

Pollinator Best Practices



Overview

The National Capital Planning Commission (NCPC) has a responsibility to review federal plans and projects in the National Capital Region. Many of these projects include new or restored landscape plans that propose trees, shrubs, grasses, vines, groundcovers, perennials, and/or meadows. Policies of the *Comprehensive Plan for the National Capital* support sustainable practices in federal landscape development to include plants that support pollinator species. This guide is intended to summarize best practices for incorporating pollinator-friendly plant species, including those that support monarch butterfly and honey bee habitats, in federal landscapes subject to review by NCPC.

This resource guide is for general information purposes, and is not a regulatory document.

What Are Pollinators?

A pollinator is anything that helps carry pollen from the male part of the flower (stamen) to the female part of the same or another flower (stigma). The movement of pollen must occur for the plant to become fertilized and produce fruits, seeds, and young plants.¹ Some plants are self-pollinated, while others are pollinated by wind, water, or insects and animals such as bees, wasps, moths, butterflies, birds, flies, and small mammals. Butterfly and insect pollinators are lured to herbaceous flowering plants (also referred to as forbs) that offer pollen, an important source of protein, and nectar, a concentrated sugar solution. The different flower shapes, colors, patterns, and scents are all part of the plant's efforts to attract pollinators.²

Pollinators are extremely important for the health and longevity of the human and natural environments. At least 75 percent of all the flowering plants on earth are pollinated by insects and animals. This amounts to more than 1,200 food crops and 180,000 different types of plants that help to stabilize soil, clean air, supply oxygen, and support wildlife. They are also part of a healthy economy. In the United States alone, pollination by honey bees contributed to over \$19 billion of crop production in 2010, while pollination by other insect pollinators contributed to nearly \$10 billion of crop production.¹

For more information about NCPC's Legislative Authorities visit <https://www.ncpc.gov/about/authorities/>

Pollinator Decline

Recent surveys have shown disturbing population declines in insect pollinator species, such as native bees, flies, butterflies, and beetles and even local extinctions of select pollinator species across Europe and the United States. A comprehensive 2017 review by 84 of the leading world scientists (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) reported that in some parts of the world 40 percent of bees and butterflies may be threatened or have declining populations.² Beekeepers have been losing an average of 40 percent of their managed European honey bee colonies every year, compared to a 10 percent historic loss. Monarch butterflies have declined 85% in two decades. The western population — which overwinters in California as part of its international migration — has suffered a 99% decline. Overall, the migrating monarch populations are less than half the size they need to be to avoid extinction.³

The cause of pollinator decline is attributed to several factors: development of natural habitats fragments pollinator habitat; invasive plant species degrade natural habitats by reducing plant diversity; urban, suburban, and agricultural landscapes offer limited nesting sites; diseases, parasites, and a changing climate, and exposure to pesticides.³

Guidance on How Federal Plans and Projects Can Support Pollinators

In 2014, President Obama issued a Presidential Memorandum – *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*. This memorandum acknowledged the substantial contribution pollinators make to the health and vitality of the citizens of the United States and its economy. It also established the Pollinator Health Task Force to develop a National Pollinator Health Strategy. The Task Force published the *National Strategy to Promote the Health of Honey Bees and Other Pollinators*⁴ which outlined a comprehensive approach to tackling and reducing the impact of multiple stressors on pollinator health. It also established goals to increase populations of honey bees, monarch butterflies, and pollinator habitat acreage. Federal agencies used this guidance to establish and implement their own pollinator-positive policies. For example, the U.S. General Services Administration (GSA) and the Council on Environmental Quality (CEQ) jointly published an addendum to the *Sustainable Practices for Designed Landscapes* titled, “Supporting the Health of Honey Bees and other Pollinators.” The addendum provided new information on landscape design and maintenance as part of the National Pollinator Health Strategy.

