to bees.
- Adding adjuvants to pesticides can increase their toxicity.
- **Warning:** Systemic insecticides such as neonicotinoids are translocated to the plant’s vascular system and expressed in pollen and nectar, making the plant toxic to both target and non-target species.
Best Practices for pollinators

Habitat loss and fragmentation is one of the biggest issues contributing to declines of pollinators. Filling in the gaps of underutilized areas such as a strip of lawn between the sidewalk and street, an open lot, or replacing manicured turf, can create vital habitat.

What you can do:

Household yard maintenance choices have direct effects on species and ecosystems.

- **Eliminating pesticides** is a key ingredient in creating pollinator friendly habitat.
- **Follow tactics of Integrated Pest Management** (IPM), such as spot treating pests and not broadcast spraying pesticides especially when pollinators are present. See more on Integrated Pest Management at: ncipmhort.cfans.umn.edu/integrated-pest-management-ipm
- **Plant native host and nectar plants.** Pollinators require both nectar and pollen for their life cycles. Planting native trees, shrubs, and flowers that bloom from April through September creates a consistent food supply so pollinators can complete their life cycles. Pollinator species are attracted by a variety of colors and shapes. Ground covers, such as ajuga, squill, crocus, clover, and creeping charlie, are also good bee plants. Heirloom garden plants also provide food for pollinators.
- **Provide nesting areas.** Just like us, pollinators need a nutritious diet and healthy places to nest and raise their young. Leave some areas untidy for good nesting in piles of grass clippings, leaf or mulch piles, compost piles, or in dead wood.
- **Leave the leaves.** Wait to do winter garden clean-up until late spring instead of fall so hibernating insects have places to overwinter.
- **Do not cut standing stems until May.** Pollinators rest in stiff standing plant stems over winter.
- **Add flowering trees, shrubs and hedgerows, and plants that make fruit,** such as serviceberry, to your backyard landscape design. These make good nesting and resting areas for pollinators and birds.
- **Provide a clean water source** with a pond, bird bath or other water feature. Pollinators not only use water for hydration but also create comb, cool down their nest/hive and re-hydrate winter food stores.
- **Promote nutrient rich soils with compost.** Healthy soil and plants support natural control of pests and disease.
- **Use elements of design** such as pathways, patios and benches to make a relaxed landscape that looks tended to.
- **Replace turf with prairies, gardens and pollinator lawns.** A pollinator lawn provides food for pollinators with grasses and low growing perennials.

Pollinators include: wild native bees, honey bees, butterflies, beetles, hummingbirds, wasps, moths, bats and MORE!
Integrated Pest Management (IPM) is an approach that employs monitoring of plants, pests and weather to strategically manage pests. IPM addresses the source of pest problems, whereas pesticides simply respond to pests. IPM minimizes the use of chemicals harmful to pollinators and beneficial insects, and is less toxic to the environment. Using less pesticides promotes the survival of beneficial insects that kill pest insects.

ncipmhort.cfans.umn.edu/integrated-pest-management-ipm

- **THE FIRST STEP** is to accept that plants can handle some pest and disease pressure.
- **KEEP A JOURNAL** when pests appear, what works and doesn’t work.
- **INSPECT** and monitor your plants on a regular basis, before problems are out of control. Set thresholds for pest populations and damage. Look for beneficial insects and determine if they are managing pests.
- **USE COMPOST** to improve soil and plant health. Healthy soil makes healthy plants that can tolerate some damage.
- **USE RESISTANT PLANTS.** If a plant species is struggling, remove it and plant a naturally resistant plant instead.
- **USE THE LEAST TOXIC OPTION.** If a pesticide must be used, only spot treat in the evening, and do not treat open blooms. Soft pesticides include horticultural soaps and oils, corn gluten, white vinegar spray, spinosad, B.T., and others.
- **BIOLOGICAL CONTROLS** include beneficial insects and pathogens naturally found in the environment, such as predatory insects, like lady beetles and lacewings.

