

Monitoring Pollinators on Your Farm

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Overview

- What *is* a pollinator?
- Why support our pollinators?
- Pollinator decline
- Monitoring pollinators
 - Butterflies
 - Bees
- Other ways to help pollinators
- Questions



Photo credit: Brock Ogilvie

What *is* a Pollinator?

- Animals that move pollen from male structures (anthers) of flowers to the female structure (stigma) of the same plant species
- Pollinators fertilize plants
- Pollinators are mainly insects such as bees, flies, butterflies, beetles
- Some bats and birds can also be pollinators



Why support our pollinators?

Pollination and Food Security

Pollinators are essential to food security and human nutrition

More than $\frac{3}{4}$ of Ontario crops rely on pollinators including:

- Alfalfa
- Apples
- Asparagus
- Blueberries
- Canola
- Cherries
- Cranberries
- Cucumbers
- Melons
- Peaches
- Plums
- Pumpkins
- Squash

Did you know?
1/3 of our diet
comes from insect-
pollinated plants!

Why support our pollinators?

Economic Importance

- More than 400 species of native bees in Ontario
- Provide ecological services at a low cost
- **Ecological Services:** valuable and essential benefits arising from ecological functions of ecosystems
 - Ex: Pollination, decomposition, etc.



Why support our pollinators?

Environmental Importance

- Keystone species
- 80% of flowering plants depend on pollinators
 - Plants are foundation of food chain
 - Provide habitat for many animal species



<https://www.ck12.org/biology/food-chain/lesson/Food-Chains-and-Food-Webs-BIO/>

Pollinator Decline

Threats impacting pollinators:

- Habitat loss
- Disease
- Climate change
- Pesticide exposure

(OMAFRA, 2016)



Pollinator Decline

6 pollinators are already listed as **species at risk** in Ontario



Photo credit: Tracy Parker

Monarch



Photo credit: Magne Flaten

Gypsy Cuckoo Bumble Bee



Photo credit: MNRF

West Virginia White



Photo credit: Johanna James Heinz

Rusty-patched Bumble Bee



Photo credit: Kurt Hennige

Yellow-banded Bumble Bee



Photo credit: MNRF

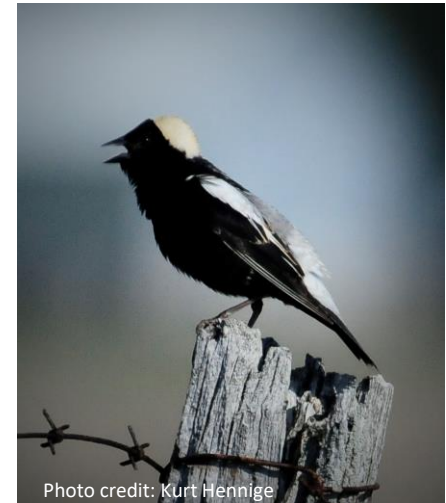
Mottled Duskywing

What is a Species at Risk?

A wildlife species (plant or animal) that is in danger of disappearing from a specific area (extirpation) or the world (extinction)

4 levels:

- Special concern
 - Ex: Snapping turtle
- Threatened
 - Ex: Bobolink
- Endangered
 - Ex: Fowler's toad
- Extirpated



Pollinator Decline

3 pollinators are extirpated; no longer present in Ontario



Photo credit: MNRF

Karner Blue



Photo credit: MNRF

Eastern Persius Duskywing



Photo credit: MNRF

Frosted Elfin

How Can We Support Pollinators?

