



SELECTING PLANTS FOR POLLINATORS



A GUIDE FOR GARDENERS, FARMERS, AND LAND MANAGERS IN THE



NOVA SCOTIA HIGHLANDS



SYDNEY

GLACE BAY

ANTIGONISH

**POLLINATOR
PARTNERSHIP**
C A N A D A

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This is one of several guides for different regions of North America. We welcome your feedback to assist us in making the future guides useful. Please contact us at feedback@pollinator.org

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A NAPPC AND POLLINATOR PARTNERSHIP CANADA™ PUBLICATION



WHY SUPPORT POLLINATORS?

IN THEIR 1996 BOOK, *THE FORGOTTEN POLLINATORS*, Buchmann and Nabhan estimated that animal pollinators are needed for the reproduction of 90% of flowering plants and one third of human food crops. Each of us depends on these industrious pollinators in a practical way to provide us with the wide range of foods we eat. In addition, pollinators are part of the intricate web that supports the biological diversity in natural ecosystems that helps sustain our quality of life.

Abundant and healthy populations of pollinators can improve fruit set and quality, and increase fruit size. In farming situations this increases production per hectare. In the wild, biodiversity increases and wildlife food sources increase. Fruits such as blueberries and apples, in addition to vegetables and field crops such as alfalfa, are grown in Nova Scotia and rely on honey bees and native bees for pollination. Honey bees pollinate more than \$4 billion worth of crops in Canada each year.

Unfortunately, the numbers of many native pollinators are declining. They are threatened by habitat loss, disease, climate change, and the excessive and inappropriate use of pesticides. As a result research and conservation actions supporting native pollinators are increasingly active. Honey bee colony losses have significantly impacted beekeepers. Parasites, disease, pesticide use, insufficient nutrition, and transportation practices all impact honey bee health, and this in turn can impact the commercial pollination services honey bees provide. The efforts to understand the threats to commercial bees should help us understand other pollinators and their roles in the environment as well.

It is imperative that we take immediate steps to help pollinator populations thrive. The beauty of the situation is that by supporting pollinators' need for habitat, we support our own needs for food and support diversity in the natural world.

Thank you for taking time to consult this guide. By adding plants to your landscape that provide food and shelter for pollinators throughout their active seasons and by adopting pollinator friendly landscape practices, you can make a difference to both the pollinators and the people that rely on them.



Val Dolcini
President and CEO
Pollinator Partnership

“**FLOWERING PLANTS
ACROSS WILD,
FARMED AND EVEN
URBAN LANDSCAPES
ACTUALLY FEED THE
TERRESTRIAL WORLD,
AND POLLINATORS
ARE THE GREAT
CONNECTORS WHO
ENABLE THIS GIANT
FOOD SYSTEM TO
WORK FOR ALL WHO
EAT... INCLUDING US.**”

— ROGER LANG, CHAIRMAN,
POLLINATOR PARTNERSHIP



THIS REGIONAL GUIDE IS JUST ONE in a series of plant selection tools designed to provide you with information on how to plant local native plants for pollinators. Each of us can have a positive impact by providing the essential habitat requirements for pollinators including food, water, shelter, and enough space to raise their young.

Pollinators travel through the landscape without regard to property ownership or provincial boundaries. We've chosen to use the ecoregional classification system and to underscore the connections between climate and vegetation types that affect the diversity of pollinators in the environment.

The Canadian ecoregions are based on the National Ecological

Framework Report. The National Ecological Framework for Canada is a system created as a management tool and is used to predict responses to land management practices throughout large areas. This guide addresses pollinator-friendly land management practices in what is known as the Nova Scotia Highlands.

The seasonal cycle of sun and shade within the forests has created a changing pattern of bloom time for food plants and shelter needs for foraging, nesting, and migrating pollinators. Farms and residential areas provide a diverse range of soil types in both sunny and shady areas. With this diversity of locations many different species of plants may be used to improve pollinator habitats where they are lacking.

Long before there were homes and farms in the Nova Scotia Highlands, natural vegetation provided essential opportunities for wildlife, including pollinators. Farmers, land managers, and gardeners in this region have a wide palette of plants to use in the landscape. In choosing plants, aim to create habitat for pollinators that allow adequate food, shelter, and water sources. Most pollinators have very small home ranges. You will make a difference by understanding the vegetation patterns on the farm, forest, or neighbour's yard adjacent to your property. With this information in hand, your planting choices will better support the pollinators' need for food and shelter as they move through the landscape.

UNDERSTANDING THE NOVA SCOTIA HIGHLANDS



✿ The Nova Scotia Highlands is a part of the larger Atlantic Maritime Ecozone, and covers northern Nova Scotia. This ecoregion has warm rainy summers, and mild to cold winters. Most of the ecoregion is characterized by forestry, and other land uses include farming and localized blueberry and maple syrup production. Agricultural land use makes up 7% of this ecoregion. The main communities in the Nova Scotia Highlands are Sydney, Glace Bay, and Antigonish.

✿ Not sure about which region you live or work in?
Go to www.pollinator.org/guides and click on Ecoregion Locator for help.

✿ Over 14 811 square kilometres of Nova Scotia.

✿ Highland plateaus that range in elevation from 300 to 350 metres above sea level.

✿ Mean annual temperature is approximately 6 °C, with a mean summer temperature of 14.5 °C, and a mean winter temperature of -2.5 °C.

✿ Mean annual precipitation ranges from 1000-1600mm.

CHARACTERISTICS

✿ Ecoregion dominated by plateaus separated by lower-elevation uplands and lowlands.

✿ Major land features include the Cobequid Mountains, Antigonish Highlands, and Cape Breton Hills.

