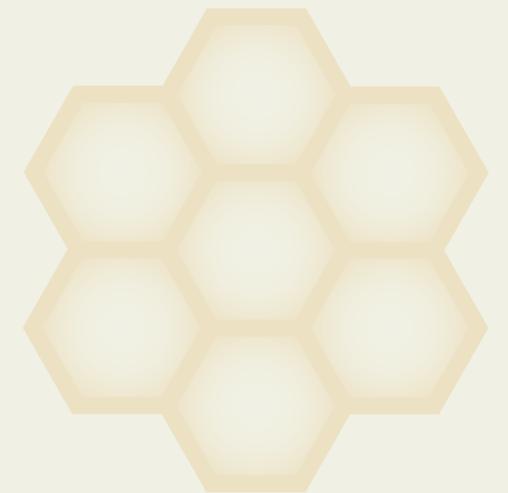


What's the BUZZ about pollinators and roadsides?



Did you know...

More than one third of all human food comes from plants pollinated primarily by bees.

Bee biologists report a reduction in the abundance and distribution of once common bumble bees.

Bumble bees pollinate some crops better than honey bees.

Managing roadsides for bees and butterflies will create important habitat for wildlife, and may support the pollination needs of neighboring farms.

With 4 acres of open space lost to development every minute, roadsides are too important to be neglected (U.S. Forest Service 2006).

Roadsides in the U.S. cover more than 10 million acres of land and support valuable habitat.

mndnr.gov



xerces.org



Bumble bee on butterfly weed



Bumble bee on purple coneflower



Monarch on blazing star



Bumble bee on lupine

Manage your roadsides for bees & butterflies

Pollination by animals is an essential ecosystem service. It is estimated that 60 to 80 percent of the world's 250,000 flowering plants depend on animals—mostly insects—for pollination. Eighty-seven of the world's 124 most commonly cultivated crops are animal- or insect-pollinated forage plants, such as alfalfa and clover, that provide feed for livestock.

In the United States, the National Research Council reported noteworthy losses of both managed and wild pollinators (2007). Habitat loss, pesticide use, diseases, parasites, and the spread of invasive species are the major causes of pollinator decline. Threats to pollinator communities affect not only pollinators themselves but also natural ecosystems and agricultural productivity.



Photograph: Carmelita Nelson, MN DNR

Food requiring pollination: tomatoes, peppers, blueberries, strawberries, cranberries, raspberries, apples, melons, sunflowers, pumpkins, plums, squash, and canola.

Roadsides as habitat

Though roadsides are not a substitute for wildlands, they have value as habitat for birds, small mammals, amphibians, reptiles, ants, and beetles. Roadside habitats also provide refuge for pollinators.

In environments substantially altered by urbanization or agriculture, marginal habitats such as roadsides, drainage ditches, and field edges may be especially important for the conservation of biodiversity. Often the only seminatural areas remaining within a landscape, these edges provide pollinators with places to forage for food and nest, while also helping to link fragmented habitats.



Photograph by Carmelita Nelson, MN DNR

Roadsides with native plants host 35 percent more bee species and twice as many bees as roadsides dominated by non-native plants.

Natural history of pollinators

Native pollinators have two basic habitat requirements: food and somewhere to lay their eggs. Understanding which features in the landscape provide these resources is essential to maintaining or enhancing habitat for pollinators.

Flowers

Pollinator habitat should have a diversity of flowers that bloom from early spring until late fall to sustain a diverse group of pollinators throughout the growing season.

Research in Kansas found that roadsides planted with native plants supported more abundant and species-rich bee communities than roadsides dominated by non-native grass (brome) and flowers (sweet clover and crownvetch). Butterflies also benefit from the presence of native plants. Roadsides replanted with native prairie grasses and wildflowers had significantly more habitat-sensitive butterfly species, such as the regal fritillary (*Speyeria idalia*) and Delaware skipper (*Anatrytone logan*), than non-native grassy or weedy roadsides.

MN Native Wildflowers with High Pollinator Value

Blazing star	<i>Liatrix</i>
Compass plant	<i>Silphium</i>
Fireweed	<i>Epilobium</i>
Gentian	<i>Gentiana</i>
Joe Pye weed	<i>Eupatorium</i>
Lobelia	<i>Lobelia</i>
Lupine	<i>Lupinus</i>
Mountain mint	<i>Pycnanthemum</i>
Obedient plant	<i>Physostegia</i>
Purple coneflower	<i>Echinacea</i>
Wild rose	<i>Rosa</i>

MN Native Wildflowers with Very High Pollinator Value

Aster	<i>Aster</i>
Bergamot	<i>Monarda</i>
Culver's root	<i>Veronicastrum</i>
Goldenrod	<i>Solidago</i>
Giant hyssop	<i>Agastache</i>
Leadplant	<i>Amorpha</i>
Milkweed	<i>Asclepias</i>
Partridge pea	<i>Chamaecrista</i>
Penstemon	<i>Penstemon</i>
Prairie clover	<i>Dalea</i>
Spiderwort	<i>Tradescantia</i>
Sunflower	<i>Helianthus</i>

Sites for nesting

Nearly 70 percent of bee species nest underground, digging slender tunnels off which they excavate cells for their eggs. Other bees choose to nest in cavities, chewing into the pithy center of stems, or clearing out existing holes, in which they create a linear series of partitioned cells. Some bees need specific nest-building materials such as mud, resin, or flower petals, which they use to form the partitions. Bumble bees are social bees, and require a small cavity such as an abandoned mouse nest to house their annual colony. Pollinator habitat should include a range of nesting substrates to provide for the differing nesting requirements of pollinators.

