

MONARCH MONITORING PROGRAM

Protocol Manual



May 16, 2024

Couchiching Conservancy Monarch Monitoring Program



Protocols adapted from the Mission Monarch program

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Introduction: Butterflies, like many other pollinators, play an important role in our ecosystem. Through this role, they provide essential services, such as plant fertilization, a process that many animals (including humans) rely on for food. Monarch butterflies can also indicate the health of the environments they live in, which can determine how we manage these habitats. They are a designated species at risk (SAR) as of 2022, listed as “Special Concern” provincially (COSSARO) and “Endangered” federally (COSEWIC). Monarchs are threatened by habitat loss at their overwintering grounds in central Mexico and reduced milkweed availability in their breeding range. Pesticide and herbicide use throughout the monarch’s range may also limit recovery.

The goals of this monitoring program are:

1. Monitor a Species at Risk (The Monarch Butterfly) and their summer breeding habitats on Conservancy-managed nature reserves.
2. Use the information collected to assist with management of nature reserves.
3. Share data with other organizations and researchers, including the Natural Heritage Information Centre (NHIC) and Mission Monarch.
4. Engage Conservancy volunteers in a long-term, science-based project that has repeatable parameters.
5. Survey for dog-strangling vine (*Cynanchum rossicum*), an invasive plant species threatening the reproductive success of the Monarch Butterflies.

Safety note:

The tall grasses of the meadows that will be monitored through this program are excellent habitat for ticks. Please familiarize yourself with tick identification and safety. The Couchiching Conservancy will provide you with a separate guide with information on tick safety.

The Couchiching Conservancy policy

Animals should not be disturbed or picked up unless it is to move them across the road (in the direction they were going), this is for your safety and theirs. It is CC policy that people do not pick up or purposely disturb wildlife, do not pick them up for a photo or to get a closer look as this causes them stress.

Monarch Surveys

Where to survey:

Surveys will take place at nature reserves with suitable habitat for monarch caterpillars. The Couchiching Conservancy staff will select patches of milkweed to be monitored for monarch eggs, caterpillars, and butterflies. The area should also be surveyed for dog-strangling vine. Use Landscape to see where your patch is located. Please follow the designated hiking trails when possible.

Suitable Habitat: The majority of sites in this study will be meadow habitat with milkweed plants. Flowering plants provide a nectar source for adult monarch butterflies who lay their eggs on milkweed plants (the only food source for monarch caterpillars). Milkweed is a pioneer plant that thrives in open, disturbed areas. Over time, shrubs and trees will replace the weedy meadow plants. This natural process, known as succession, will reduce the size of the milkweed patches and suitable monarch habitat over time.

Dog strangling vine (DSV): DSV looks similar to milkweed and is often confused by monarchs who will then lay their eggs on the plant. However, the caterpillars will not survive, as it is not a viable food source.

When to survey:

Three to four monitoring visits, a minimum of 21 days (3 weeks) apart, should be carried out between June and September. This provides a snapshot of the caterpillar abundance over time. This protocol avoids re-sampling the same individuals since caterpillars will leave the milkweed plants to form a chrysalis after ~2 weeks. Eggs are laid through the summer, and the number of eggs/caterpillars will fluctuate as they are eaten by insects and birds.

Weather/survey conditions: strong winds or rain will reduce the number of adult butterflies observed, however inclement weather should not affect the presence of eggs or caterpillars.

Duration: each transect sample will likely take 10-15 minutes depending on the height of the milkweed plants. Please give yourself ~45 minutes of time at your site so you aren't rushed.