The U.S. Department of Agriculture (USDA) developed and maintains Technical Guides as primary scientific reference for the National Resource Conservation Service (NRCS). The Technical Guides used in each field office are localized so that they apply specifically to the geographic area for which they are prepared and contain technical information about the conservation of soil, water, air, and related plant and animal resources. The USDA’s 2022 *Maryland Conservation Planting Guide* and 2023 *Maryland Wildflower Habitat Establishment Guide* are official parts of the Maryland/D.C. Area Field Office Technical Guide (FOTG) with guidance, information, recommendations, and specifications for the establishment of native plants for wildlife, pollinators, and beneficial insect habitat, with a focus on providing herbaceous pollen and nectar sources for adult pollinators and foliage for their larvae.

NCPC defers to the above resources for guidance on best practices to support pollinator-friendly landscapes in the review of federal plans and projects in the National Capital Region.

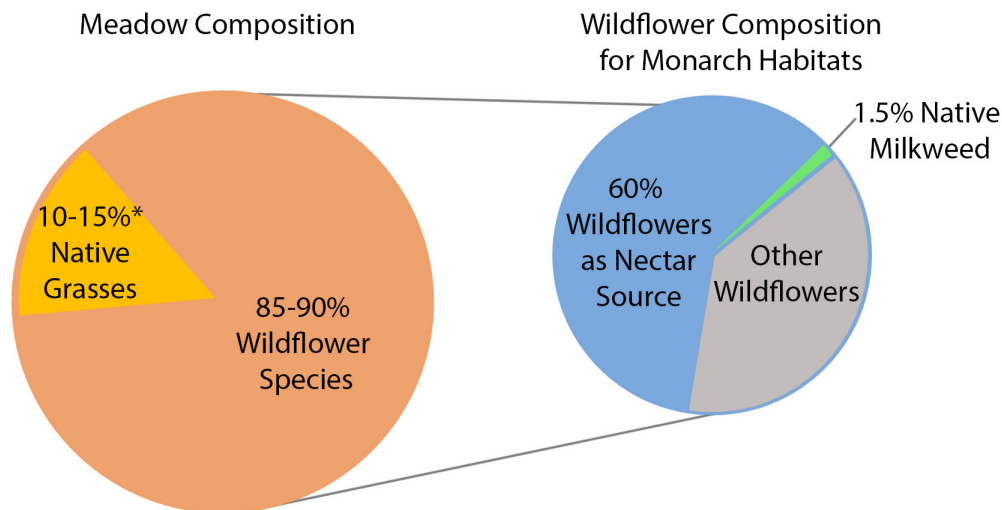
Federal plans and projects can support pollinators by specifying and installing plant species that support pollinator habitats. Per *Supporting the Health of Honey Bees and Other Pollinators*, “The objective is to promote the overall lifecycle of pollinators at Federal facilities - improved foraging, reproduction, shelter, and hibernation.” In summary, a pollinator friendly habitat will provide:

- Food for pollinators (pollen and nectar)
- Shelter for pollinators
- Nest sites and materials for pollinators
- Larval hosts for pollinators

Pollinator Best Practices

Meadow Landscapes

The USDA's *Maryland Conservation Planting Guide* recommends the following minimum grass-to-forb ratios for pollinator meadows:



*For herbaceous plantings, non-competitive native bunch grasses (e.g., broomsedge, little bluestem, purpletop) may be included at a low rate -- less than 25% of the mix for ecological stability, weed suppression, stormwater management, and wildlife habitat support.

The USDA's 2023 *Maryland Wildflower Habitat Establishment Guide* further suggests the following in meadow plant species selection:

100% Native Species. Focus plant selection on native perennials that provide pollen- and nectar-rich forage for pollinators and beneficial insects, and larval food plants for butterflies and moths. Native trees and shrubs are essential components of habitat needed to support a wide variety of wildlife and should also be considered for inclusion when designing wildflower plantings.

Bloom Requirements. Select individual species that, in combination, provide consistent and adequate floral resources throughout the growing season. Herbaceous plantings must include a minimum of 3 species from each bloom period (spring, summer, fall). A more diverse mix is encouraged. If woody species will be planted, consider including species that bloom early in the spring (e.g., spicebush, black or red chokeberry, Virginia sweetspire, black locust, black cherry, tulip poplar) when other nectar and pollen sources are not widely available.

