Planting Guide

Planting Forage for **Honey Bees in Canada**

A guide for farmers, land managers, and gardeners

This guide entitled *Planting Forage for Honey Bees in Canada*: *A guide for farmers, land managers, and gardeners*, was produced by Pollinator Partnership Canada. The guide was commissioned for discussion purposes by Agriculture and Agri-Food Canada (AAFC) on behalf of the Bee Health Roundtable, an industry-government forum.

The content of this guide does not necessarily reflect the opinions or interests of the entire Bee Health Roundtable membership or AAFC, nor does it necessarily reflect the opinions or interests of all parties interviewed during the researching of this guide. The recommendations resulting from the guide are not binding on any participant of the VCRTs or AAFC.

POLLINATOR PARTNERSHIP CANADA

Contents

Why Support Honey Bees?

About 1 in every 3 bites of food we eat is a result of pollination by animals, mainly bees. While all different types of wild bees pollinate our food, managed honey bees are the main pollinator of agricultural crops in Canada and globally. In Canada, between $3.15 to $4.39 billion per year are attributed to the beekeeping industry resulting from managed pollination services of crops such as canola, blueberries, and other orchard and field crops. And the high-quality honey that is produced and enjoyed in Canada would not be possible without healthy colonies that have access to nectar-producing flowers.

Honey bees and wild bees both rely on nectar and pollen for healthy and productive populations. Unfortunately, beekeepers in some areas are finding it increasingly difficult to find large areas with good nectar and pollen plants for bees. Crop plants can provide good resources, but often are only in bloom for a short period, and do not provide the diversity of pollen and nectar that is crucial for bee health. An additional concern with solely using agricultural crops for honey bee forage is that there is potential for pesticide exposure.

Keeping honey bee colonies healthy has become increasingly challenging over the last decade due to an interacting array of factors including diseases such as the *Varroa* mite, exposure to pesticides, and lack of forage. Providing honey bees with better forage might help with other health problems bees are facing because improved nutrition means bees are better able to fight off pest and diseases, and cope with pesticide exposure. Once honey bee forage is created, it not only provides floral resources for native bees but it also creates long-term habitat for a variety of native bees and a wider diversity of wildlife.

Photo: Diane Wilson

About This Guide

This guide provides an overview of where and how honey bee forage can be created in Canada. It provides general information to farmers, road, utility and land managers, as well as home owners who are interested in enhancing honey bee forage and bee habitat. The primary focus of this guide is forage creation for honey bees but creating forage and habitat will also help native bees and other pollinators. The guide covers three strategies for helping honey bees and other pollinators under the headings: **Preserve, Restore,** and **Maintain**. These sections are meant to be general guidelines applicable to many different types of land. Later in the guide, there are sections with more detail and considerations for different land types: **1. Farms, 2. Roadsides, 3. Utility Corridors**, and **4. Gardens**. Under each land type, links to additional resources are also provided.

The guide provides a plant list of honey bee attractive pollen and nectar plants. The list focuses on native plants, specific to four broad Canadian regions that are beneficial to honey bees and other wildlife. Introduced plant species are also included when they provide value nectar and/or pollen resources. This includes valuable cover crops and other non-native but non-invasive species that are readily available throughout parts of Canada. The plant list in this guide is not intended to be an exhaustive list of all native and introduced plants that are valuable to honey and other bees, but rather highlight the best, most accessible plants, with a range of height, habit (woody and herbaceous), and bloom periods. Choose from the list plants that meet your needs for creating honey bee forage and pollinator habitat.

The budget, size of the project area, and timeline all factor into how your project will progress and take shape. The general steps provided in this manual are for your convenience and reference; use the information that is applicable to your specific project.

Photo: Steve Fletcher

Photo: Derrick Ditchburn

Honey Bees

Honey bees (*Apis mellifera*) are managed for pollination services and honey production throughout the world. They represent one species of the estimated 20,000 species of bees globally. Honey bees are not native to Canada, but rather were imported from Europe in the 1600s. Managing honey bees for agricultural pollination services is a newer phenomenon that has grown throughout the 20th century. Today managed honey bees are essential partners in the pollination of row crops including canola, fruit and nut trees, berries, and field vegetables to name a few. Other common managed bees include bumble bees, leafcutter bees, mason bees, and mining bees. The managed non-*Apis* bee industry is growing in size but is nowhere near that of the honey beekeeping industry.

Honey bees have much larger foraging ranges than native bees, up to 5 km, but generally stay 2 to 3 km from hives. Conversely, native bees forage much closer to their nest sites, generally only a few hundred meters, depending on the species. These differing foraging ranges create unique differences in forage and habitat requirements for honey bees and native bees.

A year in the life of a honey bee colony

Honey bees are unique in that they are social bees that live in a colony where they divide tasks and roles between workers, have a queen, and persist in the colony over multiple seasons and years. This lifestyle is very uncommon in the pollinator community but it has made honey bees successful in many landscapes.

Winter

A honey bee hive has a seasonal cycle that repeats from year to year. During the winter, a hive is dormant. The queen stops laying eggs and the bees in the colony surround the queen and keep her warm. The colony survives the Canadian winter by feeding on honey stores that were collected the previous year.

Spring

When the weather gets warmer and spring flowers start to bloom the colony becomes more active. Foragers leave the hive to collect pollen and the queen starts laying between 1000 to 1500 eggs each day. The colony is ready to expand.

Summer

In early summer the colony is very active. Foragers leave daily to collect pollen and nectar and many new worker bees emerge. By mid-summer the colony has grown very large and strong. Workers start to produce new queen cells that will produce new queen bees. After a new queen hatches, the old queen leaves, taking some worker bees with her. This is called swarming. Most beekeepers manage bee colonies to avoid swarming by splitting them in late spring and early summer.


Photo: Bill Lewis

Fall

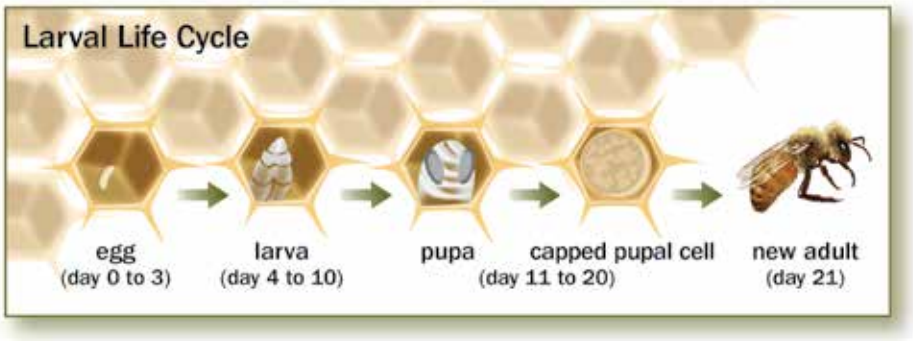
By the fall, flowers have stopped blooming and are producing fruit. The colony works on storing food and foraging for nectar slows. The worker bees and the queen will spend the winter feeding on stored honey, waiting for the spring bloom of flowers. While a honey bee colony can live through multiple years, worker bees have limited lifespans of approximately 40 days.