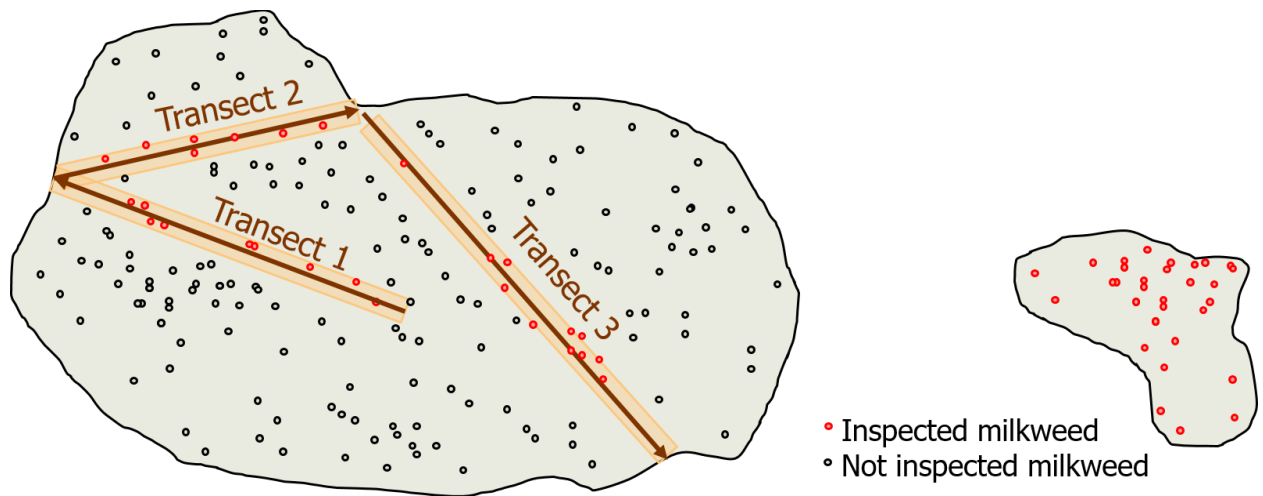
Sampling Protocols

There are two different monarch monitoring protocols:

- Complete Survey Protocol (pg 4-5) for small milkweed patches (< 60 plants), inspect every milkweed plant for monarch eggs and caterpillars
- Transect Sampling Protocol (pg 6) for large milkweed patches with walking space between the plants, sampling is done by transects. A transect is an imaginary line that cuts through the plot. A minimum of 3 transects will be done each visit.



Figure 1 Map of Sweetwater Nature Reserve Monarch Monitoring Sites. The Milkweed patches are shown in orange.



Definitions:

- **Incidental observations:** Casual wildlife sightings that happen while you are outside. All chrysalis and adult butterfly observations will be “incidental” (occurring by chance).
- **Point Count:** A count that is done while the observer is standing in one place from which all the animals of interest seen and/or heard are recorded during a fixed period of time. At anytime during your visit stand in one place and count the maximum number of adult butterflies seen at one time.

Transect Sampling Protocol

Upon arrival at the site:

1. **Go to the red stake:** the red stake placed in each milkweed patch marks the start location for the first transect.
2. **Record Preliminary Data:** record the nature reserve name, site name, date, volunteer information, weather information, patch details (dominant plant species).
3. **Record Site/Habitat Information**
 - a. **Milkweed patch size (m²):** This number can be viewed on Landscape by clicking the layer or will be provided by the Couchiching Staff.
 - b. **Milkweed density (plants/m²):** Visually estimate the average for the milkweed patch. Imagine a 1 meter by 1 meter square and count the number of milkweed plants in the square. Do this a couple times in different areas of the patch. Then average the number to get the estimated average density of the patch.

4. **Count Adult Butterflies:** count the **MAXIMUM** number of adult butterflies **seen at one point in time** - if possible make note of their gender, but this is not required. This is an incidental observation and can occur at any time during your visit.
5. **Take habitat photos** (once per year) facing each cardinal direction (N,S,E,W) including the red stake in the photo. The photos are used to track habitat changes over the years (i.e. shrubs or tree succession or milkweed plant density changes).



Start transect sampling:

6. **Write the start time and begin transect** sample starting from the red stake
7. Spin a **pencil/pen** in the air and let it land on the ground. The direction the tip points will randomly decide the direction of the transect. If the pencil points to the path that was just sampled or out of the patch, spin it again. (Repeating the same transect would skew the data).
8. **Collect data along transect:** check ALL milkweed plants while walking in a straight line the width of your outstretched arms. Record the following:
 - # milkweed plants/transect
 - # eggs/transect
 - # caterpillars/transect (measure their size using the “Instar Ruler” provided)

Monitoring will be conducted with at least two people: I) Observer II) Recorder.

