Monarch Research Project – 2020 Report

Project Leader: Shannon Steele Shannon.Steele@calvertcountymd.gov 410-535-5327

Project Goals: 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.

Calvert Steward Jennifer Horsmon releases her first monarch

SKILLS NEEDED

- Ability to fill out detailed reports
- Can correctly identify common milkweed
- Able to determine the sex of adult monarch butterflies
- Can distinguish monarch larval instars using the guide provided
- Able to bend and stoop to examine milkweed leaves low to the ground

Optional, but Preferred, Skills

- Using the Journey North App, Volunteers can report their monarch sightings using their smart phone. If they photograph other animals during their surveys, they can report them using the iNaturalist App and select the CCNRD Project.

REQUIREMENTS & EXPECTATIONS

- 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 wild life.
- 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 correctly recorded.
- Will work independently or in family teams with the guidance of a staff naturalist
- Understand that zero is important data, and that we don't always see monarchs.

VOLUNTEER DUTIES

- In early May, volunteers will help determine milkweed density in the Cypress Swamp Meadow using random sampling.
- Weekly, from May –Sept, volunteers will monitor 100-150 milkweed plants for monarch larva and report the data to the Monarch Larva Monitoring Project.
- From Sept-Oct, 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.
- A detail-oriented volunteer can assist with transferring paper data to the websites.

TRAININGS

- 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. I am also working on some monarch training videos to use for new staff and volunteers.

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. Throughout this time up to 30 monarch caterpillars can be collected from the study site and raised through adulthood to collect monarch survivorship data.
- Periodically, September through October, we tag monarchs and test them for disease at the following main locations: Cypress Swamp, the Gatewood Preserve, Biscoe Gray, Point Lookout State Park, & White Oak Farm (private residence).

VOLUNTEER APPRECIATION

- Every Fall during peak migration in mid-October, I lead a van trip to Point Lookout Park in Scotland, Maryland. Surrounded by water on each side, hundreds of monarchs are funneled here to the point where they will fuel up and wait until the winds are right before crossing the expansive Potomac River. Point Lookout staff have been very generous throughout the years, permitting us to enter the park free of charge and allowing us to roam the property while tagging monarchs.

SUGGESTIONS FOR VOLUNTEER TRAINING OR STAFF TRAINING

- **Monarch Joint Venture. (These are all free.)**
  - **Monarch Butterfly Conservation Series**
    - **https://monarchjointventure.org/resources/monarch-webinar-series**
  - **Monarch & Pollinator Presentations**
    - **https://monarchjointventure.org/resources/presentations**
  - **Handouts**
    - **https://monarchjointventure.org/resources/downloads-and-links**

SUMMARY OF 2020 ACTIVITIES

Monarch Larva Monitoring Project: https://monarchlab.org/mlmp

"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**."*

We were one of 335 sites worldwide who participated in the project this year, and made it on their one-page "Honor Roll" for having participated in the project 5 consecutive years.

COVID 19 Modifications for MLMP:

The Cypress Swamp Meadow was divided into 6 separate flagged areas within the study site to allow for social distancing. Volunteers were provided with equipment placed in individual 2gallon Ziploc bags. Consistent volunteers just kept their bags, and for others, the equipment was disinfected and not used for 2 weeks. There was enough equipment to alternate weeks, if needed. Volunteers and staff wore masks when they were in close proximity. This worked well and volunteers were happy to have an opportunity to get out of the house and be part of a worthwhile study.