Monitoring Pollinators

When to look for pollinators:

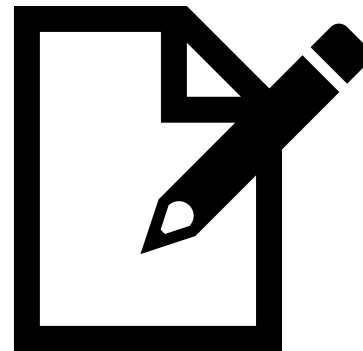
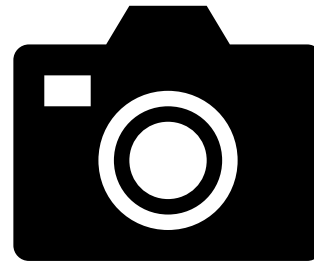
- June --> late September
- Between noon and 4 pm
- Air temperature > 15 degrees C
- Sunny days
- No or light wind



Monitoring Pollinators

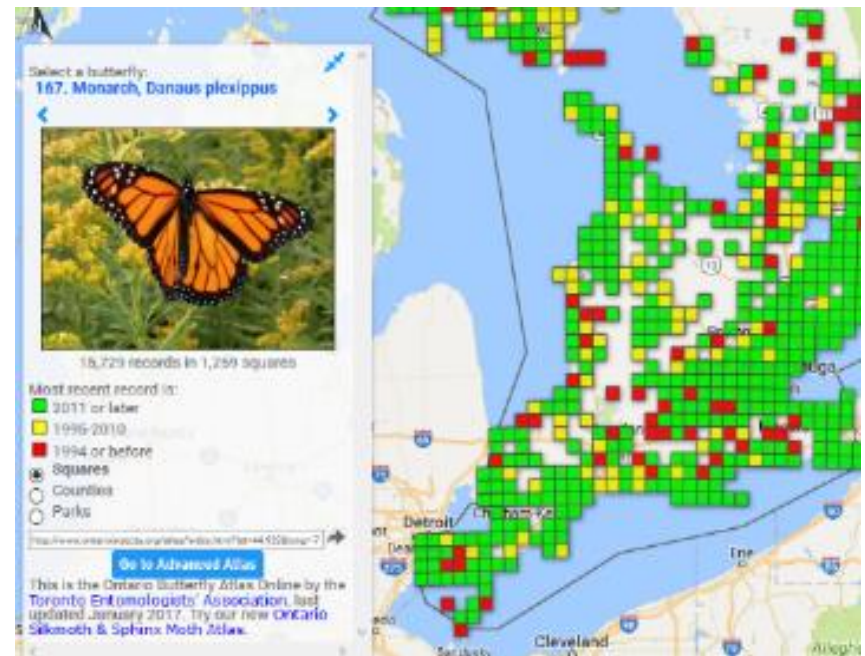
Survey equipment

- Handheld GPS (optional)
- Pencil and paper
- Camera
- Hand lens (optional)



Why Monitor and Report Pollinator Sightings?

- As a landowner, you have a unique opportunity to protect pollinators
- Contribute SAR observations to science based conservation
- Information for scientists to protect and recover species
- Funding for projects that benefit SAR on your farm