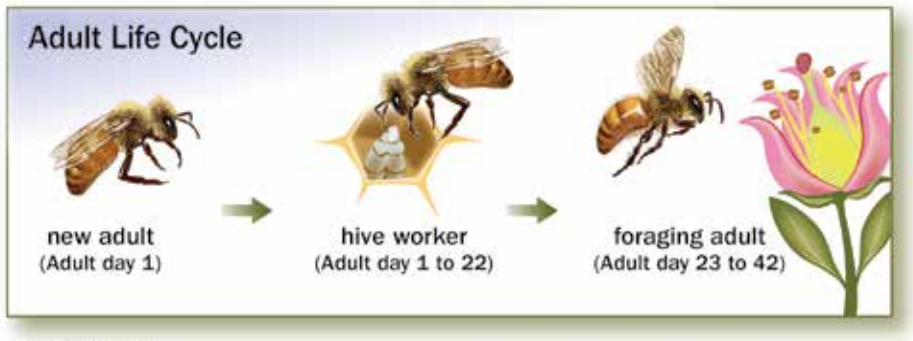

Photo: Bill Lewis

As a honey bee ages, it cycles through various tasks inside and outside the hive. Right after emerging from their pupa, worker bees build combs and take care of other developing larvae. When they get older they leave the hive and become foragers, bringing back pollen, nectar, and other plant products to the hive. Queens usually live 1 to 3 years. When a colony has a weak or older queen, or loses a queen unexpectedly due to illness, new queens are produced to replace the old queen.

Honey bee colonies are active from early spring to fall, and require a variety of pollen and nectar sources throughout this active period. Beekeepers can move colonies from one area to another throughout the season so that honey bees have enough food. Increased urban areas, larger roads/utility corridors and less diverse farms have decreased options for beekeepers to find wholesome and abundant forage for bees.

Worker Honey Bee Life Cycle





Illustrations: Marguerite Meyer

Where to Put Honey Bee Forage

Honey bee forage can be preserved or created wherever there is room for flowering plants that have honey and nectar. However, there are a few key land types where addition of forage can have the biggest impact on honey bee health and honey production: **1. Farms, 2. Roadsides, 3. Utility Corridors,** and **4. Yards and Gardens**. All of these areas have the potential to contain a large abundance and diversity of bee-attractive floral resources, and beekeepers can use these areas to pasture their colonies when they are not being used for crop pollination. While not much is known at this point about possible impacts of honey bees competing with native bees for floral resources, caution should be taken when putting large numbers of honey bees in natural areas where native pollinators thrive. Note that this guide does not include conservation areas as sites for enhancement of honey bee floral resources.

Native bees

There are over 900 species of native bees in Canada. A few species, including the common eastern bumblebee and the blue orchard bee, have been domesticated and are managed for crop pollination, but the vast majority of native bees are wild. Most species live a solitary life while a minority are social and form colonies. Generalist species, like bumblebees, forage on a wide variety of crops and wildflowers, while specialist species, such as the squash bee, are dependent on a limited group of plants for survival.

Solitary bees

About 70% of solitary bees, such as sweat bees and miner bees, nest in the ground by excavating small vertical tunnels. Carpenter bees, most leaf cutter bees and mason bees nest in hollow twigs, cavities, or in wood. Solitary bees are active at different times of the growing season – some are only active for one season while others are active throughout the spring, summer and fall. Solitary bees pose very little stinging risk at any time.

Bumble bees

Bumble bees are especially effective pollinators because they 'buzz' pollinate. By vibrating their entire body at a high frequency, they are able to dislodge pollen in tight flowers that are inaccessible to other bees. Bumble bees nest underground in abandoned rodent burrows or above ground in bunching grasses and plant litter. They can also be found nesting in houses or barns. Wild bumble bees form small colonies that are initiated in the spring by queens that have overwintered in the ground. These queens build colonies that last a season and produce a new generation of queens at the end of the season. The next generation of bumble bees is dependent on the survival of these new queens who mate, overwinter underground and repeat the cycle the following spring. Bumble bees are active from April until October and feed mostly on flowers. Although bumble bees are defensive around their nests, and will sting, they pose little stinging risk when they are foraging unless disturbed.

How to Preserve, Enhance, Maintain

There are many ways to approach creation of honey bee forage and bee habitat on farms, along roadsides and utility corridors, and at your home.

The key elements to creating forage for honey bees are:

- an abundant and diverse set of honey bee-attracting plants that provide successive blooms throughout the time when bees are active
- minimal applications of potentially harmful chemicals

If the goal is to provide a more broadly-serving habitat that will benefit native bees, and perhaps other beneficial insects and wildlife, additional considerations such as nesting sites, host plants, and connectivity need to be considered.

Options that are available fall within three categories:
1. preserve existing areas
2. enhance and restore
3. maintain safe, high-quality bee forage and habitat

You should know that both small and large actions create benefits at local, regional, and even national scales. Local, site-specific actions add up to significant change. By considering these three simple actions, you can help to support honey bees and other pollinators.

Action 1: Preserve

One of the simplest things you can do for honey bees and other pollinators is to keep the sources of food and shelter for bees that are already on the land or the land you manage. These bee resources are found in the semi-natural areas on farms, roadsides, public lands, and utility corridors. Fence lines, riparian buffers, pastures, and roadsides are considered semi-natural because they are often mowed or sprayed and contain mixes of native and non-native vegetation.

Farm land provide excellent opportunity for providing honey bee forage and bee habitat through preservation. Preservation of riparian vegetation, hedgerows, and meadows in marginal land can be a win-win because these areas can provide forage for honey bees, enhance native bee populations that aid crop pollination, and provide resources for natural enemy insects that prey on pests.

On roadsides, flowering vegetation is often abundant and needs minimal intervention to provide good bee forage and habitat. Similarly, utility corridors may provide good floral resources for bees without a lot of input; however, enhancement and proper management can greatly increase these areas value as a source of honey bee forage and bee habitat.

While there is not much natural or semi-natural land in urban areas, parts of your yard can be preserved for bees such as piles of wood for bee nesting. Consider leaving 'weeds' in your grass and watch honey and native bees forage!

If the goal is to preserve all pollinators, 'scrubby' areas with downed trees, brush piles, and open soil are excellent nesting areas for native bees. Assessing existing landscapes for their value to honey bees and native bees, and then preserving areas that are providing resources are simple, low-input ways to help pollinators.

Action 2: Enhance

The best thing you can do for honey bees and other pollinators is to restore the disturbed landscape with flowering vegetation in as many areas as possible. There are many types of land that can be used to enhance honey bee forage and habitat for pollinators. Enhancement should be tailored to the land type, area, budget, and maintenance options. Identifying goals and pre-planning will maximize success and ensure that you provide the best forage and habitat.

