T O R O N T O POLLINATOR **PROTECTION** S T R A T E G Y





Toronto's Pollinator Protection Strategy was created to support the vision of our city being home to diverse pollinator communities that contribute to resilient ecosystems and enhance urban biodiversity.

Created with the help of expert stakeholders and concerned residents, the strategy recognizes that the City and the community are already doing many things to support pollinators, and that more can be done. It builds on and expands current activities, and creates opportunities to establish new initiatives, partnerships and collaborations.

This document includes:

- an overview of Toronto's bees and butterflies;
- the guiding principles that shaped the strategy; and
- a series of actions that the City and community can take to help protect and sustain healthy pollinator populations in Toronto.

Conserving and properly managing Toronto's diverse pollinator community is a key component of a sustainable, resilient, and biodiverse city. Toronto's Pollinator Protection Strategy will be a component of the City's broader Biodiversity Strategy.

Learn more and access community resources at: livegreentoronto.ca

VISION

Toronto is home to diverse pollinator communities that contribute to resilient ecosystems and enhance urban biodiversity.



TORONTO'S POLLINATORS

Toronto is home to a wide range of pollinators, including over 360 species of bees and 112 species of butterflies. These insects provide important ecosystem services such as pollination, are a source of food for birds, and contribute to the biodiversity in our city.

WHAT IS POLLINATION?

Pollination is the act of transferring pollen from the male part of a plant to the female part of a plant, allowing plants to produce seeds, fruits, and new plants. Most plants cannot pollinate themselves, they attract pollinators through scent, nectar, and bright colours.

WHAT ARE POLLINATORS?

Animal pollinators include bees, butterflies, moths, wasps, flies, beetles, and birds. Bees are the most specialized and efficient insect pollinators. Bees collect pollen and nectar from flowers to feed themselves and their larvae.

WHAT IS POLLINATOR HABITAT?

Pollinators need food and places to nest, reproduce and overwinter. Pollinator habitat provides foraging resources (pollen and nectar from flowers), nesting and overwintering sites (bare patches of soil, hollowed stems, leaf litter), and larval host plants (such as milkweed). Pollinators need continuous access to flowers from spring to fall. Native plants that are locally-grown and pesticidefree provide pollinators with ideal forage habitat.

WHY IS THERE CONCERN ABOUT POLLINATORS?

Pollinators are under increasing stress due to habitat loss, invasive species, diseases, pesticides and climate change. Studies have shown that some species are in drastic decline.

Toronto's bees

Native bees and managed bees can be found in Toronto. An average backyard garden may contain over 50 species of bees, with some nesting and foraging there, and others visiting for pollen and nectar.

NATIVE BEES

Toronto's native bee community consists of over 360 species. Bee species vary tremendously in colour, size and shape, sometimes making it difficult to distinguish what is a bee and what isn't. For example, the Bicoloured Agapostemon (pictured here), commonly seen in Toronto, has a metallic green head and thorax.

Most native bees are solitary and nest in the ground or pre-existing cavities. Some, such as carpenter bees, excavate tunnels in wood.

Native bees typically overwinter in pithy stems, rotting logs or underground burrows.



Bicoloured Agapostemon (A. virescens)





BEES AT RISK

Several species of native bees are at risk of extinction. Toronto's at-risk species include:

- Rusty-patched Bumble Bee (Endangered),
- Gypsy Cuckoo Bumble Bee (Endangered),
- Yellow-banded Bumble Bee (Special Concern)

Did you know?

Native bees don't make honey, as they overwinter in a dormant state and do not require food stores. Honey bees make and store honey for overwintering needs. Native (or wild) pollinators exist naturally within the environment and have coevolved with native flowering plants for over 100 million years.

MANAGED BEES

Managed bees are not wild – they require humans to provide for some of their needs.

The European Honey Bee (*Apis mellifera*) is the most common managed bee in Ontario, but it is not native to Canada. It is an introduced species brought to North America by European settlers.