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**Beneficial Insects**

Meet a few lesser-known backyard friends:

**Spider wasp**
*Sphex pensylvanicus*
An efficient pollinator and helps control pest insects. Spider wasps flick their wings as they walk and feed.
photo: Laurie Schneider

**Lady beetle**
*Coccinellidae*
Eats aphids, mealy bugs, soft scales, psyllids, whiteflies, mites and other pest insects. One lady beetle can eat nearly 1,000 aphids in its lifetime.
photo: Russ Ottens

**Lacewing**
*Chrysoperla rufilabris*
Larvae are highly effective predator of aphids.
photo: Joseph Berger

**Cicada killer**
*Sphexius speciosus*
A large wasp that kills cicada for food for its larvae.
photo: Johnny Dell
Pollinator Lawn IPM

A pollinator lawn is a flowering blanket of grasses and low growing perennials which provides food for pollinators, requires very little mowing, enhances biodiversity, improves soil health, reduces herbicide and pesticide use, and promotes clean water and environment. Traditional turf lawns provide no food for pollinators.

Pollinator lawn perennial flowers:

- **English daisy** (*Bellis perennis*)
- **White dutch clover** (*Trifolium repens*)
- **Common blue violet** (*Viola sororia*)
- **Calico aster** (*Symphyotrichum lateritiflorum*)
- **Self heal** (*Prunella vulgaris*)
- **Blanket flower** (*Gaillardia*)

Fescue grasses to use: fine, creeping, chewings, hard (4 lbs seed / 1000 ft). Let grass grow longer to encourages deeper roots to keep lawn hydrated on hotter days.

How to install a pollinator lawn *( overseed method)*

1. Mow short or scalp existing lawn to 1” or less so you can see some dirt.
2. Aerate the lawn area by perforating the soil/lawn with small holes.
3. Add compost. Rake in compost with a hard rake leaving approx. 1” of compost over the top of the lawn. (6 yds/4000 sq ft).
4. Seed liberally over compost.
5. Water regularly for 2 weeks, and decrease watering over time.
6. Do not use herbicides, and avoid insecticides. For Japanese beetle grubs, use B.T.

Maintenance:

- **Pollinator lawns require a medium level of maintenance** until they are established. Once established (2-3 years), pollinator lawns are low maintenance.
- **Mowing:** Keep lawn at least 4” tall. Taller lawns shade the ground, help prevent soil from drying and discourage weed seeds from sprouting. Refrain from mowing especially when flowers are blooming. Optimally, mow lawn to 4” inches or more. Use mulching mower.
- **Soil health:** Compost will help improve soil immensely, as well as nitrogen-fixing plants such as White clover. Lower rates of organic fertilizer such as 10-0-10; Sustane greens grade or milorganite can be added later in spots where needed.
- **Weeding:** Use hand weeding to remove unwanted weeds. Diligent weeding at the start will pay off later as the weeds subside and the new pollinator lawn prospers.
- **Overseed:** Add more perennials over time, and selectively seed areas in subsequent seasons to achieve desired flower/grass ratio.
Share your space with the docile wild native bees
460+ species of wild bees are estimated in Minnesota

**ENDANGERED**
Rusty patched bumble bee - Bombus affinis
if you see me, report sighting to bumblebeewatch.org
www.fws.gov/midwest/endangered/insects/rpbb