When restoring an area for both honey bees and native bees, it is important to consider food and nesting resources. While honey bees primarily need nectar and pollen from flowers, native pollinators depend on flowers as well as non-compacted soil and woody vegetation for nesting. During restoration planting projects, it is important that bloom periods coincide with pollinator activity to sustain both plant and pollinator populations. This can be achieved by planting flowers and shrubs that are in bloom from early spring through fall, to ensure continuous nectar and pollen sources.

Depending on your land type and objectives, consider enhancing land through activities such as:

- Increasing the diversity of native flowering plants, forbs, and shrubs to offer blooms all season.

- Planting cover crops in agricultural areas that provide pollen and nectar for honey and native bees.
- Planting introduced, non-invasive plants that provide an abundance of nectar and pollen for honey and native bees.
- Providing nesting spaces in logs, nest blocks or bee hotels.

Sometimes only small areas are available for enhancement such as boulevards on roads or hedgerows adjacent to crops. These are perfect places to create floral rich pollinator patches.

Plant Selection and Design

- Honey bees and native bees depend on nectar and pollen for nutrients and energy. Since flowering plants provide these resources, it is important that bloom periods are continuous from early spring through fall.
- While introduced plants can provide excellent pollen and nectar for honey bees and native bees, attempt to include native plants as the primary floral resource. This will help ensure a healthy ecosystem by providing resources for native, beneficial insects.
- In restoration planting projects, cluster plants together. This makes for more efficient foraging by honey bees and other pollinators.
- Do not include non-native grasses in seed mixes.
- Decide whether seeds, plugs, potted plants, or a combination of plant sources will be used.
- If you want to enhance habitat for native bees as well as create honey bee forage, leave patches of bare, undisturbed soil for ground-nesting bees. You can plant woody shrubs and integrate downed logs for cavity-nesting bees wherever it is practical to do so.

Site Preparation and Invasive Species

How you prepare your site for new pollinator plantings will depend on what type of land you manage. Generally, the removal of invasive plant material is one of the first actions needed in developing honey bee forage and pollinator habitat. Pollinator-friendly native plants have little opportunity to establish and thrive unless invasive plants are removed. Each of the specific land-type sections have links to guides that provide more technical advice on preparing your site and controlling invasive species in the most efficient ways possible. Some general site preparation techniques include:

- Identify invasive plants during the planning stages and set a manageable threshold of tolerance.
- Research options for plant removal that are the most efficient, successful, and least harmful for your land type. For small-scale plantings in urban areas, hand removal will have the least environmental impact. In larger areas, tilling, cover sheets, and chemical control may be needed.
- Install desired plant material as quickly as possible after the invasive plants have been removed.
- Monitor the site frequently and have a plan in place for additional removal as needed.

Action 3: Maintain

Once forage and habitat have been preserved or established for honey bees and native bees, proper maintenance, that reduces harm to bees and maximizes floral resources, is crucial. Consider modification to standard activities such as:

- Reducing or changing the timing of mowing.
- Avoiding the use of herbicide in pollinator habitat.
- Leaving old branches and woody shrubs with pithy stems for nesting.
- Allowing trees and other woody vegetation to grow further from the roadway in areas where they are not an impediment to visibility.

Managing habitat for honey bee forage and native bee habitat is easier when you follow tried and tested Best Management Practices (BMPs). The following BMPs have proven to be beneficial to many projects.

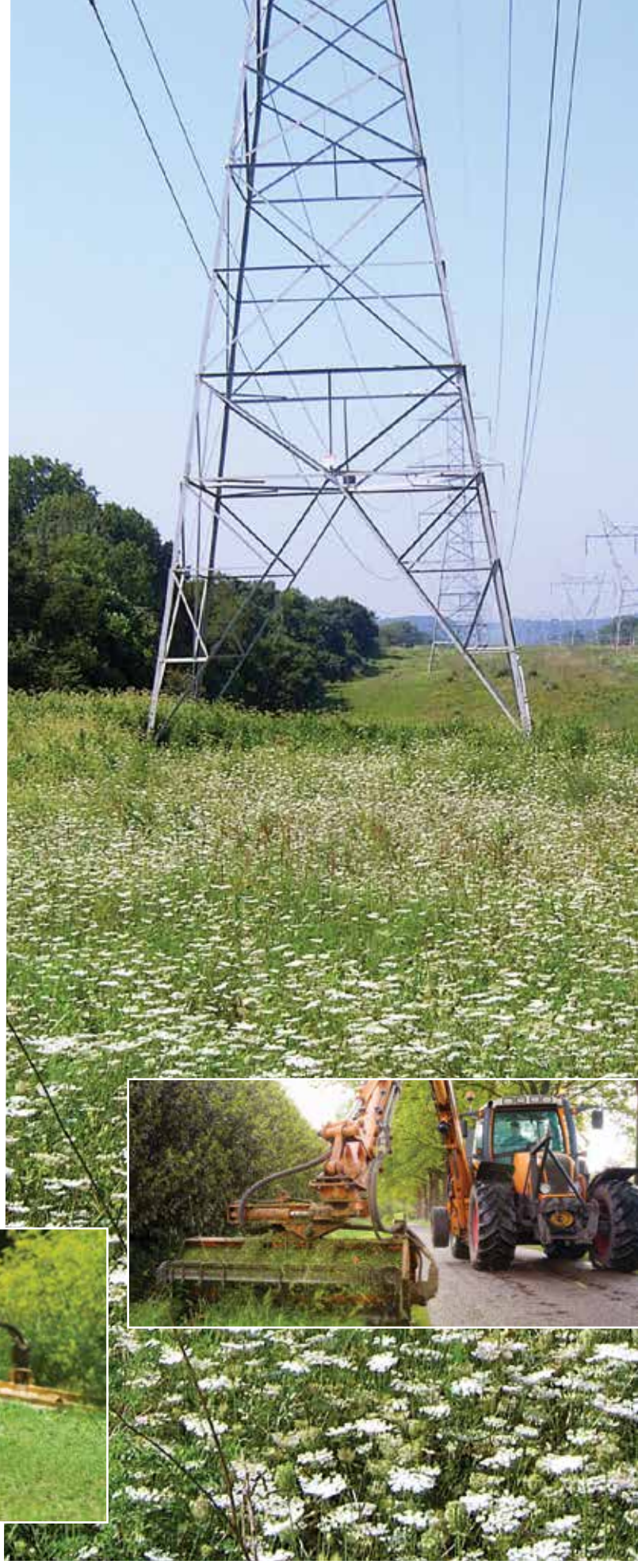
Integrated Vegetation Management

Integrated Vegetation Management (IVM) is a systematic integrated approach to managing vegetation. It applies the right intervention method at the right place and the right time to control vegetation. IVM targets undesirable species in the landscape while minimizing environmental impacts and risks.