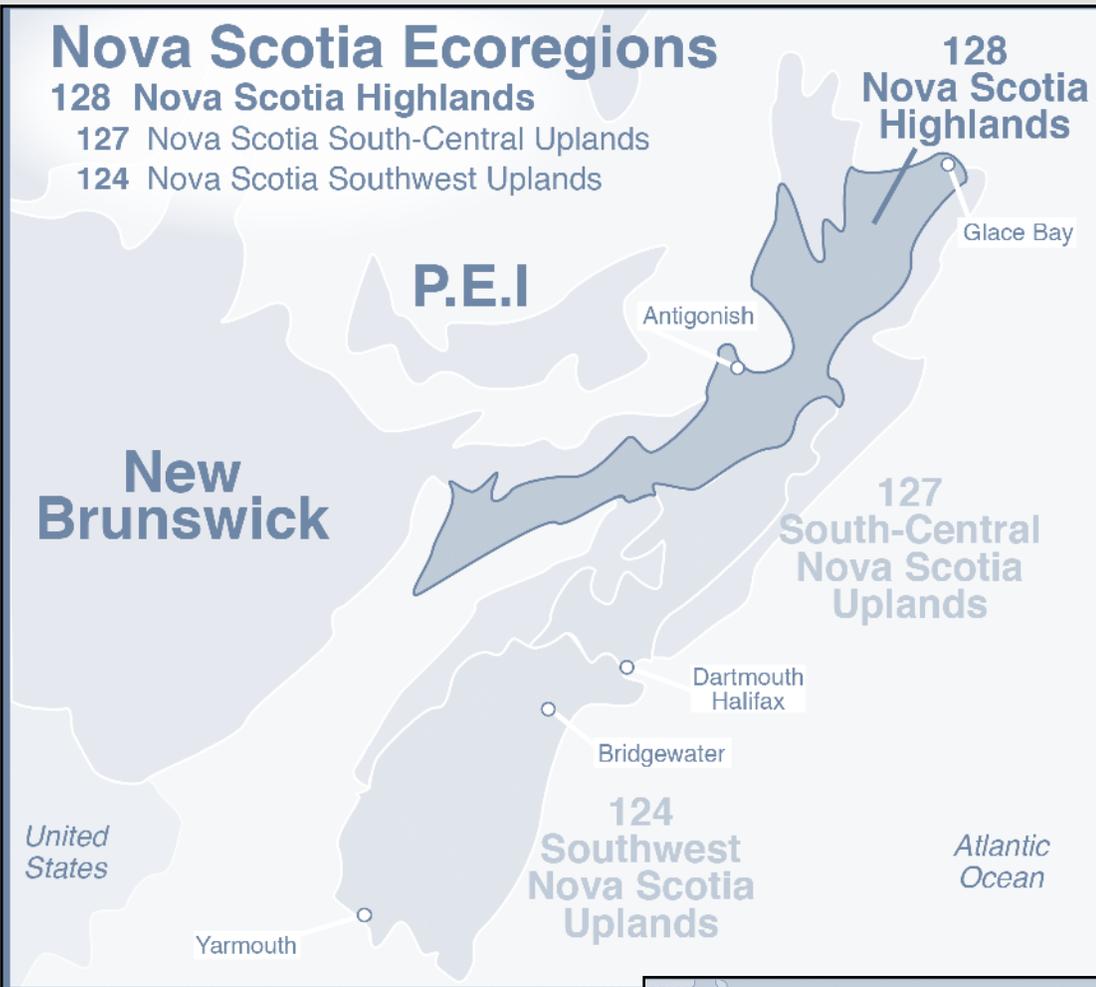
✿ Large mixed-wood forests with an abundance of yellow birch at higher elevations.

✿ Provides habitat for deer, moose, black bears, snowshoe hares, fishers, coyotes, and porcupines.



Nova Scotia Ecoregions

- 128 Nova Scotia Highlands
- 127 Nova Scotia South-Central Uplands
- 124 Nova Scotia Southwest Uplands



The Nova Scotia Highlands includes:

- Sydney
- Glace Bay
- Antigonish



MEET THE POLLINATORS



Ruby-throated Hummingbird, a summer species in the Nova Scotia Highlands.

Viceroy butterfly.



WHO ARE THE POLLINATORS?

BEES

Bees are the best documented pollinators in the natural and agricultural landscapes of the ecoregion. A wide range of wild and crop plants, including plants in the Aster and Rose Families, canola, specialty crops, and some forage crops benefit from bee pollinators.

Most of us are familiar with the colonies of honey bees that have been the workhorses of agricultural pollination for years in Canada. They were imported from Europe almost 400 years ago and continue to be managed for honey production and pollination services. There are over 800 species of native ground and twig nesting bees in Canada. Most of these bee species live a solitary life; a minority are social and form colonies or nest in aggregations.

Native bees visit and pollinate many crops; in many cases they are better at transferring pollen than honey bees. Our native bees can be encouraged to do more to support agricultural endeavours if their needs for nesting habitat are met and if suitable sources of nectar, pollen, and water are provided. Bees come in a variety of body shapes and sizes, and even have tongues of different lengths. Native bees visit the widest range of flowers and crops of any pollinator group.

Bumble bees (*Bombus* spp.) form small colonies, usually underground making use of old rodent burrows or dense thatches. They are generalists, feeding on a wide range of plant types from May to September and are important pollinators of tomatoes and blueberries.

Sweat bees (family Halictidae) are medium to small-sized, slender bees that commonly nest underground. Various species are solitary while others form loose colonies, nesting side-by-side. Other common solitary bees include mining bees (*Andrena* spp.), which nest underground and are common in the spring; leaf-cutter bees (*Megachile* spp.), which prefer dead trees or branches for their nest sites; and mason bees (*Osmia* spp.), which utilize cavities they find in stems and dead wood that they fill with mud.

BUTTERFLIES

Butterflies prefer open and sunny areas such as meadows and along woodland edges that provide bright flowers, water sources, and specific host plants for their caterpillars. Gardeners have been attracting butterflies to their gardens for some time. To encourage butterflies place flowering plants where they have full sun and are protected from the wind. They usually look for flowers that provide a good landing platform. Butterflies need open areas (e.g., bare earth, large stones) where they can bask, and moist soil from which they wick needed minerals. Butterflies eat rotten fruit and even dung, so don't clean up all the messes in your garden! By providing a safe place to eat and nest, gardeners can also support the pollination role that butterflies play in the landscape. In Nova Scotia, approximately seventy-three butterfly species have been regularly recorded. In the Nova Scotia Highlands, it is common to see the Silvery Blue (*Glaucopsyche lygdamus*), Clouded Sulphur (*Colias philodice*), Viceroy (*Limenitis archippus*), Great Spangled Fritillary (*Speyeria cybele*), and the Cabbage White (*Pieris rapae*).



MOTHS

Moths are most easily distinguished from butterflies by their antennae. Butterfly antennae are simple with a swelling at the end. Moth antennae differ from simple to featherlike, but never have a swelling at the tip. Butterfly bodies are not very hairy, while moth bodies are quite hairy and much more stout. In addition, butterflies typically are active during the day; moths at night. They are attracted to flowers that are strongly sweet smelling, open in late afternoon or night, and are typically white or pale coloured.