Managed honey bees live in colonies (or hives), are black and yellow (or amber), and are known to sting. Honey bees produce honey and pollinate a broad range of Ontario crops making them economically valuable in the agricultural sector. The Ontario Bees Act is the legislation that regulates honey bees and beekeeping in Ontario.

Canadian Bees	1 Star /	European Honey Bees	12
800+ species	CARRY .	One species	
Native	PELGO	Non-native	
Wild	C C AN	Managed	A COLOR
Don't produce honey		Make honey	
Come in a wide range of colours		Black and yellow/amber	
Nest in the ground or cavities		Live in hives	
Are primarily solitary		Are social and live in colonies	
In most cases don't sting		Sting	



Did you know? The European Honey Bee is not native to Canada. It is an introduced species originally brought to North America from Europe.

IMPACT OF NON-NATIVE BEES ON NATIVE BEES

Recent studies suggest that in urban centres where habitat is limited, the introduction of non-native bees (such as honey bees), may negatively impact native pollinators, due to competition for resources and introduction of pests/disease.

Honey bee colonies are massive and each hive can contain up to 50,000 bees. Unlike native bees, honey bees need to make and store honey to sustain the colony overwinter. This requires them to collect additional resources, which means that a single honey bee colony can potentially out-compete thousands of native bees for food.

Studies have also shown that managed honey bees may introduce parasites and diseases to native bees.

BEES IN THE NEWS

Despite the significant media attention on the declining health of honey bees, evidence suggests that native bee species are even more threatened than honey bees, and when these species are lost, they cannot be replaced. Honey bees can be re-established when beekeepers experience a loss.

Toronto's butterflies

There are 112 species of butterflies recorded in Toronto. Butterflies are beautiful and an essential part of our interconnected ecosystem. Caterpillars are immature butterflies and they are an important source of food for birds. In order to nurture our butterflies, we must first nurture our caterpillars.

MONARCH BUTTERFLIES

The Monarch butterfly is probably the world's most familiar butterfly, best known for the incredible migration of the eastern North American population. Individuals fly 3200 kilometres from breeding grounds in Toronto to overwinter in central Mexico. Monarchs return in the spring to their larval host plants (milkweed), which do not grow in their overwintering sites.

Monarch caterpillars feed exclusively on milkweed plants. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of flowers.



Did you know?

The larvae (caterpillars) of each species of butterfly, can only feed on specific plant species, called larval host plants. For Monarchs, this plant is milkweed. In 2014, the Province of Ontario removed milkweed from its noxious weed list.

WHY ARE BUTTERFLIES IMPORTANT?

While butterflies are not the most efficient pollinators, they are an important part of our ecosystem. Caterpillars are a primary source of food for other animals, such as birds. While most people are not fond of caterpillars, they need to be nurtured for their roles in the natural ecosystem.

MIGRANTS AND RESIDENT BUTTERFLIES

A few species of Toronto butterflies migrate south for the winter (such as Monarchs) while the majority remain in the city and overwinter as eggs, chrysalides, larvae or adults. These species require particular habitat such as leaf piles or sheltered areas to successfully overwinter.

BUTTERFLIES AT RISK

The Monarch butterfly is classified as Special Concern provincially and endangered federally, as populations have declined drastically over the last decade. The Mottled Duskywing and the West Virginia White are also species at risk. All eight swallowtail species in Toronto are specially protected. At least one species, the Karner Blue Butterfly is locally extinct.

LOCAL THREATS TO POLLINATORS

Pollinators are under increasing stress and populations are in decline. Trends suggest that pollinator declines are a result of the interacting impacts of several stressors resulting from human activities.

1. FORAGE HABITAT LOSS

When wildflower habitat is reduced, the availability of pollen and nectar for pollinators is also reduced. Bees and butterflies need continuous access to flowers during their foraging periods (spring to fall). Locally-grown, pesticide free, native plants provide ideal forage habitat.

2. LOSS OF LARVAL HOST PLANTS

The larvae (caterpillars) of each species of butterfly can only feed on specific plants, known as larval host plants. For Monarch butterflies, this plant is milkweed. Planting native milkweed, such as common milkweed, swamp milkweed and orange milkweed, will help to support Monarch populations.