Wildflowers, also referred to as herbaceous flowering plants or forbs, are the backbone of pollinator habitats. They offer food in the form of pollen (protein) and nectar (sugar) for pollinator animals and insects.

Pollinator animals and insects also need shelter, nest sites, and places to lay eggs which can be provided by forbs or other types of plants like grasses, sedges, trees, and shrubs. Pollinator-friendly habitats have a diversity of plant species that meet these needs year-round.

Non-Meadow and Designed Landscapes

Non-meadow and designed landscapes should also support pollinator habitats. While meadows primarily consist of herbaceous flowering plants, non-meadow and designed landscapes may primarily consist of trees, shrubs, perennials, and other types of vegetation.

For designed landscapes, *Supporting the Health of Honey Bees and Other Pollinators*, developed in partnership between CEQ and GSA, recommends the following:

- Choose plants that support the forage, reproduction, shelter and/or hibernation of pollinators specific to your ecoregion.
- Choose plants that are best for your ecoregion; preferably native plants to which pollinators are most accustomed. Native plants evolved along with native pollinator species and are well adapted to thrive in local conditions. Pay particular attention to sunlight, moisture, and soil quality needs, as many native pollinator species thrive in direct sunlight without the need for irrigation or soil enhancement. These actions may prove detrimental by encouraging unwanted weed species. Using some non-native plants is acceptable as long as they are not considered invasive.
- Seasonal variety is a major consideration. Choose plants that bloom at different times across seasons. While it is important to consider periods of peak pollinator activity in an ecoregion, also have pollen sources available when little else is in bloom. For example, common witch hazel (*Hamamelis virginiana*) blooms October to December. *Per GSA's P100 Facilities Standards for the Public Building Service, a minimum of three plant species from each bloom period (spring, summer, fall) is recommended.*
- Consider all types of plants. There are trees, shrubs, vines, perennials, and annuals that contribute to pollinator habitats. With some planning it is easy to match your plants to the needs in the landscape. For example, a hot and sunny entrance to a building may benefit greatly from a large shade tree with blooms to attract pollinators. Or a small highly visible area can be planted with attractive pollen rich flowers in display beds or containers.
- Acquire seeds and plants from nurseries that do not treat their plants with systemic insecticides.
- Take care when selecting plant cultivars. Some plants are selected for traits attractive to humans but not pollinators (size, color, shape). Sometimes these selections or cultivars of plants lose the traits/indicators on which pollinators rely. For instance the coneflower (*Echinacea purpurea*) and many of its cultivars are excellent for pollinators, whereas a number of double-flowered *Echinacea* cultivars have little appeal for pollinators. Therefore, prioritize the original native species whenever possible.

While milkweed is not specifically identified in the above points, milkweed meets several of the criteria and should be included in non-meadow and designed landscapes to support monarch butterfly habitat as described in this guide.

Why Milkweed?

Monarch butterflies are the only butterfly species that completes a two-way migration across North America every year for overwintering in California and Mexico. They play a critical part in sustaining ecosystems along the way.⁵ Monarch caterpillars feed exclusively on the leaves of milkweed, the only host plant for this iconic butterfly species. Milkweed also contains various levels of cardiac glycoside compounds which render the plants toxic to most insects and animals. For some insects, the cardiac glycosides become a defense. They can store them in their tissue which renders them inedible or toxic to other animals. Monarch butterflies use this defense and birds leave them and the caterpillars alone. As such, milkweed is critical for the survival of monarchs. Without it, they cannot complete their life cycle and their populations decline.⁶ A 2002 study by the U.S. Geological Survey (USGS) and partners found that 3.62 billion milkweed stems are needed to reestablish the monarch population, but only 1.34 billion stems remain in the United States.⁷