BEETLES

There are more than 9000 species of beetles in Canada and many of them can be found easily by looking inside flower heads. Gardeners have yet to intentionally draw beetles to their gardens, possibly because beetle watching isn't as inspiring as butterfly or bird watching. Yet beetles do play a role in pollination. Some have a bad reputation because they can leave a mess behind, damaging plant parts as they eat pollen. Beetle pollinated plants tend to be large, strong scented flowers and have the anthers and stigma exposed. Beetles are known to pollinate magnolia, paw paws, and yellow pond lilies.

FLIES

It may be hard to imagine why one would want to attract flies to the garden. However, flies are one of the most diverse group of pollinators. They include colourful flower flies and hover flies (*Syrphidae*), active bee flies (*Bombyliidae*), and tiny midges that visit many plant species. Like bees, flies are hairy and can easily

transport pollen from flower to flower. Flies primarily pollinate small flowers that bloom under shade and in seasonally moist habitats, but are also economically important as pollinators for a range of annual and bulbous ornamental flowers. Plants pollinated by flies include the American pawpaw (*Asimina triloba*), skunk cabbage (*Symplocarpus foetidus*), goldenrod (*Solidago* spp.), and members of the carrot family.

BIRDS

Hummingbirds are the primary birds that play a role in pollination in North America. Their long beaks and tongues draw nectar from tubular flowers. Pollen is carried on both their beaks and feathers. Regions closer to the tropics, with warmer climates, boast the largest number of hummingbird species and the greatest number of native plants to support their need for food. The Ruby-throated Hummingbird (*Archilochus colubris*) is a common summer species in the Nova Scotia Highlands. Hummingbirds can see the colour red; bees cannot. Many tropical flowers grown as annuals, along with native woodland edge plants, attract hummingbirds.

BATS

Though bat species in Canada are not pollinators, bats in the south western United States and Mexico are important pollinators of agave and cactus. The head shape and long tongues of nectar bats allows them to delve into flower blossoms and extract both pollen and nectar; pollen covers their hairy bodies and is transfer as they move from plant to plant.

SPECIES AT RISK

Species at Risk in Nova Scotia include endangered species, such as the Gypsy Cuckoo Bumble Bee (*Bombus bohemicus*) and the Monarch butterfly (*Danaus plexippus*), as well as threatened and special concern species such as the Sable Island sweat bee (*Lasioglossum sablense*). Some pollinator species have already been extirpated from Nova Scotia and other regions of Canada, and the Macropis Cuckoo bee (*Epeoloides pilosulus*) is endangered and on the verge of being extirpated. Other species such as the Yellow-Banded Bumble Bee (*Bombus terricola*) were once common across much of Canada, but are now rare in the Maritimes and other eastern parts of its range.

Macropis Cuckoo Bee

- The Macropis Cuckoo Bee (*Epeoloides pilosulus*) was known from six sites across five provinces, including the Annapolis Valley in Nova Scotia.
- The Macropis Cuckoo Bee is a cleptoparasite, and female bees will lay their eggs in Macropis bee nests which then use up all the resources and destroy host eggs and larvae.
- It is one of the rarest bees in North America and a member of one of the most specialized set of ecological relationships, since it is only a parasite for one genus of bees that only forages on one genus of plants (the oils of Yellow Loosestrife).
- The decline of this bee is not well understood, but loss of habitat supporting Yellow Loosestrife, as well as pressures from invasive plants and pesticide use are thought to be contributing factors to its decline and disappearance.

WHICH FLOWERS DO THE POLLINATORS PREFER?

NOT ALL POLLINATORS ARE found in each province, and some are more important in different parts of Canada. Use this page as a resource to understand the plants and pollinators where you live.

Plants can be grouped together based on the similar characteristics of their flowers. These floral characteristics can be useful to predict the type of pollination method or animal that is most effective for that group of plants. This association between floral characteristics and pollination method is called a pollination syndrome.

The interactions of animal pollinators and plants have influenced the evolution of both groups of organisms. A mutualistic relationship between the pollinator and the plant species helps the pollinator find necessary pollen and nectar sources and helps the plant reproduce by ensuring that pollen is carried from one flower to another.

Plant Trait	Pollinator		
	Bees	Beetles	Birds
Colour	Bright white, yellow, blue, or UV	Dull white or green	Scarlet, orange, red or white
Nectar Guides	Present	Absent	Absent
Odour	Fresh, mild, pleasant	None to strongly fruity or fetid	None
Nectar	Usually present	Sometimes present; not hidden	Ample; deeply hidden
Pollen	Limited; often sticky and scented	Ample	Modest
Flower Shape	Shallow; have landing platform; tubular	Large bowl-like, Magnolia	Large funnel like; cups, strong perch support

This chart and more information on pollinator syndromes can be found at:



AND THE POLLINATORS THEY ATTRACT

Pollinator

	Butterflies	Flies	Moths	Wind
	Bright, including red and purple	Pale and dull to dark brown or purple; flecked with translucent patches	Pale and dull red, purple, pink or white	Dull green, brown, or colourless; petals absent or reduced
	Present	Absent	Absent	Absent
	Faint but fresh	Putrid	Strong sweet; emitted at night	None
	Ample; deeply hidden	Usually absent	Ample; deeply hidden	None
	Limited	Modest in amount	Limited	Abundant; small, smooth, and not sticky
	Narrow tube with spur; wide landing pad	Shallow; funnel like or complex and trap-like	Regular; tubular without a lip	Regular; small and stigmas exerted

<http://www.fs.fed.us/wildflowers/pollinators/syndromes.shtml>



DEVELOPING LANDSCAPE PLANTINGS THAT PROVIDE POLLINATOR HABITAT

WHETHER YOU ARE A FARMER of many hectares, land manager of a large tract of land, or a gardener with a small lot, you can increase the number of pollinators in your area by making conscious choices to include plants that provide essential habitat for bees, butterflies, moths, beetles, hummingbirds, and other pollinators.

FOOD:

Flowers provide nectar (high in sugar and necessary amino acids) and pollen (high in protein) to pollinators. Fermenting fallen fruits also provide food for bees, beetles, and butterflies.

Specific plants, known as host plants, are eaten by the larvae of pollinators such as butterflies.