*Monarch range map
(Ontario Butterfly Atlas; www.ontarioinsects.org)*

Monitoring Butterflies

Monitoring Butterflies

Where to look



Photo credit: David Ainslie



Photo credit: Monique Aarts



Photo credit: Jen Hoesen



Photo credit: Monique Aarts

Monitoring Butterflies

Where to look



Common milkweed



Swamp milkweed



Butterfly milkweed

Milkweed is a herbaceous plant with milky sap

Life Cycle of the Monarch



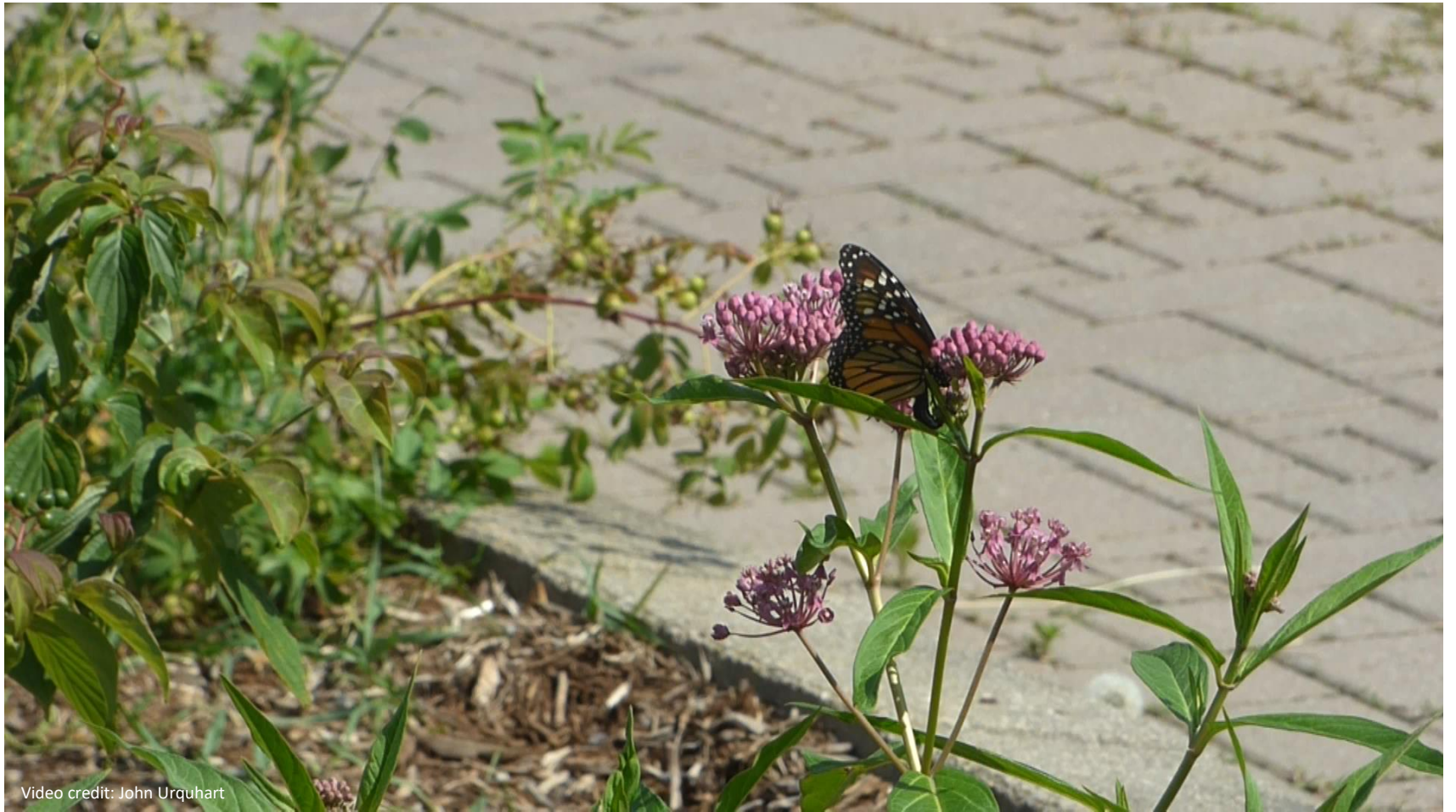
Egg

Caterpillar

Chrysalis

Butterfly





Video credit: John Urquhart



Photo credit: John H. Brown

Similar Species



Monarch



Viceroy



Photos are very important with ID because species have slight differences!

Monitoring Butterflies

Method

- Slowly walk through habitat while scanning flowers in sun
- Gently examine any milkweed plants
 - Check all parts of plant
 - Look for signs of caterpillars (chew marks)
- Use a hand lens to help see monarch eggs
- Count and record # of eggs, caterpillars, chrysalids and butterflies observed
- Take photos of unknown butterfly species



Photo credit: Shawn Wu

Monitoring Bees

Monitoring Bees

Where to look:

- Grasslands; hay field, pasture
- Openings in mixed woodlands
- Gardens



Monitoring Bees

Method:

- Slowly walk through habitat looking for bees
 - Focus attention on flowers in sun
 - Avoid casting a shadow over survey area
- Take photos of bees observed

If unable to identify any bees, submit photos to Bumble Bee Watch:

<https://www.bumblebeewatch.org/>



Yellow-Banded Bumble Bee

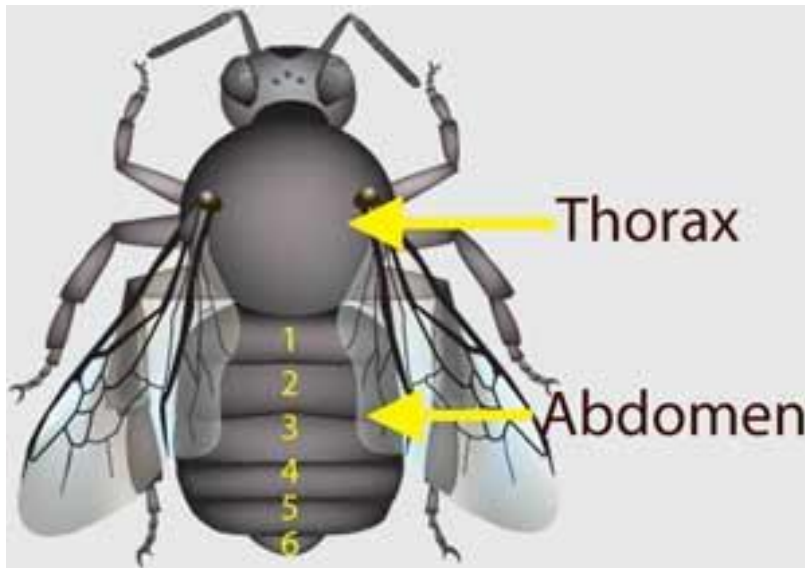
Scientific Name: *Bombus terricola*

- Status: special concern
- Medium size: queen 19-21 mm, worker 10-15 mm
- Distinct band pattern
- Short head and tongue
- Black head
- Slightly brown wings



Did you know?
This bee pollinates early blooming plants including: wild blueberry, apples, potato, cranberry, alfalfa

Yellow-Banded Bumble Bee



Yellow on 2nd and 3rd abdominal segments and on front of thorax

Similar species



Photo credit: Carolyn Gritzmaker

American bumble bee
(*Bombus pensylvanicus*)



Photo credit: Sam Droege

Black and gold bumble bee
(*Bombus auricomus*)



Photos are very important to ID because species have slight differences!

Rusty-Patched Bumble Bee

Scientific Name: **Bombus affinis**

- Status: Endangered
- Rust coloured patch
- Historically, widespread across Ontario
- Population declined in 1970s, now only found at the Pinery



Gypsy Cuckoo Bumble Bee

Scientific Name: **Bombus bohemicus**

- Status: Endangered
- White tipped abdomen
- Historically, widespread across Ontario
- In recent years only observed at Pinery Provincial Park



Other important bee species

Four main groups of bees in Ontario:



Leafcutter Bee



Squash Bee



Mason Bee



Bumble Bee

Reporting your observations

Reporting butterflies:

Important information to record:

- Location (address or geographic coordinates)
- Observation type (incidental or survey)
- Date
- Species
- Number observed



<http://www.e-butterfly.org/>

Reporting your observations

Reporting bees:

- Location (geographic coordinates or address)
- Date
- Photo(s)

Optional information:

- Floral host
- Other observation notes
 - Number, weather etc.



Photo credit: Maria Ramirez Giraldo

How will your observations be used?

- Determine if species' ranges and population sizes are changing
- Maximize benefit of local conservation projects
- Inform decisions made by government, municipalities, conservation organizations
- Help researchers discover critical information about declining species



Other ways to help pollinators

Cost-share programs for habitat creation exist!