3. NESTING HABITAT LOSS

Most native bees are solitary and nest in the ground or cavities. Converting a lawn or garden to concrete, gravel, mulch or artificial turf makes it impossible for bees to nest. Nesting sites can be provided by leaving bare patches of sandy soil, dry stems, and raspberry stalks.

4. OVERWINTERING HABITAT LOSS

Some native bees overwinter in cavities, tunnels, dry stems or wood. Bundles of raspberry stalks and other stems that are put out for yard waste collection in spring will often contain overwintering bees. Overwintering sites should be left undisturbed until the bees vacate, usually in spring or early summer.

5. INTRODUCED AND INVASIVE SPECIES

Non-native bees may negatively impact native bees. The European Honey Bee and Wool Carder Bee may make it more difficult for native bees to find adequate food, and the Giant Resin Bee may displace nesting native bees. Dog strangling vine, an invasive plant, may negatively affect Monarch populations as it is closely related to milkweed. Female Monarchs lay eggs on it, but the larvae cannot survive.



6. DISEASES AND PESTS

Diseases and pests that impact honey bees include the Varroa mite, American foulbrood, and small hive beetle. Recently, concerns have been raised about the spread of pathogens from managed honey bees to native bees.

7. PESTICIDES

Insecticides are the type of pesticide that pose the greatest threat to pollinators. In recent years, there has been attention on neonicotinoids, a class of systemic insecticides. While the intention of insecticides is to control unwanted insect pests, they can harm beneficial insects such as bees and butterflies. Many plants and seeds sold in garden centres are treated with pesticides, which can transfer into the nectar and pollen of the plant. **Did you know?** Toronto passed a Pesticide By-law in 2003, banning the use of cosmetic pesticides. Ontario followed with a provincial ban in 2009.

8. CLIMATE CHANGE AND WEATHER

Earlier spring thaws can shift the bloom times of flowering plants, which can cause gaps in the food supply. Extreme weather events can affect insect populations already stressed by climate change and other factors.

What are neonicotinoids?

- Neonicotinoids are a class of systemic insecticides that affect the central nervous system of insects, resulting in paralysis and death.
- Neonicotinoids have been widely used for agricultural seed treatment in Ontario since the mid 1990's.
- In 2015, Ontario became the first jurisdiction in North America to legislate restrictions on neonicotinoid treated corn and soybean seeds, under the Pesticides Act.
- The City of Toronto does not use neonicotinoids in any of its greenhouses, parklands or gardens.

90% of all wild flowering plants depend on pollination

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1 in every 3 bites of food we eat relies on bees for pollination

Red-belted Bumble Bee (Bombus ternarius



Conserving and properly managing Toronto's diverse pollinator community is a key component of a sustainable, resilient, and biodiverse city.

WHY DOES TORONTO NEED A POLLINATOR PROTECTION STRATEGY?

It is critical to ecosystem functioning to maintain healthy populations of bees and butterflies.

As pollinators, bees provide an invaluable service to the ecosystem. Without bees, much of the food we eat and the natural landscapes we enjoy would not exist.

Butterflies are also an essential component of our ecosystem. Caterpillars, the larvae of butterflies, have important roles as natural herbivores and food for birds.

The decline in some species of pollinators is alarming. Once a native species is lost from an area, it cannot be replaced. The actions in this Strategy are intended to ensure that species that exist in our city can be sustained.

Habitat creation is key to supporting Toronto's pollinators

One of the biggest threats facing all pollinators is habitat loss and fragmentation. Pollinators require high quality habitat to thrive in an urban environment - they need food and places to nest, reproduce and overwinter.

Fortunately there are many ways the City and community can help to create, enhance and preserve habitat for pollinators. The simple act of planting native plants, trees and shrubs will have positive benefits for all pollinators in Toronto.

Some tips for creating pollinator-friendly habitat can be found at the back of this booklet.