Mason bees - Osmia
cavity nesters, use mud

Digger bees - Anthophorini
ground nesters

Minerals bees - Andrena
ground nesters

Resin bees - Megachile (family)
nest in hollow stems or wood

Cuckoo bees
of different bee lineages

Sweat bees - Halictidae
nest in ground or wood

Cellophane bees - Colletes
nest in hollow twigs or ground

Small carpenter bees - Ceratina
nest in wood

**not a wild bee**

Honey bees **- Apis
nest in colony hives

Long horned bees - Melissodes
nest in ground or banks

Leafcutter bees - Megachilidae (family)
cavity nesters

**photos: Heather H•lm, Laura Schneider**
LEPIDOPTERA: Butterflies, Moths, & Skippers

Butterflies need both host and nectar plants

Butterfly Gardening: ncipmhort.cfans.umn.edu/butterflies

150 Species of butterflies and skippers are estimated in Minnesota
MINNESOTA BUTTERFLIES

www.butterfliesandmoths.org

Family Hesperidae
Subfamily Pyroninae
Silver-spotted Skipper
Epargyreus clarus

Hoary Edge
Achalarus lyciades

Southern Cloudy Wing
Thorybes bathylius

Northern Cloudy Wing
Thorybes pylades

Dreamy Dusky Wing
Erynnis icelus

Sleepy Dusky Wing
Erynnis brizo

Juvenal’s Dusky Wing
Erynnis juvenalis

Horace’s Dusky Wing
Erynnis horatius

Mottled Dusky Wing
Erynnis martialis

Columbine Dusky Wing
Erynnis lucilus

Wild Indigo Dusky Wing
Erynnis baptisdae

Persius Dusky Wing
Erynnis persius

Grizzled Skipper
Pyrgus centaureae

Checkered Skipper
Pyrgus communis

Common Sooty Wing
Pholisora catullus

Subfamily Hesperiinae

Arctic Skipper
Carterocephalus palaemon

Least Skipper
Ancylxoya numa

Family Pieridae

Subfamily Lycaeninae
American Copper
Lycaena phlaeas

Great Copper
Lycaena phlaeas

Bronze Copper
Lycaena hylas

Bog Copper
Lycaena epitanythe

Dorcas Copper
Lycaena dorcas

Purplish Copper
Lycaena heliolepis

Subfamily Theclinae
Coral Hairstreak
Satyrium titus

Acadian Hairstreak
Satyrium acadicum

Edwards’ Hairstreak
Satyrium edwardsii

Banded Hairstreak
Satyrium calanus

Hickory Hairstreak
Satyrium caryaevorum

Striped Hairstreak
Satyrium liparops

Olive Hairstreak
Mitoura grimea

Brown Elfin
Incisalia augustinus

Hoary Elfin
Incisalia polia

Frosted Elfin
Incisalia irus

Henry’s Elfin
Incisalia henrici

Family Lycaenidae

Subfamily Mileiinae
Harvester
Feiseca tarquinii

Eastem Pine Elfin
Incisalia niphon
### Subfamily Theclinae
- **Western Pine Elf**
- **Incisalia erythraea**
- **Gray Hairstreak**
- **Strymon melinus**

### Subfamily Heliconiinae
- **Variegated Fritillary**
  - Euptoieta claudia
- **Great Spangled Fritillary**
  - Speyeria cybele
- **Aphrodite**
  - Speyeria aphrodite
- **Regal Fritillary**
  - Speyeria idalia
- **Atlantic Fritillary**
  - Speyeria atlantis
- **Mormon Fritillary**
  - Speyeria mormonia
- **Bog Fritillary**
  - Boloria eunomia
- **Silver-bordered Fritillary**
  - Boloria selene
- **Meadow Fritillary**
  - Boloria bellona
- **Frigga Fritillary**
  - Boloria frigga
- **Freija Fritillary**
  - Boloria freija
- **Titania Fritillary**
  - Boloria titania

### Subfamily Nymphalinae
- **Bordered Patch**
  - Chlosyne lacinia
- **Gorgone Checkerspot**
  - Chlosyne gorgone
- **Silvery Checkerspot**
  - Chlosyne nycteis
- **Harris' Checkerspot**
  - Chlosyne harrisi
- **Texas Crescent**
  - Phycidex texana
- **Pearl Crescent**
  - Phycidex tharos
- **Tawny Crescent**
  - Phycidex batesii
- **Northern Crescent**
  - Phycidex coctoja
- **Anicia Checkerspot**
  - Euphydryas anicia
- **Baltimore Checkerspot**
  - Euphydryas phaeton
- **Question Mark**
  - Polygonia interrogationis
- **Hop Merchant or Comma**
  - Polygonia comma
- **Satyr Anglewing**
  - Polygonia satyrus
- **Green Comma**
  - Polygonia faunus
- **Hoary Comma**
  - Polygonia gracilis
- **Gray Comma**
  - Polygonia progne
- **Compton's Tortoise Shell**
  - Nymphalis vau-album
- **Mourning Cloak**
  - Nymphalis antiopa
- **Milbert's Tortoise Shell**
  - Nymphalis milberti
- **American Painted Lady**
  - Vanessa virginiensis
- **Painted Lady**
  - Vanessa cardui

### Subfamily Limenitidinae
- **White Admiral**
  - Limenitis arthemis arthemis
- **Banded Purple**
  - Limenitis arthemis X proserpinus
- **Red-spotted Purple**
  - Limenitis arthemis astyanax
- **Viceroy**
  - Limenitis archippus

### Subfamily Danainae
- **Monarch**
  - Danaus plexippus

### Subfamily Anarturinae
- **Hackberry Emperor**
  - Asterocampa celtis
- **Tawny Emperor**
  - Asterocampa clyton

### Subfamily Satyrinae
- **Northern Pearly Eye**
  - Enodia anethedon
- **Eyed Brown**
  - Satyridae eurydice
- **Appalachian Eyed Brown**
  - Satyridae appalachia
- **Little Wood Satyr**
  - Megisto cymela
- **Common Ringlet**
  - Coenonympha tullia