1. Scout the area identifying and/or mapping the location of unwanted plants that are present.
2. Define threshold levels of plant abundances and/or growth heights based upon your goals, priorities, and abilities. Thresholds will differ depending on the plant species you encounter, as well as your objectives. For example, determine whether you wish to prevent the plants' growth in height, or completely eliminate it from the site (as may be the case for certain invasive plant species).
3. Use as many IVM practices as practical in concert with one another. These will include manual/mechanical, biological, and chemical practices.
4. Evaluate the results. Keep accurate records and modify the unwanted vegetation management program as needed.

Mowing

Mowing is the most common way to eliminate unwanted vegetation and growth on roads or utility corridors. On crop and road edges, mowing keeps weeds in check. In urban areas, mowing grass (and weeds) is standard for most home owners. There are several BMPs that can reduce the amount of insect mortality. Not only can honey bees and other



pollinators be harmed by mower blades, but they are also adversely impacted when large swaths of floral and nesting resources are removed. Most of these techniques apply to road rights-of-way, utility corridors, and crop edges on farms, rather than urban grass plots. Use a combination of bee-friendly mowing practices that apply to your land type.

- Leave some grass patches to prevent all the forage from being removed at once.
- Restrict mowing activities to the immediate roadside edge or other areas that require very low vegetation. Maintain a clear zone for safety and visibility but, retain the remainder of the area for pollinators.
- Schedule mowing around pollinator activity. Pollinators are more active at certain times of the year, such as when flowers are in bloom. Mowing when the majority of plants are past bloom will reduce risk to pollinators.
- Mow at a slower speed so that pollinator and other wildlife have a better chance to escape.
- Set mower at 5 cm to encourage perennial flowers to make good root development.
- If mowing to control for noxious weeds, mow before seed has set.

Use of Herbicides

Herbicides can indirectly impact honey bees and native pollinators by reducing their food supply. In many cases pollinators may be using weedy plants as food. Land owners can often bypass the use of chemical herbicides, which broadly reduce all plants, and instead use hand pulling of unwanted plants, leaving other forage for pollinators. In larger areas such as road right-of-ways, crop edges and fields, and utility corridors, herbicides often are required to control unwanted plants. If herbicides are being used, always follow label guidelines and consider the follow actions:

- Carefully diagnose your weed problem. Before applying herbicide, make sure the weed population has reached a level where chemical control is necessary.
- Minimize the use of herbicides. This will allow the growth of floral resources that honey bees and other pollinators need to survive. If herbicide treatments are necessary, consider applying before or after pollinator forage plants have bloomed.
- Avoid creating pollinator food deserts. If possible, treat the managed landscape in thirds.
- Minimize drift and broadcast spraying. Do not spray when wind is blowing toward known pollinator habitats or areas where honey bee hives are placed.
- If using a motorized spray rig, always shut off the sprayer when making turns at field ends near gardens, ponds, or other areas that may be used by pollinators and other wildlife.
- When doing hand removal of persistent multi-stemmed woody plants, consider carrying a spray bottle of herbicide on your belt and directly spray the cuts as you work through the site. This will avoid over-spraying or killing desired plants. Spraying the cuts quickly will prevent the cut from healing over and allowing the undesired plant to persist and thrive.


Photo: Bill Lewis

Insecticide Use

Although unlikely for roadsides, utility corridors, and even urban gardens, you may need to use an insecticide in your management program if you are combating invasive pests. When using insecticides you could unintentionally harm honey bees, other pollinators, and other beneficial insects. When using any insecticide, following label guidelines. Coordinated timing can significantly reduce beneficial insect mortality.

- Use an Integrated Pest Management (IPM) approach to address potential pest issues.
- Carefully diagnose your pest problem through monitoring, and, before you apply an insecticide, make sure the pest population has reached a level where chemical control is necessary.
- Complete the insecticide application before pollinator foraging plants bloom. Most pollinator poisoning occurs when bee-toxic insecticides are applied during the bloom period.
- Time applications to take place when foraging honey bees and other pollinators are least active.
- Minimize insecticide drift and opt for very targeted spray techniques. Use a back-pack applicator if possible.
- Create a buffer zone around known pollinator habitat to intercept possible drift from insecticide sprayed sites.
- Check the weather forecast before pesticide application and be mindful of changing weather conditions during application. Optimal conditions are: mild breeze (>5 to <10 km/h) with considerable mixing of surface air, wind direction away from sensitive areas, cool and humid conditions.
- Do not spray when wind is blowing toward known pollinator habitats or areas where honey bee hives are placed.
- Always shut off the sprayer when making turns at field ends, near gardens, ponds, or other sources of water that may be used by pollinators.

Farms

Canada has approximately 68 million hectares (167 million acres) of farm land. Many farms already have a lot of great bee forage and habitat! Farmers are business people as well as stewards of their land, and must balance economic return with sustainable ecological services. Enhancing and protecting floral resources for honey bees and other pollinators on farms presents both challenges and rewards. Enhancing floral resources on farms means healthier bee colonies for better crop pollination. Some considerations for farm enhancement of honey bee forage and pollinator habitat include:

- Assess what habitat you have for food and nesting for pollinators and consider leaving it. This could be riparian vegetation, crop edges with wildflowers, hedgerows, and marginal land.
- Enhance areas such as crop edges and marginal lands with native or introduced, non-invasive flowers from seed mixes or starter plants.
- In perennial crops, consider adding low growing flowering herbaceous plants between rows.
- Consider other ways you can manage your farm to help honey bees and pollinators. Ideas include, mowing less in areas with wildflowers, adopting IPM measures to help reduce pesticide applications and planting cover crops that have nectar and pollen for bees.
- Check for local and national programs that may support your efforts to enhance honey bee forage and native bee habitat on your farm.

Photo: Lee Solter

Resources for creating honey bee forage and bee habitat on farms:

Pollinator Partnership EcoRegional Planting Guides: http://pollinator.org/canada.htm

Ontario Ministry of Food and Rural Affairs, "Technical Guide for Preserving and Creating Habitat for Pollinators on Ontario's Farms"

Agriculture, Pêcheries et Alimentation Québec, "Prime-Vert " (http://www.mapaq.gouv.qc.ca/fr/Productions/md/programmesliste/agroenvironnement/Pages/primevert.aspx)

Agriculture and Agri-Food Canada, "Native Pollinators and Agriculture in Canada" http://www.fs.fed.us/wildflowers/pollinators/documents/AgCanadaNativePollinators.pdf

Xerces Society, "Farming for Bees" http://www.xerces.org/wp-content/uploads/2008/11/farming_for_bees_guidelines_xerces_society.pdf

Roadsides

With over 1 million km of roads in Canada, marginal habitats such as roadsides are a significant, yet often overlooked resource for honey bee forage. In landscapes fragmented by urbanization and agriculture, roadsides are an increasingly important source of diverse and abundant floral and habitat resources. They can support native vegetation, provide floral resources for honey and native bees, create important habitat for wildlife, and may help support the pollination needs of neighbouring farms. Because roadsides require continuous management for accessibility, visibility, and user safety, maintenance of an early successionary stage habitat can have positive impacts for floral resources. There are management techniques and challenges that are unique to roadsides and should be considered when creating honey bee forage and bee habitat.