There are over 100 different species of milkweeds that are considered native to North America⁸, one of which stands out - *Asclepias syriaca*, or common milkweed. According to the U.S. Forest Service, Common milkweed is, "...among the most important food plants for Monarch caterpillars," and, "Nature's mega food market for insects. Over 450 insects are known to feed on some portion of the plant. Numerous insects are attracted to the nectar-laden flowers and it is not at all uncommon to see flies, beetles, ants, bees, wasps, and butterflies on the flowers at the same time." The Xerces Society has also identified Common milkweed as a priority species for habitat restoration efforts.⁹ Common milkweed also quickly spreads through rhizomatous roots and forms colonies which aids in its longevity. Therefore, common milkweed is clearly an important species that is critical to the survival of monarch butterflies.

Studies have shown that Monarch butterflies lay fewer eggs on some milkweed species, such as *Asclepias tuberosa*, than others. However, they also indicate that specialization on one milkweed species is not the optimal strategy for monarch butterflies. Such studies demonstrate that monarch butterflies lay more total eggs when a diversity of milkweeds are present than compared with the presence of a single species alone. They further suggest that planting the right milkweed species for the soil type, temperature, and rainfall amount can have massive impacts on the quality of milkweed plants, which influences the monarch's choice of where to lay its eggs.¹⁰

Popular milkweed species for the Mid-Atlantic Region include:

- *Asclepias syriaca* (Common Milkweed)
- *Asclepias tuberosa* (Butterfly Milkweed)
- *Asclepias incarnata* (Swamp Milkweed)
- *Asclepias variegata* (White Milkweed)
- *Asclepias verticillate* (Whorled Milkweed)
- *Asclepias purpurascens* (Purple Milkweed)

Biodiversity is important to any healthy ecosystem. Planting diverse species of milkweed not only supports greater egg production, it provides resiliency in the event that a pest or disease, or climate changes develop that are detrimental to a specific species.

Within meadows and designed landscapes, common milkweed should be planted along with a diversity of other milkweed species on federal landscape plans to the fullest extent possible and as appropriate for the site conditions.

Benefits of Native Grasses and Sedges

Native grasses and sedges (*Carex* spp.) are often overlooked when it comes to pollinators in both meadow and designed landscapes. While they do not produce nectar, these wind-pollinated species serve an important role in pollinator habitats. They provide larval hosts and food, and nesting material/structure for skipper butterflies and native bees, and they suppress weeds. The bunching habit and extensive root systems of native grasses and sedges also slow stormwater, reduce erosion, and sequester carbon. In addition, they support other wildlife habitat like birds and small mammals.^{11,12}

Examples of native grass species include:

- *Andropogon gerardii* (Big Bluestem)
- *Panicum virgatum* (Switchgrass)
- *Schizachyrium scoparium* (Little Bluestem)
- *Sorghastrum nutans* (Yellow Prairie Grass)

In addition to native grasses, sedges provide habitat value to invertebrates, reptiles, and amphibians. Birds and some mammals eat the seeds, and butterfly and moth caterpillars feed from the leaves. Sedges are also a very adaptable plant for

stormwater management as they can tolerate inundation and periods of dryness. Some sedges can also tolerate periodic mowing and are specified as an alternative to turfgrasses.

There are 669 sedge species native to North America, with some that support pollinators as pollen sources or as larval hosts, including¹³ :

- *Carex pennsylvanica* (Pennsylvania sedge)
- *Carex plantaginea* (Seersucker sedge)
- *Carex stricta* (Tussock sedge)
- *Carex vulpinoidea* (Fox sedge)

Historic, Cultural, and Commemorative Landscapes

The National Capital Planning Commission works with federal agencies as it seeks to preserve and enhance the extraordinary historical, cultural, and natural resources and federal assets of the National Capital Region to support the needs of the federal government and enrich the lives of the region's visitors, workers, and residents. As such, NCPC must balance the need to maintain historic, cultural, or commemorative significance with the demands for ecological sustainability. For some projects, such as memorials, the plant selections are often part of the commemorative theme and are a significant aspect of the design needed to achieve the desired visitor experience. Renovations to aging historic or cultural landscapes are also sometimes necessary to ensure their vitality for future generations.