- Plant in groups to increase pollination efficiency. If a pollinator can visit the same type of flower over and over, it doesn't have to relearn how to enter the flower and can transfer pollen to the same species, instead of squandering the pollen on unreceptive flowers.
- Plant with bloom season in mind, providing food from early spring to late fall. (see Bloom Periods pp.16-19)
- Plant a diversity of plants to support a variety of pollinators. Flowers of different colour, fragrance, and season of bloom on plants of different heights will attract different pollinator species and provide pollen and nectar throughout the seasons.
- Many herbs and annuals, although not native, are very good for pollinators. Mint, oregano, garlic,

chives, parsley and lavender are just a few herbs that can be planted. Old fashioned zinnias, cosmos, and single sunflowers support bees and butterflies. Non-native crops, herbs, and ornamental flowers should only be planted in gardens.

- Recognize weeds that might be a good source of food. For example, dandelions provide nectar in the early spring before other flowers open. Milkweed is a host for the Monarch butterfly.
- Learn and utilize Integrated Pest Management (IPM) practices to address pest concerns. Minimize or eliminate the use of pesticides.

SHELTER:

Pollinators need protection from severe weather and from predators as well as sites for nesting and roosting.

- Incorporate different canopy layers in the landscape by planting trees, shrubs, and different-sized perennial plants.
- Leave dead snags for nesting sites of bees, and other dead plants and leaf litter for shelter.
- Avoid applying thick layers of mulch that are hard to dig through.
- Build bee boxes to encourage solitary, non-aggressive bees to nest on your property.
- Ground nesting bees are also attracted to lawns and short grass areas, especially if there is a south facing slope.
- Leave some areas of soil uncovered to provide ground nesting insects easy access to underground tunnels.
- Group plantings so that pollinators

can move safely through the landscape protected from predators.

- Include plants that are needed by butterflies during their larval development.

WATER:

A clean, reliable source of water is essential to pollinators.

- Natural and human-made water features such as running water, pools, ponds, and small containers of water provide drinking and bathing opportunities for pollinators.
- Ensure the water sources have a shallow or sloping side so the pollinators can easily approach the water without drowning.

Your current landscape probably includes many of these elements.

Observe wildlife activity in your farm fields, woodlands, and gardens to determine what actions you can take to encourage other pollinators to feed and nest. Evaluate the placement of individual plants and water sources and use your knowledge of specific pollinator needs to guide your choice and placement of additional plants and other habitat elements. Minor changes by many individuals can positively impact the pollinator populations in your area. Watch for - and enjoy - the changes in your landscape!

- **CAUTION LAND MANAGERS:** Remember that many insecticides are toxic to pollinators. Extreme caution is warranted if you choose to use any insecticide. Strategically apply insecticides only for problematic target species.



FARMS

Fruits such as blueberries and apples, as well as various vegetables are some of the food crops grown in Nova Scotia that will benefit from strong native bee populations that boost pollination efficiency. Incorporate different plants throughout the farm that provide food for native populations when targeted crops are not in flower. Farmers have many opportunities to incorporate pollinator-friendly land management practices on their land which will benefit the farmer in achieving his or her production goals:

- Minimize the use of insecticides to reduce the impact on native pollinators. Spray when bees aren't active (after dark or just before dawn) and choose targeted ingredients.

- Consider using Integrated Pest Management (IPM) strategies to control pests. Use insecticides that cause the least harm to non-target organisms and only use when pests reach economic thresholds.
- Carefully consider the use of herbicides. Some weeds can provide needed food for pollinators.
- Minimize tillage to protect ground nesting pollinators.
- Consider creating designated permanently untilled areas for ground nesting bees along internal farm laneways.
- Ensure water sources are scattered throughout the landscape.
- Choose a variety of native plants to act as windbreaks, riparian buffers, and field borders throughout the farm.

- Plant unused areas of the farm with temporary cover crops that can provide food or with a variety of trees, shrubs, and flowers that provide both food and shelter for pollinators.
- Check with local not-for-profit organizations, or government agencies to see what technical support might be available to assist you in your effort to provide nectar, pollen, and larval food sources for pollinators on your farm.



Illustrations by Carolyn Vibbert



Public lands are maintained for specific reasons ranging from high impact recreation to conservation. In the Canadian Maritimes, forests and grasslands have been cut and altered to allow for roads, energy infrastructure, buildings, open lawn areas, boat ramps, and vistas. These other lands can provide benefits to pollinator when managed correctly. Pollinators are encouraged by timed mowing, opening tree canopies, and planting of native flowers. Less disturbed natural areas can be augmented with plantings of native plant species. Existing plantings around buildings and parking areas should be evaluated to determine if pollinator-friendly plants can be substituted or added to attract and support pollinators. Public land managers have a unique opportunity to use their plantings as an education tool to help others

understand the importance of pollinators in the environment through signs, brochures, and public programs.

In an effort to increase populations of pollinators the land manager can:

- Inventory and become knowledgeable of local pollinators.
- Provide connectivity between vegetation areas by creating corridors of perennials, shrubs, and trees that provide pollinators shelter and food as they move through the landscape.
- Maintain a minimum of lawn areas that support recreational needs.
- Restrict the use of insecticides and herbicides.
- Provide water sources in large open areas.
- Maintain natural meadows and openings that provide habitats for sun-loving wildflowers and grasses.
- Remove invasive species.



Gardeners have a wide array of plants to use in their gardens. Native plants, plants introduced from years of plant exploration from around the world, and plants developed by professional and amateur breeders can be found in garden centres, in catalogs, and on web-sites. Use your knowledge of pollinator needs and the plant list in this document to guide your choices.

- Choose a variety of plants that will provide nectar and pollen throughout the growing season.
- Resist the urge to have a totally manicured lawn and garden. Leave bare ground for ground nesting bees. Leave areas of dead wood and leaf litter for other insects.
- Find local resources to help you in your efforts. Contact your local garden club or conservation groups. Visit your regional botanic gardens and arboreta.