- While adhering to safety standards for visibility, consider reducing mowing and pruning to allow plants, shrubs, and trees to flower.
- Most local, native plants that support pollinators are not tolerant to salt. If salt is used on roadways in the winter, consider the hydrology of the area so that run-off will not carry salt into areas of pollinator plantings.
- Weed management should be targeted only where absolutely necessary, leaving pollinator-attractive plants as often as possible.
- There is not a lot of information on how much bees and other pollinators cross roads, and how much mortality results. So far, it seems that the benefits of having pollinator forage on roads outweigh the possible negative impacts of mortality from crossing roads.

Resources for creating honey bee forage and bee habitat on roadsides:

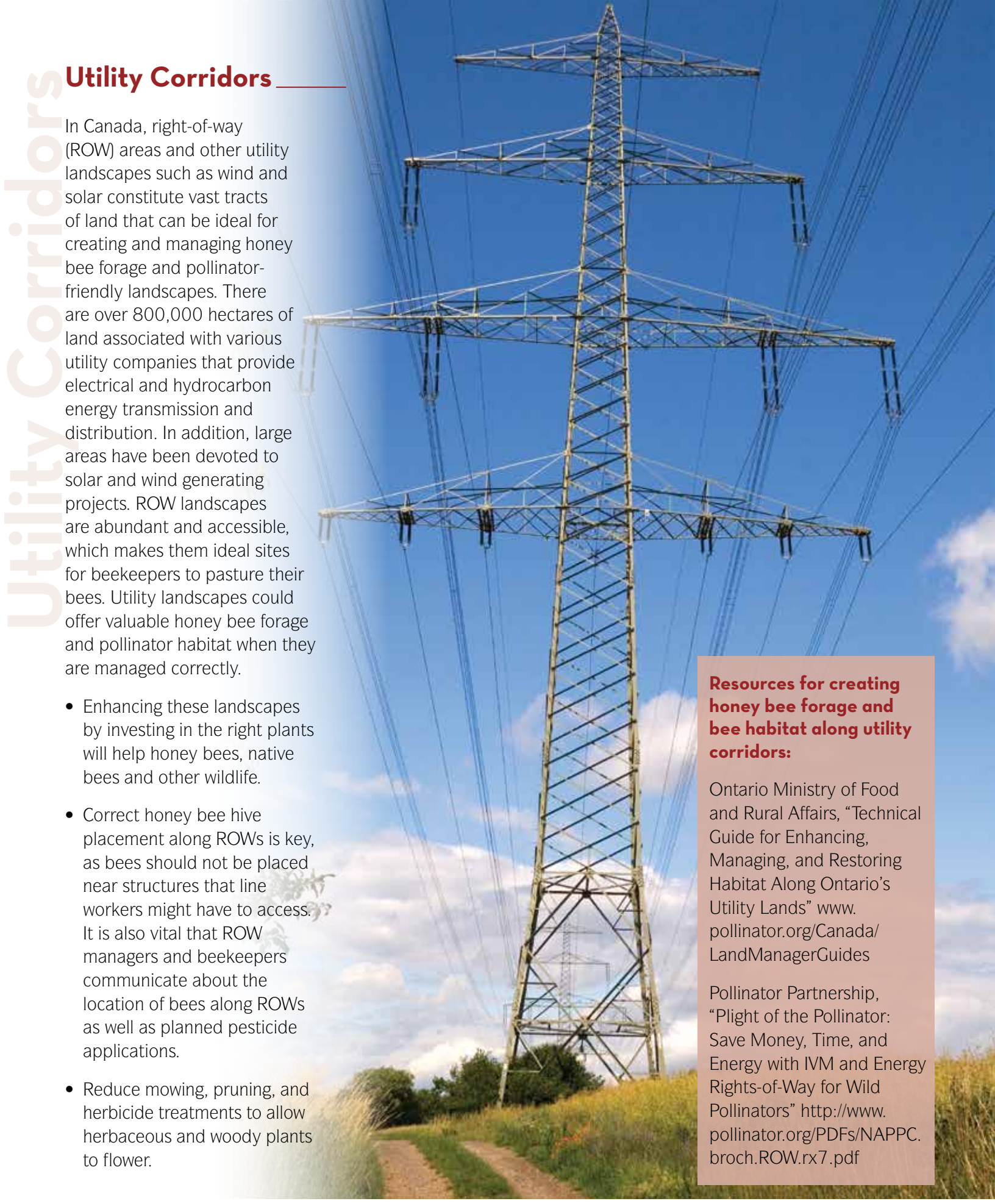
Ontario Ministry of Food and Rural Affairs, "Technical Guide for Enhancing, Managing, and Restoring Habitat Along Ontario's Roadsides" www.pollinator.org/Canada/LandManagerGuides

Xerces Society, Pollinators and Roadsides, multiple overview and technical documents: http://www.xerces.org/pollinator-conservation-roadsides/

Utility Corridors

In Canada, right-of-way (ROW) areas and other utility landscapes such as wind and solar constitute vast tracts of land that can be ideal for creating and managing honey bee forage and pollinator-friendly landscapes. There are over 800,000 hectares of land associated with various utility companies that provide electrical and hydrocarbon energy transmission and distribution. In addition, large areas have been devoted to solar and wind generating projects. ROW landscapes are abundant and accessible, which makes them ideal sites for beekeepers to pasture their bees. Utility landscapes could offer valuable honey bee forage and pollinator habitat when they are managed correctly.

- Enhancing these landscapes by investing in the right plants will help honey bees, native bees and other wildlife.
- Correct honey bee hive placement along ROWs is key, as bees should not be placed near structures that line workers might have to access. It is also vital that ROW managers and beekeepers communicate about the location of bees along ROWs as well as planned pesticide applications.
- Reduce mowing, pruning, and herbicide treatments to allow herbaceous and woody plants to flower.



Resources for creating honey bee forage and bee habitat along utility corridors:

Ontario Ministry of Food and Rural Affairs, "Technical Guide for Enhancing, Managing, and Restoring Habitat Along Ontario's Utility Lands" www.pollinator.org/Canada/LandManagerGuides

Pollinator Partnership, "Plight of the Pollinator: Save Money, Time, and Energy with IVM and Energy Rights-of-Way for Wild Pollinators" http://www.pollinator.org/PDFs/NAPPC.broch.ROW.rx7.pdf

Yards and Gardens

Even if you only have a small yard, you can help enhance forage for honey bees and native pollinators using the simple steps outlined in this guide. Increasingly, beekeepers have hives in urban areas and honey bees are a common site in many communities. Urban habitats have a great diversity of flowers and nesting sites for native bees, and with some planning, you can ensure continued and increased floral resources for honey bees and habitat for native pollinators.