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# Backyard Blooms for Pollinators

**Honey bee** on hyssop  
**Hair streak** on butterfly weed  
**Bumble bee** on tomato  
**Monarch** on blazing star

<table>
<thead>
<tr>
<th>Latin name</th>
<th>Common name</th>
<th>Bloom Color(s)</th>
<th>Early bloom</th>
<th>Mid bloom</th>
<th>Late bloom</th>
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</thead>
<tbody>
<tr>
<td><strong>Agastache</strong></td>
<td>Anise hyssop</td>
<td>Purple</td>
<td>X</td>
<td>X</td>
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<tr>
<td><strong>Amelanchier</strong></td>
<td>Serviceberry</td>
<td>White</td>
<td>X</td>
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<tr>
<td><strong>Allium</strong></td>
<td>Onions</td>
<td>Purple</td>
<td>X</td>
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<tr>
<td><strong>Asclepias</strong></td>
<td>Milkweeds</td>
<td>Variety</td>
<td>X</td>
<td></td>
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<tr>
<td><strong>Coreopsis</strong></td>
<td>Coreopsis</td>
<td>Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Echinacea</strong></td>
<td>Coneflowers</td>
<td>Pink-purple</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Eurybia</strong></td>
<td>Asters</td>
<td>Variety</td>
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<tr>
<td><strong>Eutrochium</strong></td>
<td>Joe-pye weeds</td>
<td>Pink</td>
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<tr>
<td><strong>Helianthus</strong></td>
<td>Sunflowers</td>
<td>Yellow</td>
<td>X</td>
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<tr>
<td><strong>Liatris</strong></td>
<td>Blazing stars</td>
<td>Purple</td>
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<tr>
<td><strong>Lupinus perennis</strong></td>
<td>Wild lupine</td>
<td>Purple</td>
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<tr>
<td><strong>Malus</strong></td>
<td>Crabapples</td>
<td>Pink-red</td>
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<td><strong>Mellilotus officinalis</strong></td>
<td>Yellow sweet clover</td>
<td>Yellow</td>
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<td><strong>Monarda</strong></td>
<td>Bee balm, Wild bergamot</td>
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<td><strong>Nepeta</strong></td>
<td>Catnip, catmint</td>
<td>White-purple</td>
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<tr>
<td><strong>Pycnanthemum</strong></td>
<td>Mountain mints</td>
<td>White</td>
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<td>X</td>
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<tr>
<td><strong>Salix</strong></td>
<td>Willows</td>
<td>White</td>
<td>X</td>
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<tr>
<td><strong>Salvia</strong></td>
<td>Sages</td>
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<tr>
<td><strong>Sedum</strong></td>
<td>Stonecrop sedum</td>
<td>Pink</td>
<td>X</td>
<td>X</td>
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<tr>
<td><strong>Solidago</strong></td>
<td>Goldenrods</td>
<td>Yellow</td>
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<tr>
<td><strong>Tradescantia</strong></td>
<td>Spiderworts</td>
<td>Purple</td>
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<tr>
<td><strong>Trifolium</strong></td>
<td>Clovers</td>
<td>Variety</td>
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<tr>
<td><strong>Vaccinium</strong></td>
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<tr>
<td><strong>Verbena</strong></td>
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<td>Purple</td>
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<td>X</td>
<td>X</td>
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<tr>
<td><strong>Zizia</strong></td>
<td>Golden alexander</td>
<td>Yellow</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>


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**Other Resources:**

- Pollinator Conservation Biocontrol and Best Practices, University of Minnesota, Krishik: ncipmhort.cfans.umn.edu
- Beneficial insects, University of Minnesota, Krishik: ncipmhort.cfans.umn.edu/beneficial-insects
- Pollinator plant list, Xerces Society: xerces.org/publications/plant-lists/pollinator-plants-great-lakes-region
- Bee and plant species lists, Heather Holm: [www.pollinatornativeplants.com/plant-lists--posters.html](www.pollinatornativeplants.com/plant-lists--posters.html)
- Planting guide, Pollinator partnership: [www.pollinator.org/guides](www.pollinator.org/guides)
- Habitat and gardening factsheets, Pollinator friendly alliance: [www.pollinatorfriendly.org/plants-and-gardening](www.pollinatorfriendly.org/plants-and-gardening)
- Monarchs, Monarch Joint Venture: [monarchjointventure.org](monarchjointventure.org)
- Rusty patch bumble bee: [Bumblebeewatch.org](Bumblebeewatch.org)