CITY OF TORONTO SUPPORT FOR POLLINATORS

The City of Toronto is already doing many things to support pollinators, and more can be done. Several of the initiatives already underway in our city are highlighted as success stories in this document. This Strategy builds upon and expands current activities, and creates opportunities to establish new initiatives, partnerships and collaborations.

BEES OF TORONTO, BUTTERFLIES OF TORONTO – THE BOOKS

Available at local libraries and online, these two books are a part of the City's Biodiversity Series. These are made-in-Toronto guides to bees and butterflies in the city. Bees of Toronto, the first book on urban native and non-native bees in the world, was the result of a partnership between the City, York University and volunteers.

TORONTO, THE FIRST BEE CITY IN CANADA

In April 2016, City Council showed its commitment to raising awareness of the importance of pollinators by adopting a resolution designating Toronto a Bee City. With that decision, Toronto became the first Bee City in Canada. Participation in the Bee City program raises awareness of pollinator protection activities and encourages municipalities to take action.



ROYAL ONTARIO MUSEUM

TORONTO'S POLLINATOR PROTECTION STRATEGY

Toronto's Pollinator Protection Strategy recognizes that:



- Toronto is home to a wide range of pollinators, including bees, wasps, flies, butterflies, moths, beetles, and birds.
- Threats to Toronto's pollinators include forage habitat loss, loss of larval host plants, nesting habitat loss, overwintering habitat loss, pesticides, introduced and invasive species, diseases/pests, and climate change.
- Toronto's diverse bee community consists of over 360 species of native bees and one species of managed bee, the European Honey Bee, which is not native to North America. Honey bees are managed by beekeepers, governed by the Ontario Bees Act, and they can be re-established when beekeepers experience a loss.
- Evidence suggests that native bee species are more threatened than honey bees and may be negatively impacted by urban beekeeping activities due to resource competition and the spread of parasites and disease.
- The habitat creation efforts presented in this strategy will support native bees and butterflies, and will also be beneficial to all pollinators, including honey bees.

Guiding Principles:

- a. To prioritize actions that support and sustain native pollinator biodiversity in Toronto, recognizing that native bee species, for example, are more threatened than non-native honey bees, that they are ecologically important, and that once they are lost they cannot be replaced.
- b. To create, enhance and protect habitat in natural and urbanized areas – using native plants, trees and shrubs as much as possible – recognizing that habitat loss is one of the greatest threats facing pollinators and that additional habitat will benefit all pollinators, both native and non-native.
- c. To engage and support the community in taking action to help sustain Toronto's native pollinators.



POLLINATOR PROTECTION STRATEGY: VISION, PRIORITIES AND ACTIONS

Toronto's vision is to be home to diverse pollinator communities that contribute to resilient ecosystems and enhance urban biodiversity.

To achieve this vision, Toronto's Pollinator Protection Strategy identifies six priorities:

- 1) Create and enhance habitat
- 2) Design and connect green spaces
- 3) Partner and build relationships
- 4) Invest and incentivize
- 5) Educate and train

Adult Black Swallowtail (Papilio polyxenes)

6) Celebrate and recognize achievements

For each priority, a series of actions have been developed that will help to achieve this vision. These actions will support native bees and butterflies, and will also be beneficial to all pollinators, including non-native honey bees. Habitat creation in particular will have a positive impact on all pollinators, and is the foundation of the Strategy.

1. CREATE AND ENHANCE HABITAT



Pollinators require high quality habitat to thrive in an urban environment. High quality habitat is any area that provides foraging resources (pollen and nectar from flowers), nesting and overwintering sites, and larval host plants (such as milkweed) that support butterflies.

Many of the places to create and enhance pollinator habitat already exist on the ground and on our rooftops. Our urban environment with patches of parkland, ravines, urban gardens and green roofs, can provide an abundance of floral resources and nesting sites for a wide range of pollinators.

Actions:

1. Plant more pollinator-friendly native plants, trees, and shrubs in City parks and facilities, with the goal of creating pollinator habitat in every park, where feasible.