The scale of your plantings will vary but it is important to remember that you are trying to provide connectivity to the landscape adjacent to your property. Don't just look within your property boundaries. If your neighbour's property provides an essential element, such as water, which can be utilized by pollinators visiting your land, you may be able to devote more space to habitat elements that are missing nearby. It is best to use native plants which have evolved to support the needs of specific native pollinators. Some pollinators, however, are generalists and visit many different plants, both native and non-native. Be sure that any non-native plants you choose to use are not invasive. Remember that specialized cultivars sometimes aren't used by pollinators. Flowers that have been drastically altered, such as cultivars with double petals or completely different colour than the wild species, often prevent pollinators from finding and feeding on the flowers. In addition, some cultivars don't contain the same nectar and pollen resources that attract pollinators to the wild types.

- **CAUTION:** Take time to evaluate the source of your plant material. You want to ensure you get plants that are healthy and correctly identified. Your local garden club can help you make informed decisions when searching for plants.



PLANTS THAT ATTRACT POLLINATORS IN THE NOVA SCOTIA HIGHLANDS

The following chart lists plants that attract pollinators. It is not exhaustive, but provides guidance on where to start. Annuals, herbs, weeds, and cover crops provide food and shelter for pollinators, too.

Species	Common Name	Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture	Pollinators
Shrubs/Trees								
<i>Acer rubrum</i>	red maple	12-25m	red, pink	April - May	sun to shade	moist to wet	loam	bees, butterflies
<i>Acer saccharum</i>	sugar maple	20-35m	yellow, green/ brown	April - May	sun to shade	normal to moist	sand, loam	bees, butterflies
<i>Actaea pachypoda</i>	white baneberry	0.5-0.9m	white	May-June	partial sun	moist	humus	bees, beetles, flies
<i>Actaea rubra</i>	red baneberry	less than 1m	white/cream	May - July	partial shade to shade	moist	clay	bees, flies, beetles
<i>Alnus incana ssp. Rugosa</i>	speckled alder	3-4m	purple/brown, green	April - May	sun to partial shade	moist to wet	clay, loam	bees
<i>Arctostaphylos uva-ursi</i>	kinnikinnick	less than 1m	purple-blue	May-June	sun to partial sun	excessively drained	sand	bees
<i>Aronia melanocarpa</i>	black chokeberry	1-3m	white/cream, pink	May - June	sun to partial shade	normal to moist	clay, sand, loam	bees
<i>Chamaedaphne calyculata</i>	leatherleaf	less than 1m	white	May-July	sun to partial sun	wet	peat	bees, flies, butterflies
<i>Cornus canadensis</i>	bunchberry	less than 1m	white/cream, green/brown	May - September	sun to partial shade	normal to moist	clay, sand, loam	bees, flies
<i>Cornus rugosa</i>	roundleaf dogwood	up to 3m	white	May-August	sun to shade	moist to dry	neutral or alkaline	bees, beetles, flies, butterflies
<i>Crataeguschrysoarpa</i>	native hawthorns	3.5-11m	white	May - June	sun to part shade	dry to moist	clay, sand, loam	bees, butterflies
<i>Crataegus macroserma</i>	native hawthorns	3.5-11m	white	May - June	sun to part shade	dry to moist	clay, sand, loam	bees, butterflies
<i>Crataegus scabrída</i>	native hawthorns	3.5-11m	white	May - June	sun to part shade	dry to moist	clay, sand, loam	bees, butterflies
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	up to 1m	Yellow	May-July	sun to partial sun	dry to wet	calcareous, savannahs, meadows, bog	bees, flies, butterflies
<i>Diervilla lonicera</i>	bush honeysuckle	up to 1m	Yellow	June-July	sun to shade	dry to moist	sandy and stony	bees, moths
<i>Epigaea repens</i>	trailing arbutus	less than 1m	white to pink	May-July	sun to partial sun	moist, acidic well-drained	N/A	bees
<i>Fraxinus americana</i>	white Ash	less than 1m	yellow, purple	May	sun to partial shade	dry to moist	clay, sand, loam	butterflies
<i>Gaultheria procumbens</i>	eastern teaberry	less than 1m	Pink	May-July	sun to partial sun	sun to shade	N/A	bees
<i>Ilex mucronata</i>	catberry	2-3m	Inconspicuous	June-July	sun to shade	moist to wet, acidic	peat	bees, flies
<i>Ilex verticillata</i>	common winterberry	2-3m	white	June-July	sun to shade	moist to wet	loam	bees, flies
<i>Lonicera canadensis</i>	Canadian fly honeysuckle	up to 1m	yellow	May - June	sun to partial shade	moist	clay, sand, loam	hummingbirds, butterflies
<i>Photinia melanocarpa</i>	black chokeberry	up to 2m	white	May-June	sun to partial sun	dry to moist, poorly-drained	N/A	bees, beetles, flies



Species	Common Name	Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture	Pollinators
<i>Prunus pennsylvanica</i>	pin cherry	5-20m+	white	March - June	sun	dry to moist, well drained	sand, loam	bees
<i>Prunus virginiana</i>	Bitter-berry	6m+	white	June	sun to partial sun	moist	loam	bees
<i>Rhododendron canadense</i>	rhodora	1m	rose pink	June-July	sun to partial sun	moist to wet, poorly-drained	humus	bees, hummingbirds
<i>Ribes hirtellum</i>	smooth gooseberry	up to 1m	yellow, purple, green/brown	May - June	sun to partial shade	moist	clay, sand, loam	bees
<i>Ribes lacustre</i>	bristly black currant	1-2m	yellow, green/brown, pink	May - June	sun to shade	normal to wet	clay, sand, loam	bees
<i>Ribes triste</i>	swamp red currant	up to 1m	red, purple, green/brown	May - June	sun to partial shade	normal to moist	clay, sand, loam	bees
<i>Rosa carolina</i>	Carolina rose	up to 2m	white/cream, pink	May - June	sun to partial shade	dry to wet	sand, loam	bees, butterflies
<i>Rosa nitida</i>	shining rose	less than 1m	pink	June - September	sun	moist to wet	clay, sand	bees
<i>Rosa virginiana</i>	Virginia rose	up to 2m	yellow, pink	June - August	partial shade to shade	moist	clay, sand	bees
<i>Rubus allegheniensis</i>	Alleghany blackberry	2-3m	white/cream	June - July	sun to partial shade	moist	sand, loam	bees, butterflies
<i>Rubus chamaemorus</i>	cloudberry	less than 1m	white/cream, green/brown	June - July	sun	dry to moist	loam	bees, butterflies, beetles
<i>Rubus idaeus</i>	wild red raspberry	up to 2m	white/cream	June - July	sun to partial shade	dry to moist	sand, loam	bees, butterflies
<i>Rubus pubescens</i>	dwarf red raspberry	less than 1m	white/cream, pink	May - July	sun to shade	dry to wet	sand, loam	bees, butterflies
<i>Salix discolor</i>	pussy willow	2-8m	white/cream, green/brown	March - April	sun	moist to wet	clay, sand, loam	bees, butterflies
<i>Salix humilis</i>	upland willow	1-3m	yellow, green/brown	April - June	sun to partial shade	dry to moist	clay, sand, loam	bees, butterflies
<i>Salix lucida</i>	shining willow	up to 10m	yellow, green/brown	May - June	sun to partial shade	normal to wet	clay, sand, loam	bees, butterflies
<i>Salix pyrifolia</i>	balsam willow	2-3m	green/brown	May	sun	moist to wet	sand, loam	bees
<i>Sorbus americana</i>	American mountain ash	4-10m	white/cream	May - June	sun to partial shade	dry to moist	clay, sand, loam	bees
<i>Vaccinium angustifolium</i>	lowbush blueberry	0.2-0.6m	white to pink	May-June	sun to partial shade	normal to moist	sand	bees, butterflies
<i>Vaccinium macrocarpon</i>	large cranberry	0.3-.06m	white to pink	May-July	sun to partial shade	moist to wet	loam	bees, butterflies
Forbs								
<i>Achillea millefolium var. occidentalis</i>	western yarrow	0.3-0.9m	white, cream, pink	June - August	sun	dry to well drained	clay, sand	bees, butterflies, flies
<i>Anaphalis margaritacea</i>	pearly everlasting	0.3-0.9m	white/cream	July - September	sun	dry	sand	butterflies, moths
<i>Asclepias incarnata</i>	swamp milkweed	0.3-1.5m	purple, pink	June - August	sun	moist to wet	clay, loam	bees, butterflies

