

# Monarch Research Project

## 2022 Annual Report

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2022 Volunteer Hours: 34.00

### 2022 Volunteers

- Maggie Silverman \* Volunteered the most hours with 22.5
- Cheryl Cox donated 10 or more hours to this project.
- Jennifer Horsmon
- Camryn Arnstein
- Kathryn Motley
- Rick Hagen

### Purpose and Objectives

To provide volunteer opportunities and raise awareness for monarch butterfly conservation by participating in the below citizen science projects. Hopefully, the data we collect will help scientists shed light on what is happening with the monarch butterfly populations, especially in our local area.



*5<sup>th</sup> instar monarch caterpillar*

### Skills Needed

- Ability to fill out detailed reports
- Ability to correctly identify common milkweed
- Ability to determine the sex of adult monarch butterflies
- Ability to distinguish monarch larval instars using the guide provided
- Ability to bend and stoop to examine milkweed leaves low to the ground
- Ability to work in areas with little shelter from the sun and high temperatures

## Requirements and Expectations

- Volunteers and staff must be able to tolerate long periods of time outdoors in areas with limited shade
- Volunteers will be exposed to ticks, chiggers, mosquitoes, bees, wasps, poison ivy, bad weather, and other wildlife.
- Children are a big help chasing and catching butterflies and observing tiny caterpillars on the milkweed; however, a supervising adult needs to accompany them so that data is recorded correctly.
- Volunteers will work independently or in family teams with the guidance of a staff Naturalist.
- Volunteers and staff must understand that zero is important data and that we do not always see monarchs.



*Volunteers Rick Hagen and Jennifer Horsmon measuring Milkweed Density*

## Volunteer Duties

- In early May, volunteers/staff will help determine milkweed density in the Battle Creek Cypress Swamp Meadow using random sampling.
- Weekly, May through September, volunteers will monitor 100 to 150 milkweed plants for monarch larva and the data collected by them will be reported to the Monarch Larva Monitoring Project.
  - This year monitoring started fully in June because of staff changes.
- From September to October, volunteers can capture adult migrating monarchs and put an ID sticker on them, as well as test them for disease. They can either do this at home or join the naturalist for tagging opportunities in our parks. This data will be reported to Monarch Watch and Project Monarch Health.

- Volunteers who have completed at least 3 days of monarch monitoring throughout the season were offered the opportunity to go to Point Lookout State Park with staff to tag monarch butterflies. This is where hundreds of butterflies congregate before continuing their migration.
- A detail-oriented volunteer can assist with transferring paper data to the websites.



*Volunteer Maggie Silverman catching a monarch butterfly at Gatewood Preserve.*

## Trainings

- A video training created by Shannon Steele must be watched by volunteers before they are able to sign up for any Monarch Monitoring volunteer opportunities. It is also suggested that new staff to the project and even returning staff to the project watch this video as it covers all the information needed about monarchs and completing the datasheets. It is a good overview of everything you could possibly need to know while participating in this project
- On the job. Within the first 5-10 minutes of the monitoring activity, the accompanying staff naturalist or knowledgeable volunteer will show new volunteers what to do and how to correctly fill out the data sheet. They will be on hand the entire time to answer questions as they arise.

## Project Dates

- Once annually in May, we determine the milkweed density for each study site.
- Weekly, May through September, we examine 100-150 random milkweed plants for monarch larvae in the study sites.
- Weekly, September through October, we tag monarchs and test them for disease at the following main locations: Cypress Swamp, the Gatewood Preserve, Biscoe Gray, and Point Lookout State Park.
- No monarchs were captive-raised this year due to staff turnover and insufficient staff and time to adequately care for the animals. In addition, recent concerns on how captive raised monarchs can impact local populations and our scientific research, until a more detailed proposal for raising monarchs, this particular aspect will be on hold.
  - <https://monarchjointventure.org/images/uploads/documents/RearingMonarchsWhyorWhyNot.pdf>
  - [https://monarchjointventure.org/images/uploads/documents/Captive Breeding and Releasing Monarchs oct2015.pdf](https://monarchjointventure.org/images/uploads/documents/Captive_Breeding_and_Releasing_Monarchs_oct2015.pdf)

## Volunteer Appreciation

- Tagging day at Point Lookout State Park on October 10, 2022, from 10 am-12 pm.
- For 2023 I would like to bring a picnic to our tagging day at Point Lookout State Park for the volunteer that come.