- Consider less mowing, and avoid using herbicides for weed control. More municipalities are understanding that some diversity in lawns is okay, and a great thing for pollinators. Hand pull any undesirable plants, but consider leaving wild flowers like dandelions in your yard, as they are great for honey bees.
- Try to incorporate flowers with different bloom periods so that there are flowers available in your yard from early spring through fall.
- Plant native (or non-invasive introduced) plants that are good for honey bees and other pollinators using the plant lists that are in this guide.
- Avoid showy, hybrid, ornamentals. They tend not to have much pollen or nectar for bees.
- Practice Integrated Pest Management in your flower and vegetable gardens to keep insect pests under control.
- Honey bees and native bees need water sources. Keep gardens watered so there are small puddles or add a moving water feature to your garden.
- Native bees need nesting sites as well as food from flowers. Leave small patches of brush, open soil, or add nest boxes to your yard.

Opportunities to Share the Success

Let the community know what your organization and partners are doing for pollinators!

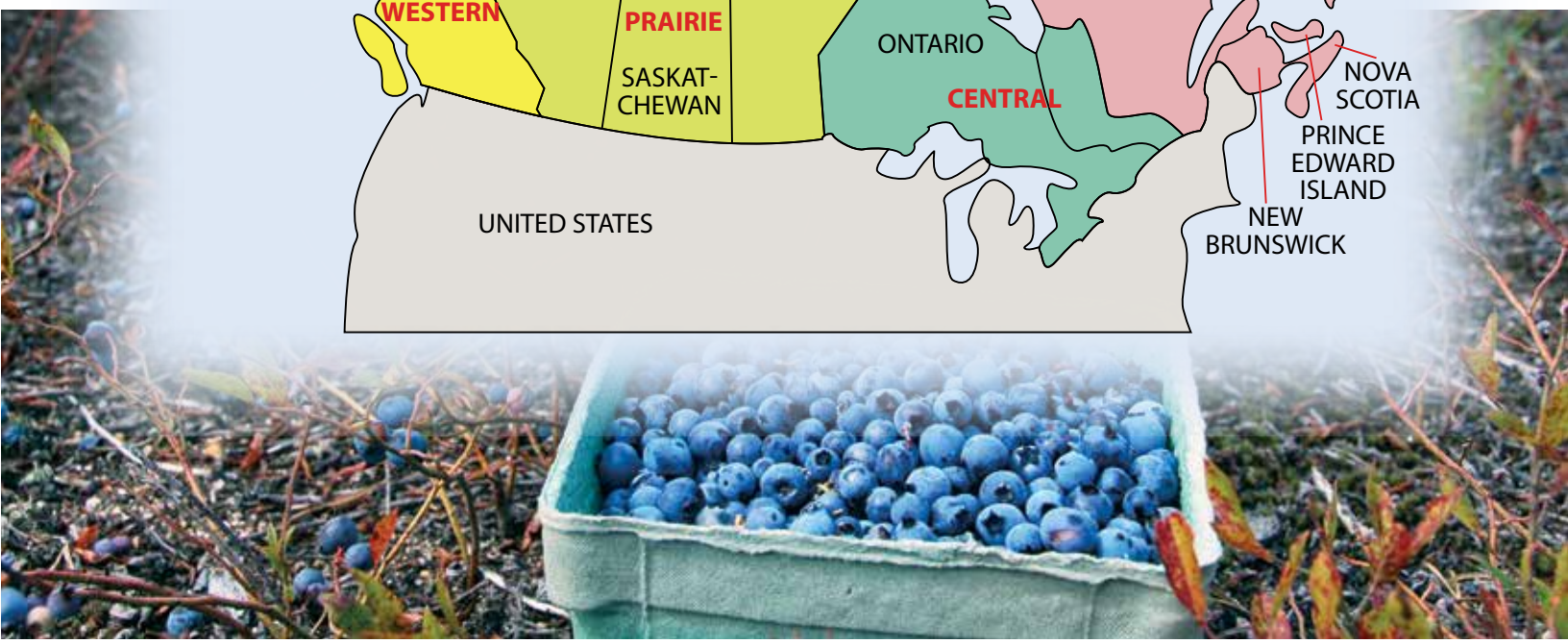
- Create a website, Facebook page, or a Twitter account to keep the public informed and engaged.
- Take before and after pictures.
- Post pictures of planting activities and the pollinators that you hope to attract.
- Provide planting lists so that your neighbours can also plant for pollinators.
- Hold meetings to communicate the status of the pollinator habitat throughout the course of the project. Invite partners and contributors to speak and be available for questions.
- Request outreach materials from the Pollinator Partnership (www.pollinator.org)
- Register this site with the S.H.A.R.E. (Simply Have Areas Reserved for the Environment) program at: http://www.pollinator.org/SHARE.htm.
- Hold a Pollinator Week event and add it to the Pollinator Week Event Calendar at www.pollinator.org.

Photo: Laurie Adams

Photo: Racquel Morris

Plant List Regions:

	WESTERN (W)	British Columbia
	PRAIRIE (P)	Alberta, Saskatchewan, Manitoba
	CENTRAL (C)	Ontario and parts of south western Quebec
	EASTERN (E)	Quebec, Newfoundland and Labrador, Nova Scotia, New Brunswick, Prince Edward Island



Honey Bee Plant List

The list of plants for honey bee and native bee forage is in four broad regions of Canada,
Western (**W**) = British Columbia, **Prairie** (**P**) = Alberta, Saskatchewan, Manitoba, **Central** (**C**) = Ontario,
Eastern (**E**) = Quebec, Newfoundland and Labrador, Nova Scotia, New Brunswick, Prince Edward Island.
The list is not meant to be exhaustive, rather it includes common plants known to be very good for honey bees. It focuses mainly on native (**N**) plants that are beneficial to honey and native bees, but includes some commonly used garden and agricultural plants that are introduced and non-invasive (**I**). Plant height and bloom period will vary with climate. It is best to find local sources for your plants and check to see that your selections are native to your region. Most of these plants should be easy to find from your local nursery. A large number of woody and herbaceous plants are what works for your region, soil, sun exposure, size of planting, goals, and your vision.