Species at Risk Farm Incentive Program (SARFIP)

- Ontario Soil and Crop Improvement Association

Examples of eligible projects:

- Pollinator planting projects
- Creation of pollinator nesting sites
- Planting corridors connecting habitat
- Native grassland planting for livestock
- Cross-fencing for rotational grazing



Photo credit: Jen Hoesen

<http://www.ontariosoilcrop.org/oscia-programs/sarfip/>

Other ways to help pollinators

Examples of SARFIP Projects that benefit pollinators:



Livestock exclusion fencing



Rotational grazing



Pollinator planting

Other ways to help pollinators

Pollinator Planting Tips:

- Select native plants
- Select plants that bloom at different times
- Select flowers with different shapes & sizes
- Provide water source
- Keep some dead branches or logs
- Plant flowers in clusters
- Leave or plant milkweed for monarchs (MOECC, 2017)



<http://pollinator.org/guides>

Other ways to help pollinators

Other practices to consider:

- Consider practicing Integrated Pest Management (IPM)
- Minimize mowing of roadsides, marginal lands and lawns
- Plant flowers or flowering trees on roadsides
- Use dust deflectors and fluency agents when planting treated seeds
- Plant flowering cover crops
- Notify local beekeepers when using insecticide



(Law & Willis Chan, n.d)

Other ways to help pollinators

Volunteer with local naturalist club or conservation organization to participate in surveys or stewardship work focused on pollinators



Other ways to report pollinators

eButterfly

- <http://www.e-butterfly.org/>

Bumble Bee Watch

- <https://www.bumblebeewatch.org/>

iNaturalist

- <https://www.inaturalist.org/>

Toronto Entomologist Association website

- http://www.ontarioinsects.org/LEP_contributors.htm

More intensive monarch monitoring programs exist

- <https://monarchjointventure.org/get-involved/study-monarchs-citizen-science-opportunities>

Questions?

Additional Resources

Best Management Practices for Pollination in Ontario Crops

- <http://www.pollinator.ca/bestpractices/>

Pollinator Partnership

- <https://www.pollinator.org>

Farms at Work

- [Native Pollinators on Farms](#)

Monarch Watch

- <http://www.monarchwatch.org/>

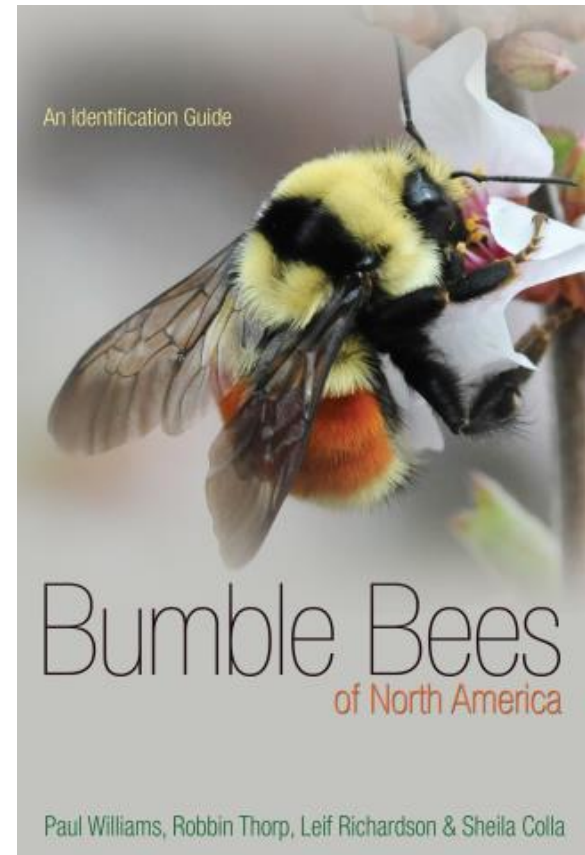
OMAFRA

- [Adjusting Planting Practices to Protect Pollinators](#)

Additional Resources

Bumble Bees of North America: An Identification Guide

Paul H. Williams, Robbin W. Thorp, Leif L. Richardson & Sheila R. Colla



References

Law, K., & Willis Chan, S. (n.d). Technical Guide for Preserving and Creating Habitat for Pollinators on Ontario's Farms. Retrieved from Farms at Work:
<http://farmsatwork.ca/pollinators/resources>

Ministry of Environment and Climate Change. (2017, July 28). *Pollinator Health* . Retrieved from Ontario :
<https://www.ontario.ca/page/pollinator-health#section-3>

Ontario Ministry of Agriculture, Food and Rural Affairs. (2016). *Pollinator Health Action Plan*.