## Suggestions for Volunteer Training or Staff Training

- Monarch Joint Venture.
  - Monarch Butterfly Conservation Series
    - <https://monarchjointventure.org/resources/monarch-webinar-series>
  - Monarch & Pollinator Presentations
    - <https://monarchjointventure.org/resources/downloads-and-links>

## Summary of 2022 Activities

### Cypress Swamp Meadow Management:

In 2022, the meadow was mowed in March and had the paths cut in June, which was a late start because of staff changes.

### Management Plans for 2023:

We would like to continue mowing the meadow in March, and then bush hogging in late June to prevent plants from dying to quickly and allowing milkweed to sprout again. We would try periodically trimming back plants that tend to take over milkweed such as blackberry.

## Monarch Larva Monitoring Project: <https://monarchlab.org/mlmp>

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“Our mission is to better understand the distribution and abundance of breeding monarchs and to use that knowledge to inform and inspire monarch conservation. The Monarch Larva Monitoring Project (MLMP) is a citizen science project involving volunteers from across the United States and Canada in monarch research. It was developed in 1997 by researchers at the University of Minnesota to collect long-term data on larval monarch populations and milkweed habitat. The project focuses on monarch distribution and abundance during the breeding season in North America. As an MLMP volunteer, your contributions will aid in conserving monarchs and their threatened migratory phenomenon, and advance our understanding of butterfly ecology in general. You can learn more about monarch conservation here.”

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### Activity 1: Measuring Monarch Density

From June 20, 2022, to September 22, 2022, Calvert Stewards, Interns, and other Calvert County Natural Resources staff monitored about 130 milkweed plants each week in the Cypress Swamp Meadow. The purpose was to look for and collect data on monarch eggs, caterpillars, and pupa.

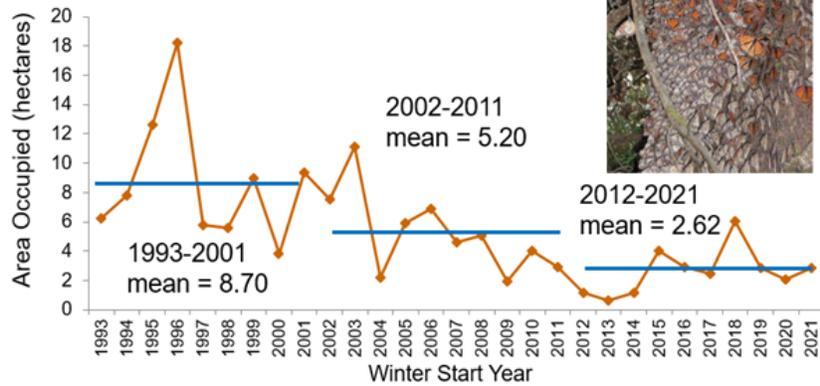
Prior to 2020, we were finding on average up to 1.3 monarchs per milkweed plant. In 2020 there was an average of 0.32 monarchs (egg, 1-5<sup>th</sup> instar, and pupa) per plant. In 2021 that number increased to 3.3 monarchs per plant. However, for 2022 our numbers dropped up to 0.2 monarchs per plant. (See Activity 1 below) From June-July the majority of what we were finding were monarch eggs. Once it was August, we did see an increase in 1<sup>st</sup> and 2<sup>nd</sup> instars, but still we were finding mostly eggs.