Species	Common Name	N/I	Region				Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture
			W	P	C	E						
Wood Plants												
Acer spp.	Native maples	N	X	X	X	X	12-20m+	red, greenish, yellow	March - April	sun to partial shade	dry to wet	sand, loam
Amelanchier spp.	Serviceberry	N	X	X	X	X	2-12m	white	March - April	sun to partial shade	moist, well drained	clay, sand, loam
Artemisia campestris	Field sagewort	N	X	X	X	X	0.3-1.0m	green/ brown	July - September	sun	dry, well drained	sand
Artemisia cana	Silver sagebrush	N	X	X			0.5-1.5m	yellow	August - September	sun	dry to moist, well drained	clay, sand, loam
Artemisia tridentata	Big sagebrush	N	X				0.6-2.0m	yellow	June	sun	dry	sand, loam
Chrysothamnus viscidiflorus	Yellow rabbitbrush	N	X				0.2-1m	yellow	June - October	sun	well drained	sand, loam
Cornus stolonifera	Redosier dogwood	N	X	X	X	X	1.6-4.0m	white/cream	May - June	sun to partial shade	moist to wet, well drained	clay, sand, loam
Crataegus spp.	Hawthorns	N	X	X	X	X	3.5-11m	white	May - June	sun to part shade	dry to moist	clay, sand, loam
Fraxinus spp.	Ash	N	X	X	X	X	5-15m+	purple, yellow	May-June	sun to part shade	moist to dry	clay, sand, loam
Gleditsia triacanthos	Honey Locust	N			X		15-35m	white/ cream, green/ brown	May - June	sun to partial shade	dry to moist, well drained	clay, sand, loam
Malus coronaria	Sweet crab apple	N			X		0-12m	white/cream	April - May	sun to partial shade	dry to moist	clay, loam
Prunus spp.	Native cherry	N	X	X	X	X	5-20m+	white	March - June	sun	dry to moist, well drained	sand, loam

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			W	P	C	E						
Purshia tridentata	Antelope bitterbrush	N	X				0.6-1.8m	white, yellow	May - July	sun	dry, well drained	sand, loam, clay
Quercus spp.	Native oaks	N	X	X	X	X	5-30m+	greenish white	May-June	sun	dry to moist	clay, sand, loam
Ribes spp.	Native current and gooseberry	N	X	X	X	X	1-3m	greenish white, white, pink, red	March - June	sun to shade	moist to dry, well drained	clay, sand, loam
Rosa spp.	Wild rose	N	X	X	X	X	1-3m	pink to white	June-July	sun	well drained	clay, sand, loam
Rubus spp.	Raspberry	N	X	X	X	X	1-3m	white or rose purple	June - September	sun to part shade	moist	clay, sand, loam
Salix spp.	Willows	N	X	X	X	X	5-15m+	white	April-May	sun	moist	clay, sand, loam
Sambucus spp.	Elderberry	N	X	X	X	X	1.5-5m	white	May - June	sun to partial shade	dry to wet	clay, sand, loam
Shepherdia canadensis	Canadian buffaloberry	N	X	X	X	X	1-3m	yellow, white/cream	April-May	sun	dry to moist	clay, sand, loam
Sorbus decora	Showy Mountain Ash	N		X	X	X	5-10m	white/cream	June - July	partial shade to shade	moist	clay, sand, loam
Symphoricarpos alba	Snowberrry	N	X	X	X	X	0.3-1.2m	pink	June - July	sun to partial sun	dry	clay, sand
Tilia americana	Linden or Basswood	N		X	X	X	up to 25m	yellow white	April - June	sun to partial shade	moist, well drained	sand, loam
Forbs												
Achillea millefolium var. occidentalis	Western Yarrow	N	X	X	X	X	0.3-0.9m	white, cream, pink	June - August	sun	dry to well drained	clay, sand
Asclepias speciosa	Showy Milkweed	N	X				0.4-1.2m	purple, pink	June - August	sun	dry to moist, well drained	sand, loam
Asclepias syriaca	Common Milkweed	N		X	X	X	0.5-1.5m	purple, pink	June - August	sun	moist, well drained	clay, sand
Asclepias tuberosa	Butterfly Weed	N			X	X	less than 1m	orange to yellow	May - August	sun	moist to dry	sand, loam
Agastache foeniculum	Blue Giant Hyssop	N	X	X	X	X	0.6-1.2m	blue, purple	July - August	sun to partial shade	dry, well drained	sand

Honey Bee Plant List

Species	Common Name	N/I	Region				Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture
			W	P	C	E						
Aster sagittifolius (Symphyotrichum cordifolium)	Arrowleaf Aster	N	X		X	X	0.2-1.2m	blue, purple	August - October	sun to partial shade	dry, well drained	clay, sand, loam
Aster umbellatus (Doellingeria umbellata)	Flat-topped White Aster	N			X	X	0.6-2.0m	white/cream	August - September	sun	moist to wet, well drained	sand, loam
Balsamorhiza sagittata	Arrowleaf Balsamroot	N	X				0.2-0.4m	yellow	May - June	sun	well drained	loam
Baptisia tinctoria	Wild Indigo	N			X		0-0.9m	yellow	May - September	sun	dry	sand, loam
Borago officinalis	Bee Borage	I	X	X	X	X	0.3-0.9m	blue	June - August	sun to partial shade	dry to moist, well drained	clay, sand, loam
Brassica napus	Canola	I	X	X	X	X	0.3-0.9m	yellow	May - August	sun	moist, well drained	loam
Camelina sativa 'Suneson'	Camelina 'Suneson'	I	X	X	X	X	0.6m	yellow, cream	June - July	sun to partial shade	dry to moist	clay, sand, loam
Campanula medium	Canterbury Bells	I	X		X	X	0.5-1.2m	pink, white, purple, blue	May - July	sun to partial shade	moist, well drained	sand, loam
Chamerion angustifolium	Fireweed	N	X	X	X	X	0.6-1.8m	purple, pink	July - September	sun	dry to moist, well drained	sand, loam
Cleome serrulata	Rocky Mountain Beeplant	N	X	X	X	X	0.3-0.8m	white/ cream, pink	July - August	sun to partial shade	dry to moist, well drained	sand, loam
Cosmos bipinnatus	Garden Cosmos	I			X	X	0.3-1.8m	red, violet, white, pink	August - September	sun	dry to moist, well drained	sand, loam
Coreopsis lanceolata	Lanceleaf Coreopsis	N	X		X		up to 1m	yellow	May - August	sun to partial sun	moist to dry, well drained	sand, rocky
Erigeron annuus	Eastern Daisy Fleabane	N	X	X	X	X	0.3-1.2m	white/cream	May - October	partial sun to sun	dry, well drained	clay, sand
Erigeron compositus	Cutleaf Daisy	N	X	X			up to 1m	white, pink	May - August	partial sun to sun	moist to wet	sand, granite gravels
Erigeron divergens	Spreading Fleabane	N	X				up to 1m	white, pink, purple	March - November	partial sun to sun	moist to dry	sand
Erigeron philadelphicus	Philadelphia fleabane	N	X	X	X	X	0.15-0.9m	white/ cream, purple	April - August	partial sun to sun	dry, well drained	clay, sand