2. Work with members of City Council to identify at least one City-managed site in each ward that can be enhanced for pollinators and serve as a model garden, and establish a pollinator demonstration garden at Toronto City Hall.



3. Create "pollinator patches" at urban agriculture sites managed by the City by incorporating pollinator-friendly native plants into community gardens and allotment gardens.

4. Work with Solid Waste Management Services to identify City-owned closed landfill sites that may have the potential to become high quality pollinator habitat.

5. Review the City's landscaping practices, including mowing and mulching activities, with the goal to preserve pollinator habitat.

Success story

The Humber Bay Butterfly Habitat (HBBH) -

This City of Toronto led ecological restoration project provides critical habitat for a variety of native butterflies and other pollinators. Located along the shore of Lake Ontario in Toronto's west end, HBBH incorporates a diversity of native flowers, shrubs, trees, grasses, sedges and a variety of physical features known to support butterflies throughout their life cycles. The goal of HBBH is to establish a self-sustaining native plant community that will support a variety of butterfly species, while engaging and educating park users about the value of urban wildlife habitat.

> Humber Bay Butterfly Habitat

2. DESIGN AND CONNECT GREEN SPACES

As cities grow, habitat can be lost or fragmented into small patches, making it difficult for some species to access all of the resources they need to survive. By re-connecting green spaces, a continuous corridor of habitat can be created that allows pollinators to move freely from area to area and take advantage of the resources each patch has to offer.

On a city-wide scale, parks, ravines, green roofs, and infrastructure corridors present the greatest opportunity for the conservation of pollinators.

On a smaller scale, individual pollinator plantings such as urban gardens, parkettes, laneways, and planter boxes, can be linked to create a neighbourhood-scale pollinator corridor.

Actions:

6. Identify opportunities to improve connections between existing habitat, and encourage the creation of "pollinator pathways" to foster corridor creation across the city.

7. Continue to support the work of the Toronto and Region Conservation Authority (TRCA) to revitalize hydro corridor space in Toronto and transform it into high functioning meadow habitat that supports pollinators, by contributing staff time and exploring funding requirements needed to advance these efforts.

8. Enhance areas of the City Hall podium green roof with pollinator-friendly habitat, where possible, accompanied by educational signage, to demonstrate the role green roofs play in pollinator habitat and corridor creation.





Success story

The Scarborough Centre Butterfly Trail - This TRCA initiative with funding from the W. Garfield Weston Foundation, revitalized approximately 40 hectares of hydro corridor space. By converting the area from barren mown grass into a meadow that provides high functioning pollinator habitat to complement the multi-use trail for pedestrians, the initiative transformed an underutilized space into an important part of the natural system in Toronto. Through education and stewardship programs, community members are able to connect with nature and take active ownership of the space to maintain it for future generations to enjoy. This corridor represents an important pathway of connected greenspace, which allows pollinators to forage in a larger area.

9. Engage with developers, property owners and landscape architects to encourage the creation of pollinator-friendly landscapes and promote biodiverse, pollinator-friendly green roofs, by updating information in the City's Guidelines for Biodiverse Green Roofs and by offering support through the City's existing Eco-Roof Incentive Program. 10. Work with relevant City divisions to ensure native, pollinator-friendly plants are considered in the implementation of green infrastructure projects undertaken by the City, and included in City guidelines such as the Green Streets Technical Guidelines, Complete Street Guidelines, the Toronto Green Standard, the Wet Weather Flow Master Plan and Policy, Greening Surface Parking Lots, Streetscape Manual and other relevant policies.

3. PARTNER AND BUILD RELATIONSHIPS

It is vital to pollinator protection that the City continues to build relationships, consult, and engage with stakeholders. There are groups in Toronto already working on pollinator protection initiatives and the City of Toronto can support and encourage their actions. Many of the actions proposed in this document cannot be achieved without the support and guidance of partners.



Actions:

11. Engage with the Toronto Association of Business Improvement Areas (TABIA), property and rental associations, condominium boards, faith groups and other large property owners to encourage the creation of pollinator habitat through native plantings.