The observer will slowly walk the 3 transect lines, gently & thoroughly checking all milkweed. Each new transect will start from the end of the last. A pencil/pen will be spun in the air again, landing on the ground giving the direction of the new transect. They will make their observations aloud so **the recorder** can complete the information on the “Field Data Sheets”. The recorder can help keep the observer on a straight path and let them know when a transect is done.

End the transect when:

- 20 milkweed plants have been examined
- or walked 20 large steps
- The edge of the milkweed patch has been reached (whichever comes first)

9. **Start next transect** from the end of the previous transect, tossing the pencil again to find the direction of the next random sampling path. (repeat steps 8 and 9 until you have completed *a minimum* of 3 transects)
10. Monitor for **dog-strangling vine** around the site. If a new DSV patch is discovered, record it in Landscape or contact your program coordinator.
11. **Complete the back of the data sheet** with additional visit information, i.e. if other species at risk were observed or invasive species were found.
(please note map locations/GPS coordinates when submitting your data)
12. **Submit your data to Couchiching Conservancy** (through Landscape). Only the total counts and number of transect lines are needed.
13. Couchiching Conservancy staff will submit your data online to Mission Monarch

Complete Patch Protocol

1. **Record Preliminary Data:** record the nature reserve name, site name, date, volunteer information, weather information and patch details (dominant plant species).
2. **Record Site/Habitat Information:**
 - a. Milkweed patch size (m²): This number can be viewed on Avenza maps by clicking the layer or will be provided by the Couchiching Staff.
 - b. Milkweed density (plants/m²): Count the number of plants and divide by the patch size.
3. **Count Adult Butterflies:** count the **MAXIMUM** number of adult butterflies **seen at one point in time** - if possible make note of their gender, but this is not required. This is an incidental observation and can occur at any time during your visit.
4. **Take your habitat photos:** The Couchiching Conservancy staff will provide volunteers with instructions on where to take photos for complete patch protocols.
5. **Collect data**, inspecting every milkweed plant in the patch, count:
 - # milkweed plants
 - # eggs

- # caterpillars (measure their size using the “Instar Ruler” provided)

Monitoring will be conducted with at least two people:

I) Observer II) Recorder.

The observer will gently & thoroughly check all milkweed. They will make their observations out loud so **the recorder** can complete the information on the “Field Data Sheets”.

6. Monitor for **dog-strangling vine (see ID guide)** around the site. If a new DSV patch is found, record it in Landscape or contact your program coordinator at the Couchiching Conservancy.
7. **Record any additional information**, i.e. if other species at risk were observed or invasive species were found, details about the patch, etc.
(please note map locations/GPS coordinates when submitting your data)
8. **Submit your data to Couchiching Conservancy** (paper or online). Only the total counts and number of transect lines are needed.

Situational Notes

- **NO eggs/caterpillars found during a survey:** The absence of caterpillars and eggs is information that is still significant to our records. Please send in your data sheets and observations regardless of how many caterpillars you find
- If you get to a **trimmed trail** but the milkweed patch continues on the other side, step past it **WITHOUT** counting your steps and continue your transect on the other side.

Caution: “A single milkweed plant can spread over a large area. You should consider that two plants are distinct when there is soil between their stems” (Mission Monarch). Do not assume a stem is a new plant, each plant could have multiple stems. Check the base of the plant to make sure you are looking at another milkweed plant. This will ensure you have an accurate number of milkweed plants recorded.

How to Submit Monarch Monitoring Data

Option A: Digital Only (preferred option)

Please submit your monitoring data and volunteer hours to the Couchiching Conservancy through Landscape using the Monarch Monitoring form. The individual tallies are not needed when submitting. Only the total counts and number of transects are needed.

Option B: paper data sheets can be dropped off outside the Couchiching office.

Mission Monarch: Couchiching Conservancy staff will submit all monarch observations to Mission Monarch.

Resources

Monarch Sheet handout: Familiarize yourself with monarch egg, caterpillar, chrysalis, and butterfly identification.


Milkweed Sheet handout: Familiarize yourself with milkweed species.