Historic, cultural, and commemorative landscapes should consider pollinator-friendly plant species, including milkweed, early in the development of the project to best ensure that these species can be incorporated into the design. However, there may be circumstances where a plant species without known value to pollinators is appropriate for such projects to maintain or achieve the design intent. In these cases, projects should seek other forms of ecological value in the plants species that are specified such as their native range, stormwater benefits, or wildlife habitat value.

Additional Applicant Resources

[Council on Environmental Quality and the U.S. General Services Administration, Supporting the Health of Honey Bees and Other Pollinators](#)

[U.S. General Services Administration, P100 Facilities Standards for the Public Buildings Service](#)

[Smithsonian Gardens, Native Grasses and Sedges: Smart Choices for Better Landscapes](#)

[USDA Conservation Fact Sheet Native Herbaceous Plantings Establishment, Maintenance and Management for Wildlife Habitat and Pollinators](#)

[USDA, Maryland Conservation Planting Guide December 2022](#)

[USDA, Maryland Native Larval Host and Nectar Plants for Monarchs](#)

[USDA, Maryland Wildflower Habitat Establishment Guide Planting for Pollinators and Beneficial Insects January 2023](#)

[U.S. Forest Service, Plant of the Week – Common Milkweed \(*Asclepias syriaca* L.\)](#)

[Xerces Society, Milkweeds A Conservation Practitioner's Guide](#)

[Xerces Society, Native Plants for Pollinators & Beneficial Insects: Mid-Atlantic](#)

[Xerces Society, Monarch Nectar Plants Mid-Atlantic](#)

Endnotes

- 1 National Park Service, What is a Pollinator? <https://www.nps.gov/subjects/pollinators/what-is-a-pollinator.htm>
- 2 PennState Extension, Pollination and Pollinators <https://extension.psu.edu/pollination-and-pollinators>
- 3 Center for Biological Diversity, Saving the Monarch Butterfly https://www.biologicaldiversity.org/species/invertebrates/monarch_butterfly/
- 4 Pollinator Health Task Force, National Strategy to Promote the Health of Honey Bees and Other Pollinators <https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/Pollinator%20Health%20Strategy%202015.pdf>
<https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/Pollinator-Strategy%20Appendices%202015.pdf>
- 5 The Nature Conservancy, Monarch Butterflies Bring Together Conservation and Culture Between U.S. and Mexico <https://www.nature.org/en-us/what-we-do/our-priorities/tackle-climate-change/climate-change-stories/monarch-butterflies-us-mexico/>
- 6 National Wildlife Federation, Milkweeds for Monarchs <https://www.nwf.org/Garden-for-Wildlife/About/Native-Plants/Milkweed>
- 7 USGS, Billions More Milkweeds Needed to Restore Monarchs <https://www.usgs.gov/news/national-news-release/billions-more-milkweeds-needed-restore-monarchs>
- 8 PennState Extension, Milkweed Isn't Only for Monarchs <https://extension.psu.edu/milkweed-isnt-only-for-monarchs>
- 9 Xerces Society, Milkweeds A Conservation Practitioner's Guide, Plant Ecology, Seed Production Methods, and Habitat Restoration Opportunities, Page 90 <https://www.xerces.org/publications/guidelines/milkweeds-conservation-practitioners-guide>
- 10 Ecosphere Volume 9, Issue 1, Monarch butterflies do not place all of their eggs in one basket: oviposition on nine Midwestern milkweed species <https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/ecs2.2064>
- 11 Hoffman Nursery, A Different Kind of Pollinator Plant <https://hoffmannursery.com/blog/article/a-different-kind-of-pollinator-plant>
- 12 University of Minnesota, Native Grasses as Pollinator Food <https://grasses.cfans.umn.edu/>
- 13 Landscape Architecture Magazine, The Sedge Insurgency, adapted from Carex for the Mid-Atlantic Region, Mt. Cuba Center <https://mtcubacenter.org/trials/carex-for-the-mid-atlantic-region/>