12. Partner with Toronto Master Gardeners, Landscape Ontario and horticultural and landscape school programs to provide advice and inspiration to property owners in Toronto interested in creating pollinator habitat through on-site consultations and information sessions.

13. Continue to work with local growers and nurseries to encourage them to provide native, pesticide-free plant material and seeds for pollinator habitat, and explore ways to make these items easier for consumers to identify in stores.

14. Support university and college-led research and monitoring projects, and citizen science initiatives that support the goals of this Strategy, and provide data to track and measure the success of implementing the actions in the Strategy. 15. Convene an Aboriginal Committee/ Working Group to provide ongoing feedback on the incorporation of Indigenous knowledge, practices, and approaches into the implementation of the Strategy.

16. Continue to coordinate with the Province of Ontario on the Pollinator Health Action Plan, and the Provincial Apiarist on the Ontario Bees Act.

Success story

Parkland Naturalization Program -

The City works with community groups and funding partners to restore degraded natural landscapes and establish new natural areas to create forest, wetland, and meadow habitats. More than 60,000 native trees and shrubs have been planted, as well as more than 50,000 wildflowers, herbaceous and aquatic plants.



4. INVEST AND INCENTIVIZE

Investing in pollinator protection initiatives and incentivizing actions that create pollinator habitat will inspire and motivate people to act. Incentives play a key role in changing behaviour, encouraging new approaches, and supporting community interest in pollinator protection.

City purchasing practices can be designed to support healthy pollinator populations. The purchasing power of the City can be utilized to shift the market toward growing and distributing pesticide-free native plants that are beneficial to pollinators.



Actions:

17. Develop and seek funding sources for an incentive program that provides modest financial support to encourage community-led pollinator habitat creation or enhancement, and pollinator education initiatives.

18. Explore the creation of a City procurement policy to purchase more pollinator-friendly native plants, and to select plants and seeds that have not been treated with systemic pesticides (e.g. neonicotinoids) for use in City-managed spaces, and incorporate these guidelines into tender documents for all City divisions.

19. Inspire residents to create pollinator habitat by offering resources such as pollinator-friendly gardening tips, plant lists, seeds, and recognition signage (e.g. Pollinators Are Welcome Here!) through Community Environment Days and Live Green Toronto outreach events.

20. Update the City's Street Tree brochure to include information on how trees benefit pollinators, and identify which trees are pollinator-friendly.

21. Seek sponsorships, grant and external funding opportunities to support the actions presented in this Strategy.



Success story

Live Green Toronto Grants - The grants funded 168 community-led greening projects from 2008 to 2015. The grant recipients included 40 garden projects that provide important habitat for Toronto's pollinators. One grant recipient, the Dallington Pollinators Community Garden, also won the RBC Blue Water Award and a City of Toronto Garden Award. Another grant recipient, the Franklin's Children's Garden Pollination Station, on Toronto Island, welcomed close to 40,000 visitors in the summer of 2016.

5. EDUCATE AND TRAIN

Strengthening education initiatives will leverage the interest in protecting pollinators that already exists in the community. The City has the opportunity to promote practices that are beneficial to pollinators, and identify those that can be harmful.

For example, well-meaning individuals who want to help pollinators may pursue hobby beekeeping, when planting a pollinator garden is an easier and more effective way to support them.

It's also important to recognize the role of City staff, and the importance of delivering and expanding the Horticulture Program of Excellence, that provides education and training to City staff.

Actions:

22. Develop pollinator-friendly gardening practices tips and share lists of pollinator-friendly native plants, trees and shrubs suited to the Toronto area.

23. Work with Live Green Toronto to develop and deliver outreach on pollinator stewardship, and look for opportunities to incorporate Indigenous cultural content into educational initiatives.

24. Engage with Toronto School Boards to encourage schools to create pollinator habitat, with the goal of creating a teaching garden at every school, and investigate support for ongoing garden maintenance.



25. Continue and expand training for City staff on pollinator protection practices through the Horticulture Program of Excellence and identify pollinator-friendly native plants on the plant list available to City horticulture staff.