Landscape linkages

Roadsides may serve as corridors for pollinators and other wildlife. The linear structure of roadsides provides continuity within the surrounding landscape. Habitat-sensitive butterflies are much less likely to leave a roadside planted with native vegetation, suggesting that for some butterflies, roadside restorations could serve as protective corridors. Many milkweed (*Asclepias*) species grow readily in roadsides. Monarch butterfly (*Danaus plexippus*) larvae feed exclusively on milkweed, therefore making milkweed essential for monarch reproduction.



Photograph by Stephen Munafo

Monarch butterfly larvae feed exclusively on milkweed.

Traffic and wildlife

Movement is fundamental to an animal's life, and roads can be barriers to animals, dividing and blocking movement between habitats. The degree to which roads are restrictive to animals appears to vary greatly between species.

Some insects are more vulnerable to traffic mortality than others. That pollinating insects do die as a result of collisions with passing vehicles is certain, but further quantifying the impacts of traffic on pollinators is challenging and studies of the impacts of roads on insects are few.

Surprisingly, a roadside inventory of dead butterflies along roads in Illinois found that observed mortality was highest in intermediate levels of traffic, with lowest mortality at the highest and lowest levels of traffic. In Iowa, research found that more butterflies were killed in predominately grassy roadsides than in roadsides planted with prairie vegetation, and only 2.8 percent of butterflies observed crossing the road were hit by cars.



Photograph by David Capparet, MN State University

The width of the roadside and proximity to traffic does not matter to bees. Bumble bee on goldenrod.

A study of butterfly diversity, mortality, and movement within roadsides concluded that roads could not be considered barriers to the movement of any butterflies they observed. Although between .6 and 7 percent of butterfly species were killed by vehicles, the authors considered those mortalities to be small compared to mortality due to natural factors. Such research suggests that the benefit from roadside native habitat outweighs the hazard from passing vehicles.



Photograph by Mike Halverson, MN DNR

Pollinators need a succession of blooming flowers. Swallowtail butterfly on vervain.

For many roadside managers, the biggest concern about the presence of taller native vegetation along roads is that it will increase the number of accidents involving deer. However, evidence from studies indicates that the presence of tall vegetation does not increase deer-related collisions. Also, because deer often prefer to eat tender new growth of vegetation over tough older growth, allowing native plants to grow without frequent mowing may encourage fewer deer to browse in roadsides.

Tips for helping bees & butterflies

Enhancing flower diversity

- To provide pollinators with continuous blooms, plant seed mixes that include flowers with differing but overlapping bloom times.
- Use local ecotype grasses and wildflowers best suited to the climate, soil type, and location of the intended habitat site.
- For optimal pollinator habitat use a mix of about 50 percent forb seed and 50 percent grass seed.

Providing nest sites

- Nearly 70 percent of bee species nest underground. Some species prefer sunny exposed slopes while others prefer level ground.
- Bees that nest in the ground often prefer to dig their nests in patches of exposed earth. Native bunch grasses such as little bluestem (*Schizachyrium scoparium*) and Indiangrass (*Sorghastrum nutans*) tend to grow in dense clumps, leaving small patches of bare ground exposed.

Reducing the impact of mowing and spraying

- Mow once a year in late autumn, when pollinators are not flying. Ideally, mowing every 3 to 5 years has the least impact on pollinators and grassland birds.
- Choose a pesticide that is the least toxic and has low residue to control weeds. Spray in the early morning or evening when pollinators are less active.

For more information

Web sites

- The Xerces Society: Regional information on plants, guidance on providing nest sites, and detailed guidelines for habitat creation and management in a variety of landscapes. www.xerces.org/pollinator-conservation
- Minnesota Department of Natural Resource Roadsides for Wildlife Program: Information on how to enhance roadside habitat for wildlife, free signs, educational materials. www.mndnr.gov/roadsidesforwildlife
- Minnesota Department of Transportation: Information about the use of native plants for the state's roadside management program. www.dot.state.mn.us
- University of Minnesota Bee Lab: Provides the latest science-based education and outreach on sustainable honey beekeeping and general bee ecology in Minnesota. www.extension.umn.edu/Honeybees
- Federal Highway Administration: Roadside vegetation management program. www.fhwa.dot.gov/environment/vegmgt
- National Roadside Vegetation Management Association: Integrated Roadside Vegetation Management guide. www.dot.state.mn.us/environment/pdf_files/irvm_howto.pdf
- Monarch Watch: Information about providing habitat for monarch butterflies and monitoring migrations. www.monarchwatch.org
- Minnesota Native Wildflower/Grass Producers Association. Click on Consumer Directory for a listing of native wildflower and grass producers in Minnesota. www.mnnwga.org

Books

- Harper-Lore, B., and M. Wilson (editors). 2000. *Roadside Use of Native Plants*. Washington DC: Island Press. Read online at: www.fhwa.dot.gov/environment/rdsduse/index.htm
- Shepherd, M., S. L. Buchmann, M. Vaughan, and S. H. Black. 2003. *Pollinator Conservation Handbook*. Portland: The Xerces Society. Available from: www.xerces.org/books-pollinator-conservationhandbook/



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The need for bees