Unfortunately, there is an overall decline in the number of monarchs found since this study started in 2017. Although 2021 was more successful than 2020, there was still a large decrease of monarch activity in from 2021 to 2022. Since we were only finding eggs, it seems there could be something happening that is not allowing caterpillars to live past the egg stage, or past 1<sup>st</sup> instar.

Some possible reasons we saw fewer monarchs in 2022 than 2021:

- The Battle Creek Cypress Swamp meadow was not bush hogged this year, which it had been in previous years.
- Plants were not being maintained throughout the summer.
- Multiple monarch caterpillars were found by the Nature Center front door suffering from t-fly parasites, this could also be happening in the meadow.
- Overwintering populations in Mexico have been in decline (see graph).

## Area Occupied in Mexico Winter Sites



Area with monarchs roosting on trees (1 hectare = 2.5 acres). Note year to year weather-driven variation, but long-term decline in monarch numbers illustrated by decade means. Data from 1993-2003: Monarch Butterfly Biosphere Reserve (MBBR, CONANP). Data from 2003-2021: WWF-Telcel Alliance, in coordination with the MBBR.

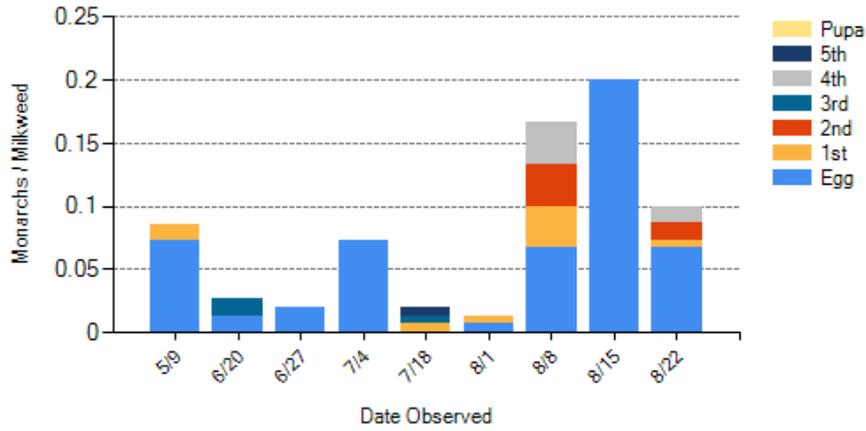


*Monarch Caterpillar in J formation.*

Activity 1 Results:

### 2022 MLMP Monarch Density for Battle Creek Cypress Swamp Meadow

Total avg. sample size = 137 plants/week

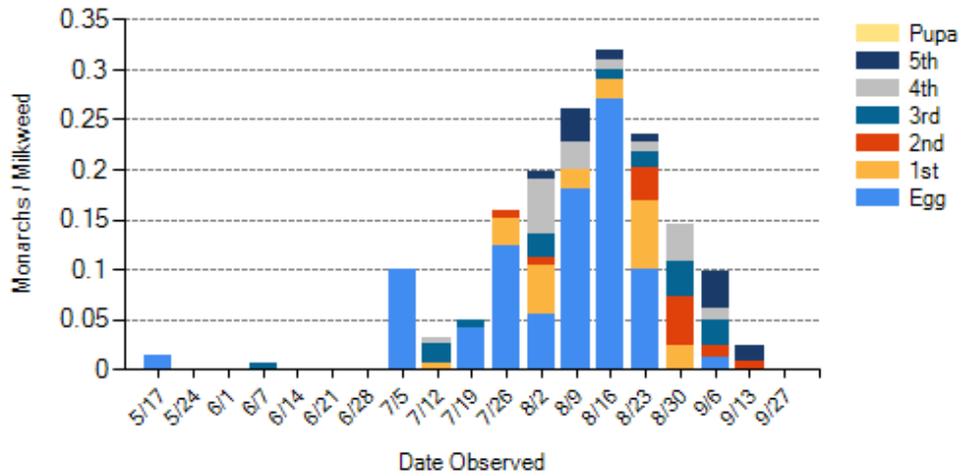


# of sites monitored = 1

© Monarch Larva Monitoring Project

### 2021 MLMP Monarch Density for Battle Creek Cypress Swamp Meadow

Total avg. sample size = 133 plants/week

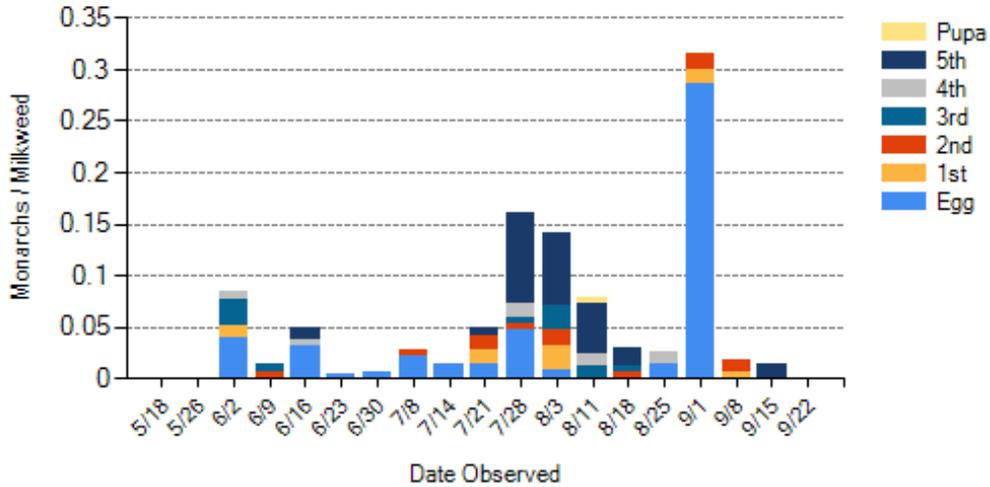


# of sites monitored = 1

© Monarch Larva Monitoring Project

## 2020 MLMP Monarch Density for Battle Creek Cypress Swamp Meadow

Total avg. sample size = 149 plants/week

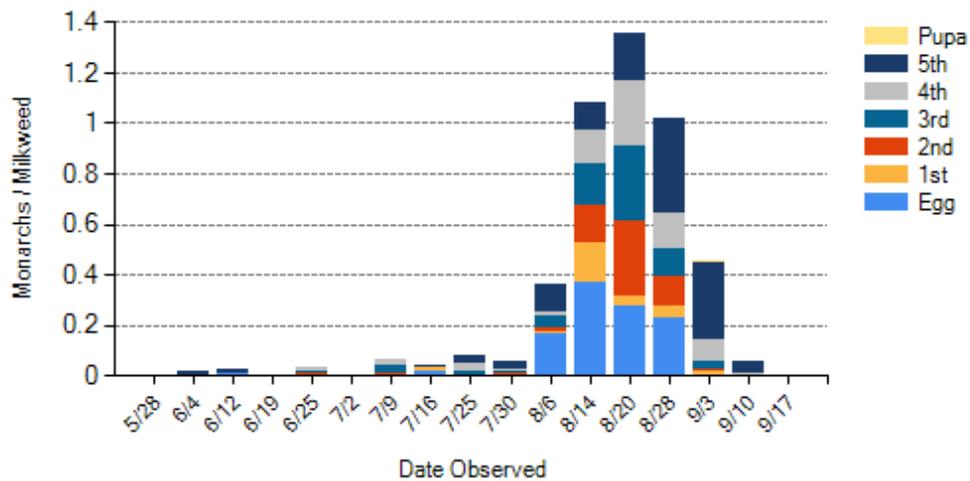


# of sites monitored = 1

© Monarch Larva Monitoring Project

## 2019 MLMP Monarch Density for Battle Creek Cypress Swamp Meadow

Total avg. sample size = 126 plants/week

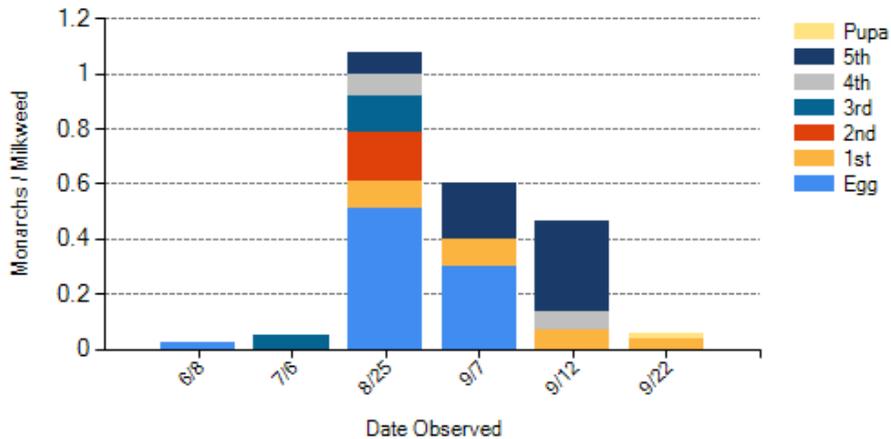


# of sites monitored = 1

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## 2018 MLMP Monarch Density for Battle Creek Cypress Swamp Meadow

Total avg. sample size = 53 plants/week



# of sites monitored = 1

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### Activity 3: Estimating Monarch Survival

This activity requires raising monarchs in captivity. Because of staff turnover, lack of staff time, and the increasing concern that rearing monarchs does not benefit the population, this was not done this