26. Collaborate with the Ontario Beekeepers' Association, Toronto-based beekeeping groups, and the Provincial Apiarist to facilitate informed beekeeping in Toronto by creating best practices, promoting training for novice beekeepers, and educating potential beekeepers about habitat creation as a more effective way to help pollinators.

Success story

Tickle Bees and City Staff - In the spring of 2015, thousands of gentle, ground-nesting native bees emerged with the warm weather in a City park. Being in close proximity to a playground, members of the public voiced their concern to the Park supervisor. City staff, having recently completed training on pollinators as part of the Horticulture Program of Excellence, identified the bees as Mining bees, nicknamed the "Tickle Bee" by school children, as they don't sting and are very gentle.

Staff installed educational signage about the "Tickle Bees" and the vital role they play in pollination. The community was thrilled to host these important pollinators and often stopped to observe their activity. Educating City staff about this important pollinator led to this educational opportunity for members of this community.

<section-header>

Ground Nesting Solitary Bee

6. CELEBRATE AND RECOGNIZE ACHIEVEMENTS

There are many ways to celebrate and recognize achievements in pollinator protection. National Pollinator Week is a wellestablished annual celebration that raises awareness and celebrates actions taken to protect pollinators.

The City can recognize the efforts of residents, businesses, community organizations, and institutions by celebrating milestones and honouring the contributions of members of our community. Public signage, awards, and certification programs will also raise the profile of pollinators and assist in educational efforts that encourage further action.



Actions:

27. Celebrate and promote National Pollinator Week and Toronto's status as the first Bee City in Canada by undertaking at least one public education and/or habitat creation or restoration activity each year.

28. Work with relevant partners such as Canadian Wildlife Federation, Monarch Watch, Pollinator Partnership, World Wildlife Fund, Carolinian Canada, and others to promote existing certification programs, mapping tools and other resources that guide and recognize Toronto property owners in creating pollinator habitat.

29. Add a pollinator-friendly garden category to the City's existing Garden Awards program, and inspire others by offering in person and virtual tours of award-winning gardens.

30. Investigate the opportunity to incorporate pollinator protection initiatives into the City's existing Urban Design Awards.

Success story

Celebrating National Pollinator Week - In June 2016, an event was organized to celebrate National Pollinator Week and Toronto's status as the first Bee City in Canada. A mural of a green metallic sweat bee was unveiled at Bloor Street and Howland Avenue and a proclamation declaring "Pollinator Week" in Toronto was announced. The mural was the result of a partnership between Burt's Bees and the City's StreetARToronto and Live Green Toronto programs. Painted by Toronto artist Nick Sweetman, the mural is about 65' long by 35' high and serves as a stunning reminder of the importance of pollinators in our urban environment.





TORONTO'S OFFICIAL BEE: BICOLOURED AGAPOSTEMON (Agapostemon Virescens)

The metallic green sweat bee - Bicoloured Agapostemon - is an ideal choice as Toronto's Official Bee for several reasons:

- It is easy to identify. No other insect in our area has a brilliant bright green head and thorax combined with a black abdomen. The males are also bright green at the front but their abdomen is yellow and black striped.
- It is a common bee. The females can easily be found in early summer mornings foraging on thistles and other flowers. The males can be observed flying slowly around flowers looking for females.
- It is welcoming. Females form communal nests in the ground. Their social set up is similar to a condominium with one entrance that is shared by all occupants, but each has its own separate unit. Up to two dozen females may share a single nest entrance, but each individual builds its own burrow. One bee usually guards the entrance, with only her head visible from above ground. There is strength in numbers, which is why these bees allow other Bicoloured Agapostemon individuals (complete strangers) into their nests to increase entrance surveillance. Most bees will defend their nests against others of their own species, but our official bee is much more tolerant of newcomers, and this makes it a particularly appropriate choice for Toronto's Official Bee.