CONTINUED ON PAGE 18

PLANTS THAT ATTRACT POLLINATORS IN THE NOVA SCOTIA HIGHLANDS

Species	Common Name	Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture	Pollinators
<i>Caltha palustris</i>	yellow marsh marigold	0.3-0.6m	yellow	April - June	sun to partial shade	moist to wet	clay	butterflies
<i>Chamerion angustifolium</i>	fireweed	0.6-1.8m	purple, pink	July - September	sun	dry to moist, well drained	sand, loam	hummingbirds, butterflies, bees
<i>Chelone glabra</i>	white turtlehead	up to 1m	white	July-September	sun to partial sun	wet to moist	humus	bees
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	0.15-0.9m	white/cream, purple	April - August	partial sun to sun	dry, well drained	clay, sand	bees, flies, butterflies, moths
<i>Erigeron strigosus</i>	rough fleabane	0.15-0.7m	white/cream	April - August	partial sun to sun	dry, well drained	clay, sand	bees, flies, butterflies, moths
<i>Eupatorium maculatum</i>	Joe-pye-weed	0.6-1.8m	purple, pink	July - September	sun to partial shade	moist to wet, well drained	clay, sand, loam, humus enriched	bees, butterflies
<i>Eupatorium perfoliatum</i>	common boneset	1-1.5 m	white	July - September	sun	well drained to moist	clay, sand, loam	bees, butterflies, flies
<i>Eurybia macrophylla</i>	bigleaf aster	up to 1m	white to pale blue, yellow centre	August-October	sun to partial sun	moist	sandy loam	bees, butterflies, beetles, wasps
<i>Euthamia graminifolia</i>	flat-top goldentop	0.3-1.2m	yellow	July - October	sun	moist to well drained	loam	bees, butterflies
<i>Fragaria virginiana</i>	wild strawberry	less than 1m	white/cream	May - July	sun to partial shade	dry to normal	clay, sand	bees, butterflies
<i>Geum rivale</i>	purple avens	0.3-0.8m	purple	May - July	sun	moist to wet	sand, loam	butterflies
<i>Impatiens capensis</i>	common jewelweed	0.6-1.5m	yellow, orange, green/brown	July - October	partial shade to shade	moist to wet	clay, sand, loam	hummingbirds, butterflies, bees
<i>Lilium canadense</i>	Canada lily	1-1.5m	red orange	June-August	sun to partial sun	moist to wet	loam	hummingbirds
<i>Linnaea borealis</i>	twinline	less than 1m	white/cream, pink	May - July	sun to partial shade	moist to wet	sand	bees, flies, moths
<i>Maianthemum canadense</i>	wild lily-of-the-valley	less than 1m	white/cream	May - June	partial shade to shade	normal to moist	sand, loam	bees, flies, beetles
<i>Maianthemum racemosum</i>	large false Solomon's seal	0.3-0.9m	white/cream	May - July	partial shade to shade	normal to moist	clay	bees
<i>Mentha arvensis</i>	wild mint	less than 1m	purple, white/cream	July - September	partial shade	moist to wet	clay, sand	bees, butterflies, flies
<i>Mitchella repens</i>	partridgeberry	up to 0.5m	white	June-August	partial sun	moist	N/A	bees
<i>Packera aurea</i>	golden ragwort	3-7m	dark yellow	May-June	sun to shade	moist to wet	sand, loam, clay	bees, flies, butterflies, moths
<i>Rudbeckia hirta</i>	black-eyed susan	up to 1m	yellow with dark brown centre	June-September	sun to partial sun	moist to dry	clay, loam	bees, butterflies, beetles, wasps
<i>Rudbeckia laciniata</i>	green-headed coneflower	0.5-3m	yellow	July - September	sun to partial shade	normal to moist	sand, loam	bees, butterflies
<i>Sisyrinchium montanum</i>	mountain blue-eyed-grass	0.1-0.5m	blue, purple	May - July	sun to shade	dry to wet	sand, loam	bees, flies