year. Research has been showing that rearing monarchs indoors can cause breakouts of disease, killing all the monarchs, and that they are less equipped to live in the wild as they have become used to indoor climate control. Even keeping monarchs outside in close proximity can increase disease in the population shows the research.

In the future, if we attempted to collect and raise Monarchs for survivorship research and we would put together a monarch exhibit, that could dovetail into a volunteer enrichment and public education initiative.

Project Monarch Health: <http://www.monarchparasites.org/>

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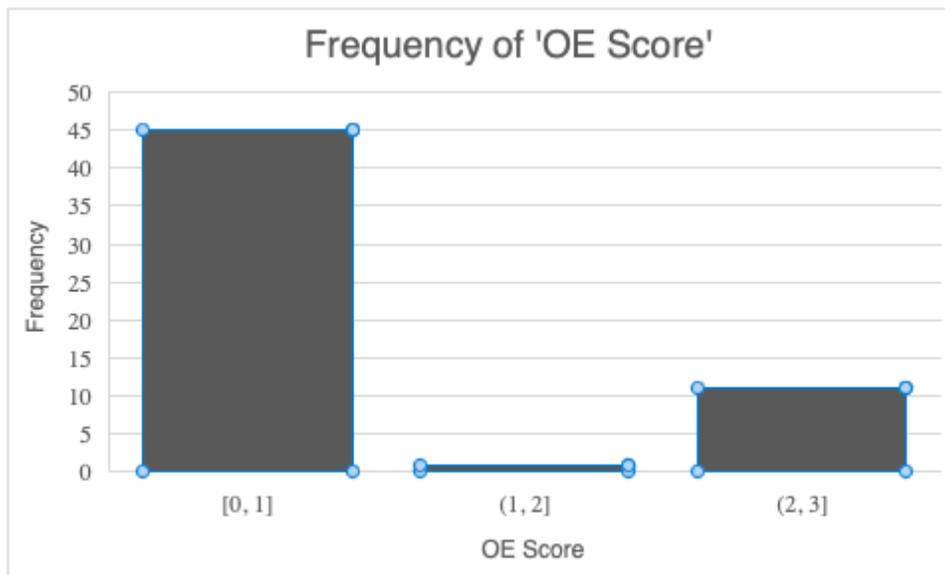
“Monarch Health is a citizen science project in which volunteers sample wild monarch butterflies to help track the spread of a protozoan parasite across North America.” Volunteers and staff can catch wild adult monarchs and test them for parasites (being sure to mark their wing with a sharpie so they don’t test the same one), or they can collect them in the 4<sup>th</sup>&5<sup>th</sup> instar stage and rear them to adulthood, then test, mark & release them. At the same time, they can record data for MLMP. As an additional complication, at the end of August, any adults that emerge can also be tagged for MonarchWatch.