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Species	Common Name	N/I	Region				Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture
			W	P	C	E						
Erigeron strigosus	Priaire Fleabane	N	X	X	X	X	0.15-0.7m	white/cream	April - August	partial sun to sun	dry, well drained	clay, sand
Eriogonum umbellatum	Sulphur-flower Buckwheat	N	X				0.1-0.3m	white/ cream, yellow	June - September	sun	dry	gravel
Eriophyllum lanatum	Common Woolly Sunflower	N	X				0.15-1.0m	yellow	June - September	sun	dry	clay, sand
Eupatorium maculatum	Joe-Pye Weed	N	X	X	X	X	0.6-1.8m	purple, pink	July - September	sun to partial shade	moist to wet, well drained	clay, sand, loam, humus enriched
Eupatorium perfoliatum	Common Boneset	N			X	X	1-1.5 m	white	July - Septepmber	sun	well drained to moist	clay, sand, loam
Euthamia graminifolia	Flat-top Goldentop	N	X	X	X	X	0.3-1.2m	yellow	July - October	sun	moist to well drained	loam
Eutrochium purpureum	Sweetscented Joe Pye Weed	N			X	X	1-2m	pink, purple	July - September	sun to shade	well drained, moist	sand, loam, clay
Fagopyrum esculentum	Buckwheat	I	X	X	X	X	1.5m	white	July - September	sun	moist, well drained	sand, loam, clay
Gaillardia pulchella	Indian Blanket	I			X	X	0.3-1m	red, yellow, brown	May - August	sun to partial shade	well drained	loam, sand, calcareous
Gilia capitata	Globe Gilia	I	X				0.3-1m	blue	May - July	sun	dry, well drained	sand, rocky
Helenium autumnale	Common Sneezeweed	N	X	X	X	X	1-1.5m	yellow, brown	July - September	sun to partial shade	moist to wet	clay, sand, loam
Helianthus annuus	Wild Sunflower	I	X	X	X	X	0.5-1.2m	yellow	July - October	sun	dry	disturbed clay, heavy sand
Helianthus maximiliani	Maximilian Sunflower	N	X	X	X	X	0.9-3m	yellow	July - October	sun	dry to moist	sand, clay, loam
Heliopsis helianthoides	Oxeye Sunflower	N		X	X	X	1m	yellow	July - October	sun	dry to moderately moist	clay, sand, loam
Lavandula angustifolia	Lavender	I	X		X	X	1.2m	purple	July - September	sun	dry to moist, well drained	sand, clay, loam
Medicago sativa	Alfalfa	I	X	X	X	X	0.3-1m	blue, yellow, purple	June - September	sun	dry, well drained	sand

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Species	Common Name	N/I	Region				Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture
			W	P	C	E						
Melilotus alba	White Sweet Clover	I	X	X	X	X	1.2m	white, pink	July - August	sun	dry to moist, well drained	sand, clay, loam
Onobrychis viciifolia	Sainfoin	I	X	X	X	X	0.2 - 1m	pink, white, purple	June - August	sun	moist, well drained	sand, loam
Phacelia tanacetifolia	Lacy Phacelia	I		X	X		0.3-1m	blue	March - May	sun	dry	sand, rocky
Physostegia virginiana	Obedient Plant	N			X	X	0.3-1.2m	purple, pink	June - September	sun to partial shade	moist, well drained	sand, clay, humus-rich
Pycnanthemum tenuifolium	Narrowleaf Mountainmint	N			X	X	0.3-0.75m	white/cream	July - September	sun	mosit to dry	sand
Ratibida columnifera	Prairie Coneflower	N	X	X	X		0.3-0.5m	yellow	May - October	sun	dry, well drained	clay, sand, loam, calcar-eous
Ratibida pinnata	Pinnate Praire Coneflower	N			X		0.45 - 1.8m	yellow	June - September	sun to partial shade	dry to moist, well drained	sand, loam
Rudbeckia hirta	Black-eyed Susan	N	X	X	X	X	0.3-1.5m	yellow with dark brown center	June - September	sun to partial sun	moist to dry	sand, loam
Solidago altissima	Canada Goldenrod	N		X	X	X	0.6-2.1m	yellow	August - November	partial shade	moist	clay, sand, loam
Solidago canadensis	Canada Goldenrod	N	X	X	X	X	0.6-2.1m	yellow	August - November	partial shade	moist	clay, sand, loam
Solidago gigantea	Giant Goldenrod	N	X	X	X	X	1.2m	yellow	September	partial shade	moist	clay, sand, loam
Solidago rigida (Oligoneuron rigidum var. rigidum)	Stiff Goldenrod	N			X		1-1.5m	yellow	August - October	sun	dry to wet	clay, sand, loam
Solidago speciosa	Showy Goldenrod	N			X		0.6-2.1m	yellow	August - October	partial shade	dry	sand
Symphyotrichum laeve	Smooth Blue Aster	N	X	X	X	X	0.3-1.2m	blue, purple	August - November	sun	dry	clay, sand
Symphyotrichum novae-angliae	New England Aster	N	X		X	X	up to 1m	purple	September - October	sun to partial shade	moist, well drained	clay
Symphyotrichum oolentangiense	Skyblue Aster	N			X		up to 1m	blue to purple	September - November	sun to partial shade	dry to well drained	sand, loam

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Species	Common Name	N/I	Region				Height	Colour	Bloom Period	Sun	Soil Moisture	Soil Texture
			W	P	C	E						
Symphyotrichum puniceum	Purplestem Aster	N	X	X	X	X	up to 2m	white, pink, purple	July - August	sun	moist	sand, loam
Trifolium fragiferum	O'Conners Strawberry Clover	I	X				0.1-0.3m	pink	July - August	sun	moist	loam
Trifolium hybridum	Alsike Clover	I	X	X	X	X	0.6-1.2m	white, pink	June - September	sun	moist, well drained	sand, loam, clay
Trifolium incarnatum	Crimson Clover	I	X		X	X	0.5m	scarlet, white	April - August	sun	moist, well drained	sand, loam, clay
Trifolium pratense	Red Clover	I	X	X	X	X	0.6m	rose-pink	May - September	sun	moist, well drained	sand, loam, clay
Trifolium repens	White Dutch Clover	I	X	X	X	X	0.1m	white/pink	June - September	sun	moist, well drained	sand, loam, clay
Trifolium wormskioldii	Cows Clover	N	X				up to 0.8m	red	May - September	partial shade	moist, wet	loam
Verbena hastata	Blue Vervain	N	X	X	X	X	0.6-1.8m	blue, purple	June - September	sun to partial shade	moist to wet, well drained	clay, sand, loam
Verbena stricta	Hoary Vervain	N			X		less than 1m	purple	July - September	sun	dry, drained to sandy	sand
Verbesina alternifolia	Wingstem	N			X		1.2-2.4m	yellow	August - October	sun to partial shade	moist, well drained	humus-rich
Vernonia altissima	Tall Ironweed	N			X		1.5-2.4m	purple	August - September	sun, partial shade	moist, wet	sand, loam, clay
Vernonia gigantea	Giant Ironwood	N			X		1-2.5m	purple	August - September	sun, partial shade	moist, well drained	sand, loam
Vicia cracca	Tufted Vetch	I	X	X	X	X	1-1.8m	purple	May - July	sun	dry	clay, sand
Vicia villosa	Hairy Vetch	I	X	X	X	X	0.6-1.5m	purple	June - July	sand, loam, clay	well drained	loam, sand
Zizia aurea	Golden Alexanders	N			X	X	up to 1m	yellow	May - July	sun to partial sun	moist to wet	clay, sand, loam

*Use caution; can spread and become weedy

Photo: Lee Solter

Photo: Derrick Ditchburn

Photo: Racquel Morris