Species	Common Name	Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture	Pollinators
<i>Solidago canadensis</i>	Canada goldenrod	0.6-2.1m	yellow	August - November	partial shade	moist	clay, sand, loam	bees, butterflies
<i>Solidago gigantea</i>	giant goldenrod	1.2m	yellow	September	partial shade	moist	clay, sand, loam	bees
<i>Solidago puberula</i>	downy goldenrod	0.3-0.9m	yellow	August - October	sun	dry to normal	sand	bees
<i>Solidago rugosa</i>	rough-stemmed goldenrod	0.3-1.8m	yellow	July - October	sun to partial shade	moist to wet	sand	bees, butterflies
<i>Symphotrichum cordifolium</i>	heart-leaved aster	0.2-1.2m	blue, purple	August - October	sun to partial shade	dry to normal	clay, sand, loam	butterflies
<i>Symphotrichum lanceolatum</i>	lance-leaved aster	up to 1m	white/cream	September - October	sun	moist to wet	clay, sand, loam	butterflies
<i>Symphotrichum lateriflorum</i>	calico aster	0.3-1.2m	white/cream	August - October	sun to partial shade	dry to moist	clay, sand	butterflies
<i>Symphotrichum novi-belgii</i>	New York aster	less than 1m	blue, purple	June - September	sun	normal to moist	clay, sand	bees, butterflies, flies
<i>Symphotrichum puniceum</i>	purple-stemmed aster	up to 2m	white, pink, purple	July - August	sun	moist	sand, loam	bees, butterflies, flies
<i>Tiarella cordifolia</i>	foamflower	less than 1m	white	May-June	sun to shade	moist	humus	bees, bee flies
<i>Trientalis borealis</i>	starflower	less than 1m	white	May-June	partial sun to shade	moist to wet	wide range	bees, beetles, butterflies
<i>Trillium cernuum</i>	nodding trillium	0.15-0.6m	white/cream, pink	April - July	shade	moist	sand	bees, butterflies
<i>Trillium undulatum</i>	painted trillium	0.2-0.4m	purple, white/cream, pink	April - June	partial shade to shade	moist	sand	bees, butterflies
<i>Zizia aurea</i>	golden zizia	up to 1m	yellow	May-July	sun to partial sun	moist to wet	N/A	bees, flies
Vines								
<i>Clematis virginiana</i>	Virginia clematis	1.8-3m	white/cream	July - October	sun to partial shade	dry to moist	loam	hummingbirds, butterflies, bees
Shelter plants								
<i>Agrostis scabra</i>	rough bentgrass	0.15-0.8m						
<i>Agrostis stolonifera</i>	creeping bent grass	0.15-0.6m						
<i>Ammophila breviligulata</i>	American beachgrass	less than 1m						
<i>Athyrium filix-femina</i>	common lady fern	up to 2m						
<i>Danthonia spicata</i>	poverty oakgrass	less than 1m						
<i>Eriophorum angustifolium</i>	common cotton-grass	less than 1m						
<i>Eriophorum virginicum</i>	common cotton-grass	0.45-1.2m						
<i>Festuca rubra</i>	red fescue	0.1-0.8m						

HABITAT HINTS

FOR THE NOVA SCOTIA HIGHLANDS

BEE-POLLINATED GARDEN FLOWERS AND CROPS

	Bumble	Digger	Lg Carpenter	Sm Carpenter	Squash/ Gourd	Leafcutter	Mason	Sweat	Plasterer	Yellow- faced	Andrenid
FLOWERS											
Catalpa			x								
Catnip	x	x					x				
Clover		x									x
Columbine	x										
Cow parsley										x	
Goldenrod	x	x				x		x			
Impatiens	x										
Irises	x		x								
Lavender	x	x	x			x					
Milkwort								x			
Morning glory				x							
Penstemon	x	x					x				
Phacelia	x	x		x		x	x	x	x		x
Potentilla										x	
Rose	x		x				x	x		x	
Salvia	x	x	x			x	x				
Saxifrages								x		x	
Sorrel				x							
Sunflowers	x	x	x	x		x		x	x		x
Violet								x			x
Wild Mustard		x							x		
Willow catkins									x		x
CROPS											
Apple							x				
Blueberry	x	x									x
Cherry							x				x
Eggplant	x		x					x			
Gooseberry	x										x
Legumes	x	x				x		x			
Water melon	x							x			
Squash/ Pumpkins/ Gourds			x		x						
Tomatoes	x	x	x					x			
Thyme	x	x					x	x		x	



HABITAT AND NESTING REQUIREMENTS:

Honey Bees:

Honey bees are colonial cavity nesters. Occasionally in the spring and summer you might encounter a swarm of honey bees on the move to a new home. In Canada, the majority of honey bees are managed by beekeepers in hives. Beekeepers with commercial operations can have bee yards with tens to hundreds of hives commonly in agricultural, rural and some natural habitats. In urban and garden settings, it is common to see a single or a handful of honey bee hives – usually wooden boxes painted white or other light colours. Give honey bees space and don't approach their hive. Even beekeepers minimize the amount of time they spend working bees. Honey bees have different feeding needs than native bees. Their colony can last multiple years and they feed on flowers from the beginning of spring bloom to the fall. Honey bees visit crops when they are in bloom and forage on a diversity of wildflowers as well. Honey bees also need plants that produce a large amount of nectar to make honey. Clovers, lavenders, mints, and sages are great nectar sources. Honey bees also like to feed off of the pollen of trees and shrubs such as maples, willows, and roses. Fields of goldenrod are an excellent pollen source.

Bumble Bees:

Bumble bees nest in cavities such as abandoned mouse nests, other rodent burrows, upside down flower pots, under boards, and other human-made cavities. Colonies are founded by a queen in the spring. The number of workers in a colony can grow to upward of 400 at the peak of summer bloom. Bumble bee colonies die out in the fall after producing new queens. New queens mate and then overwinter, hiding underground in cracks, or small crevices. Bumble bees are usually active during the morning hours and forage at colder temperatures than honey bees, even flying in light rain.

Large carpenter bees:

Large carpenter bees chew nests into dead wood, poplar, cottonwood or willow trunks and limbs. They also make nests in structural timbers including redwood and cedar. Depending on the species, there may be one or two brood cycles per year. These bees can be active all day even in the hottest and coolest weather.

Digger bees:

Digger bees can be found nesting in sandy, compacted soils, and along stream banksides. These bees are usually active in the morning hours, but can be seen at other times of the day as well. To attract these bees have some areas of exposed soil in your garden and avoid applying thick layers of mulch that are hard to dig through.

Small carpenter bees:

Small carpenter bees chew into pithy stems, including roses and blackberry canes, where they make their nests. These bees are more active in the morning but can be found at other times.

Squash and Gourd bees:

Squash and gourd bees prefer to nest in sandy soil but also may nest in gardens (where pumpkins, squash and gourds are grown). These bees are early risers and can be found in pumpkin patches before dawn. Males often sleep in wilted squash flowers.