Commonly Confused Species ID handout: Learn about other butterflies that are orange or have similar patterns (i.e. Viceroy) to the monarch butterfly.

Milkweed Community handout: Learn about other insects that can be found on milkweed.

Data recording

Below is an example of the data collection sheets for field monitoring.

Monarch Monitoring Data Form	<i>The Couchiching Conservancy</i> 	Office Use: Data: ___ Photos: ___ Hours: ___
Property Name: _____	Property Issues Reported: _____	
Date: Year _____ Month _____ Day: _____		

First Name: _____	Last Name: _____	Volunteer Hours: _____
First Name: _____	Last Name: _____	Volunteer Hours: _____
First Name: _____	Last Name: _____	Volunteer Hours: _____ (including travel time)

Site Location Name: _____	# Adult Monarch Butterflies Observed: (Male or Female if known)												
Milkweed Patch Size: _____ m ² (<i>orange area on map</i>)													
Visually Estimate Milkweed Density: # _____ plants/m ²													
Start Time: _____ End Time: _____	# Monarch Chrysalises Observed:												
Cloud cover %: _____													
Wind (Beaufort): _____	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Beaufort Wind Scale</th> </tr> <tr> <td style="text-align: center;">0</td> <td>Calm, no wind</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Smoke drifts</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Felt on face</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Moves leaves</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Raises dust</td> </tr> </table>	Beaufort Wind Scale		0	Calm, no wind	1	Smoke drifts	2	Felt on face	3	Moves leaves	4	Raises dust
Beaufort Wind Scale													
0	Calm, no wind												
1	Smoke drifts												
2	Felt on face												
3	Moves leaves												
4	Raises dust												
Air Temperature (°C): _____													
Precipitation (check appropriate): None: _____ Fog/Mist: _____ Rain: _____													
Dominant plant species: _____													
Comments on aphid presence: _____													
Other Species Observed:													
Other Comments (trail maintenance requests/ hazards/encroachments):													

	Milkweed Plants	Eggs	Caterpillars				
			Instar 1	Instar 2	Instar 3	Instar 4	Instar 5
Transect 1							
Transect 2							
Transect 3							
Transect 4 (Optional)							
Transect 5 (Optional)							
Total Counts:							

4 Habitat Photos (N,S,E,W): Yes No Photos of team/other: Yes No

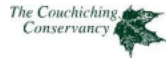
Species-At-Risk (other than Monarchs)

*Avoid handling the species.

	Species Name	GPS coordinate (UTM NAD83 17T format)	Count	Photos? (Y/N)
1				
2				
3				

Invasive Species: Please note the (1) species name, (2) gps location, and (3) the abundance: light, moderate, or everywhere. If it is a known location and the invasive is absent, please note this as well. Manual Control: Leave the plant but take the seed pods/flowers away in plastic bag for disposal.

	Species Name	GPS coordinate	Abundance	Photos? Y/N
1				
2				
3				



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Resources used:

Mollenhauer, Erik. 2018. Journeys - Teaching & Learning with Monarch Butterflies. Monarch Teachers Network of Canada (MTNC).

Committee on the Status of Species at Risk in Ontario (COSSARO). 2022. Ontario Species at risk Evaluation Report for Monarch (*danaus plexippus*): Subeastern subpopulation.

Cover Photo Credits:

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Field Kit List

Required	First aid kit (with tick key/tweezers)
Monitoring sheet*	Emergency information
Pen/pencil + spare	Camera or camera on your phone <i>(for the 4 habitat photos)</i>
Phone for emergencies & mapping	Water + Snacks
Caterpillar Instar Ruler on lanyard* Magnifying Glass*	<i>Recommended:</i>
Map: printed*, Landscape* or GPS Unit*	<i>Clipboard (hard writing surface)</i>
Monarch Monitoring Protocol Manual*	<i>Reading Glasses and/or Binoculars</i>
ID handouts*	<i>Sunscreen and sunglasses</i>

Provided by Couchiching Conservancy

Recommended clothing:

Rubber Boots for walking through poison ivy & to help prevent ticks
Long pants tucked into socks, shirt tucked into belt
Bug jacket and gloves
Hat