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Data sheets and samples are sent to:

Project Monarch Health  
c/o Sonia Altizer  
Odum School of Ecology  
University of Georgia  
Athens, GA 30602-2202

Results of the monarchs we were able to sample received 12/14/2022



We were able to sample 57 monarch butterflies. The score [0,1] means there was no presence of the OE parasite found on the butterfly, a score [1,2] means there were 11-100 spores of the parasite found indicating a mild infection, the score [2,3] means there were over 100 spores found. Over 100 spores indicate a high level of infection, likely being infected as a larva. The high level of infection is where there is cause for concern that the butterfly will not make it the

entire way of migration. Overall, out of 57 samples 19.30% of the butterflies were highly infected with OE.

In 2019 5.24% were heavily infected, there were no data for 2020 and 2021.

Monarch Watch: <https://www.monarchwatch.org/>

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“The Monarch Watch Tagging Program is a large-scale citizen science project that was initiated in 1992 to help understand the dynamics of the monarch's spectacular fall migration through mark and recapture.

Tagging was originally used by Dr. Fred Urquhart of the University of Toronto help locate overwintering monarchs and later to determine where monarchs came from that wintered in Mexico. Our long-range tagging program at Monarch Watch continues to reveal much more. Tagging helps answer questions about the origins of monarchs that reach Mexico, the timing and pace of the migration, mortality during the migration, and changes in geographic distribution.

It also shows that the probability of reaching Mexico is related to geographic location, size of the butterfly, and the date (particularly as this relates to the migration window for a given location). Volunteers & Staff catch-tag-release or raise-tag-release monarchs to help MonarchWatch with the above mission. In Maryland, we shouldn't begin tagging Monarchs until the last week of August because there is a chance that monarchs caught earlier may not be the final migratory generation.

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In 2022 this project was completed by the Cox family and other volunteers at Cypress Swamp Meadow. Data was submitted in December 2022.

### Tagging Data

- The Cox family tagged 85 adult monarch butterflies.
- Staff and volunteers tagged 99 adult monarch butterflies.

### Ideas for 2023

- Will have the meadow bush hogged to increase monarch numbers.
- Will trim the meadow in late June or early July to allow new milkweed to grow and prepare for the higher densities of monarchs we get later in summer
- Will participate in Monarch Watch and Monarch Health in 2022
- Will work on taking a volunteer appreciation picnic at Point Lookout State Park.
- Will work on project advertising ideas to increase volunteer participation.
- Have a more streamline process for mass butterfly tagging to prevent cross contamination of OE.
- Develop targeted social media posts highlighting the program



*2022 Spring Intern Camryn Arnstein came back to volunteer for Monarch Tagging and caught her first butterfly.*



*2022 Fall intern Kathryn Motley helping with Monarch tagging at Point Lookout State Park.*

*Supporting Calvert County's nature parks and natural spaces*



# CALVERT STEWARDS

## VOLUNTEER PROGRAM

*A partnership between Calvert Nature Society and Calvert County Natural Resources Division*

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Date of Issue March 2023

CALVERT STEWARDS VOLUNTEER PROGRAM  
c/o Natural Resources Division  
2880 Grays Road  
Prince Frederick, MD 20678  
(410) 535-5327

Volunteer Portal: <https://calvertstewards.galaxydigital.com/>

Calvert Nature Society: [www.calvertparks.org](http://www.calvertparks.org)

Calvert County Natural Resources Division:  
[www.calvertcountymd.gov/NaturalResources](http://www.calvertcountymd.gov/NaturalResources)