Leaf-cutting bees:

Leaf-cutting bees nest in pre-existing circular tunnels of various diameters in dead wood created by emerging beetles. Some also nest in the ground. Leafcutter bees line and cap their nests with leaves or flower petals. These bees can be seen foraging throughout the day even in very hot weather.

Mason bees:

Mason bees use pre-existing tunnels of various diameters in dead wood made by emerging beetles, or human-made nesting substrates such as drilled wood blocks or cardboard tubes. These bees get their name from the fact that they cap their nests with mud. Mason bees are generally more active in the morning hours.

Sweat bees:

Sweat bees need bare ground in sunny areas not covered by vegetation for nesting. Some will nest in small pre-existing holes, much like leaf-cutting or mason bees. Like most bees, sweat bees forage for pollen earlier in the morning and then for nectar later in the day. To help these bees nest, keep some parts of your garden exposed and avoid applying thick layers of mulch that are hard to dig through.

Plasterer or cellophane bees:

Plasterer or cellophane bees get their name from the unique, clear waterproof lining they make around their nest. Similar to sweat bees they prefer bare ground, stream banks or slopes. These bees can be active in the morning or later in the day.

Yellow-faced bees:

Yellow-faced bees are tiny, hairless bees that make their nesting by chewing into small dead stems. These bees are more active during morning hours.

Mining bees:

Mining bees prefer sunny, bare ground, and sand soil. They are also known to nest under leaf litter or in the soil along banksides and cliffs. Mining bees are active in the spring and most commonly seen on flowers during the morning when pollen and nectar resources are abundant.

S.H.A.R.E. - SIMPLY HAVE AREAS RESERVED FOR THE ENVIRONMENT.

- ✿ Planting for pollinators is the first step. Put your pollinator habitat on the S.H.A.R.E. map and connect to pollinator conservation efforts across North America. Visit pollinator.org/SHARE
- ✿ Farmers can also certify their habitat with Bee-Friendly Farming. Visit pollinator.org/bff

BECOME FAMILIAR WITH POLLINATORS IN YOUR LANDSCAPE.

- ✿ Watch for activity throughout the day and the seasons.
- ✿ Keep a simple notebook of when and what comes to your garden.
- ✿ Take part in citizen science monitoring and get involved in local programs.
- ✿ Consult a local field guide or web site when you are ready to learn more details.

ADD NATIVE PLANTS TO ATTRACT MORE NATIVE POLLINATORS.

- ✿ List the plants you currently have in your landscape.
- ✿ Determine when you need additional flowers to provide nectar and pollen throughout the growing season.
- ✿ Add plants that provide additional seasons of bloom, create variable heights for shelter, and attract the types of pollinators you want.
- ✿ Don't forget to include host plants that provide food and shelter for larval development.
- ✿ Contact your local native plant society or extension agent for more help.

USE POLLINATOR FRIENDLY LANDSCAPE PRACTICES TO SUPPORT THE POLLINATORS YOU ATTRACT.

- ✿ Use Integrated Pest Management (IPM) practices to address pest concerns.
- ✿ Tolerate a little mess – leave dead snags and leaf litter, keep areas bare for ground nesting insects, and leave some weeds that provide food for pollinators.
- ✿ Provide safe access to clean water.

NOTICE THE CHANGES THAT YOU HAVE HELPED TO CREATE!



RESOURCES

Many books, websites, and people were consulted to gather information for this guide. Use this list as a starting point to learn more about pollinators and plants in your area.

ECOREGION PROFILE

The Ecological Framework of Canada

<http://ecozones.ca/english/zone/AtlanticMaritime/ecoregions.html>
<http://ecozones.ca/english/region/128.html>

Webb, K. T., and I. B. Marshall. 1999. Ecoregions and ecodistricts of Nova Scotia. Crops and Livestock Research Centre, Research Branch, Agriculture and Agri-Food Canada, Truro, Nova Scotia

POLLINATION/POLLINATORS

Pollinator Partnership www.pollinator.org

North American Pollinator Protection Campaign www.nappc.org

Pollination Canada www.pollinationcanada.ca

Seeds of Diversity www.seeds.ca

Canadian Biodiversity Information Facility: Butterflies of Canada
www.cbif.gc.ca/eng/species-bank/butterflies-of-canada/?id=1370403265518

North American Butterfly Association www.naba.org

Canadian Honey Council www.honeycouncil.ca

Buchmann, S.L. and G.P. Nabhan. 1997. *The Forgotten Pollinators*
Island Press: Washington, DC.

Committee on the Status of Pollinators in North America. 2007. *Status of Pollinators in North America* The National Academies Press: Washington, DC.
<https://novascotiabutterflies.ca/>
<https://novascotia.ca/natr/wildlife/biodiversity/species-list.asp>

The Butterflies of Nova Scotia <https://novascotiabutterflies.ca/>

Maritimes Butterfly Atlas <http://accdc.com/mba/en/checklists.html>

Nova Scotia Canada Species at Risk Overview
<https://novascotia.ca/natr/wildlife/biodiversity/species-list.asp>

Packer, L., J.A. Genaro, and C.S. Sheffield 2007. The Bee Genera of Eastern Canada. Canadian Journal of Arthropod Identification available online at doi: 10.3752/cjai.2007.03.

Sheffield, C. S., P. G. Kevan, and R. F. Smith. 2003. Bee species of Nova Scotia, Canada, with new records and notes on bionomics and floral relations (*Hymenoptera: Apoidea*) Journal of the Kansas Entomological Society

NATIVE PLANTS

Ecological Framework of Canada
<http://ecozones.ca/english/zone/AtlanticMaritime/index.html>

NOVA SCOTIA MUSEUM PUBLICATIONS - NOVA SCOTIA PLANTS

Munro, M. C., R. E. Newell, and N. M. Hill. 2014. Nova Scotia Plants. Nova Scotia Museum.
<https://ojs.library.dal.ca/NSM/issue/view/508>

FEEDBACK

We need your help to create better guides for other parts of North America. Please e-mail your input to **feedback@pollinator.org**.

- ✿ How will you use this guide?
- ✿ Do you find the directions clear? If not, please tell us what is unclear.
- ✿ Is there any information you feel is missing from the guide?
- ✿ Any other comments?

**THANK YOU
FOR TAKING
THE TIME TO HELP!**



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