SPECIAL THANKS TO OUR POLLINATOR ADVISORY GROUP:

The City acknowledges the important role of academic community, subject matter experts, and concerned non-profit groups in providing guidance to the City on pollinator protection. Our Advisory Group includes conservation biologists, academic researchers, pollinator and native plant experts, green roof researchers, beekeepers, and community based organizations.

City staff are fortunate to be able to tap into the expertise of this group and receive evidencebased research and advice on how to approach pollinator protection. We thank the members of our Advisory Group for donating their time, expertise and enthusiasm to this effort. This group has been instrumental in guiding the development of the actions presented in this document.

Pollinator Advisory Group:

Antonia Guidotti, Royal Ontario Museum Brock Harpur, York University Charlotte de Keyzer, University of Toronto Clement Kent, York University and Master Gardener Dave Barr, Toronto Field Naturalists Gillian Leitch, Landscape Designer and Beekeeper Jode Roberts, David Suzuki Foundation Jodi Lastman, Park People Kathleen Law, Pollinator Partnership Liat Margolis, University of Toronto Lorraine Johnson, Native Plant Expert **Oliver Couto, Toronto Beekeepers Collective** Sarah Hedges, Ontario Nature Scott Maclvor, University of Toronto Sheila Colla, York University Vicki Wojcik, Pollinator Partnership

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TIPS TO CREATE A POLLINATOR-FRIENDLY GARDEN

Plant native: Choose native plants, trees and shrubs rich in pollen and nectar. Locally grown and pesticide free are best.

Mass plantings: Planting multiples of the same plant together in large groupings makes it easier for pollinators to find and collect pollen.

Plant single bloom varieties: The petals of double or triple bloom varieties can block access to pollen and nectar.

Provide continuous bloom: Pollinators need a continuous source of pollen and nectar so choose a variety of plants that will bloom from spring to fall.

Plant host plants: Butterflies lay their eggs on specific plants. Monarch butterflies, for example, will only lay their eggs on milkweed, the sole food source for their larva.

Provide water: A bird bath or shallow dish of water with half submerged rocks will help bees and butterflies quench their thirst.

Provide sun: Butterflies like to bask in the sun, so place a few flat rocks in sunny, sheltered locations.

Keep it natural: Converting a lawn or garden to concrete, gravel, mulch or artificial turf reduces valuable food and nesting sites.

Bare ground: Many native bees build nests in soil, so leave some bare patches and limit your use of mulch.

Leave dead stems: Some bees hibernate and lay eggs in hollow stems. If you do cut them, leave the bottom 8 inches. Bundle the stems and place them in your garden.

Leave the leaves: Leave the leaves where they fall or rake them into your garden to provide overwintering habitat for butterflies.

Prune and deadhead: Remove dead flower heads to encourage new growth and a longer flowering season.

Reduce mowing: To avoid disturbing ground nesting bees, mow your lawn less often and set the blade at the highest level possible.

Avoid pesticides: Avoid plants/seeds treated with systemic insecticides, such as neonicotinoids. And don't spray pesticides. Toronto's Pesticide Bylaw bans the cosmetic use of pesticides.

Find more tips and resources at livegreentoronto.ca

Learn more and get involved:

Live Green Toronto livegreentoronto.ca

Bumble Bee Watch bumblebeewatch.org

Canadian Wildlife Federation cwf-fcf.org

Carolinian Canada & World Wildlife Fund - In The Zone caroliniancanada.ca/zone

David Suzuki Foundation's Butterflyway Project butterflyway.davidsuzuki.org

Evergreen's Native Plant Database nativeplants.evergreen.ca

Monarch Butterflies and Butterfly Watching ebutterfly.ca

North American Native Plant Society nanps.org

Ontario Invasive Plant Council ontarioinvasiveplants.ca

Ontario Nature ontarionature.org

Park People parkpeople.ca

Pollinator Partnership Canada pollinator.org/Canada

Toronto and Region Conservation Authority trca.ca

Toronto Master Gardeners torontomastergardeners.ca

Wildlife Preservation Canada wildlifepreservation.ca

Xerces Society for Invertebrate Conservation xerces.org