Activity 1: Measuring Monarch Density

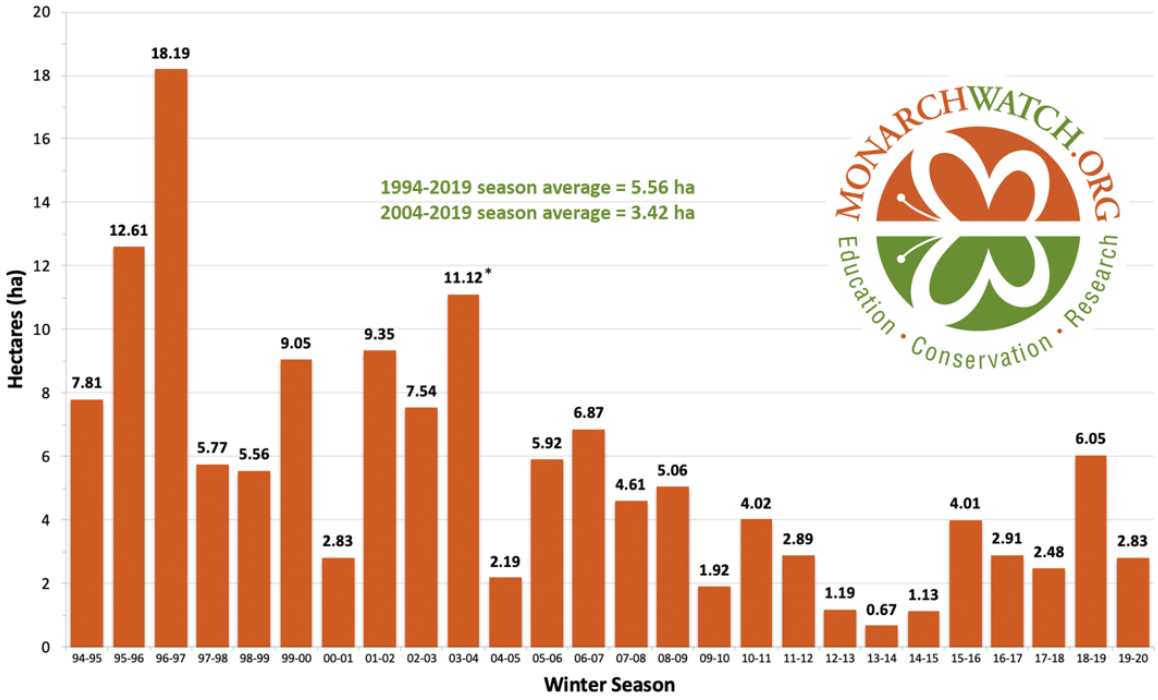
From 5/18/20 to 9/22/20 Calvert Stewards helped me monitor about 150 random milkweed plants weekly in the Cypress Swamp Meadow to look for monarch eggs, caterpillars and pupa. Out of the last 3 years since we have been conducting this activity, 2020 was the most disappointing year. For example, during the first week of September 2020, there was a density of 0.35 monarchs per plant, 1.45 monarchs per plant in 2019, and 0.60 monarchs per plant in 2018.

Calvert Steward Lauren Kleist measuring milkweed

Some possible reasons we had fewer monarchs this year:

- Due to COVID 19, the meadow was not bush-hogged in March. In fact, it was set to be burned that month for the first time but never happened due to COVID. This led to more growth of blackberries, winged sumac, poplar and sweet gum trees which out-competed flowering herbaceous plants that would attract monarchs to the meadow.
- We had more rain this summer than we had in 2018 & 2019.
- The 2020 overwintering population was less than the 2019 overwintering population (see graph below).

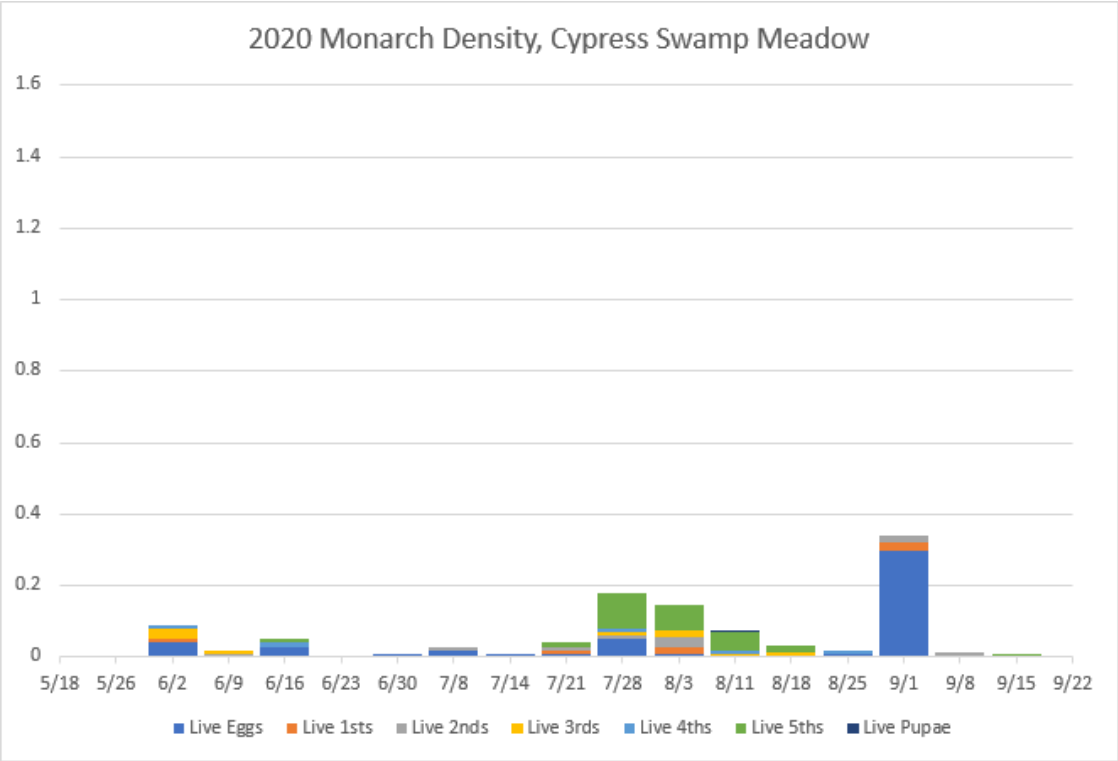
Total Area Occupied by Monarch Colonies at Overwintering Sites in Mexico

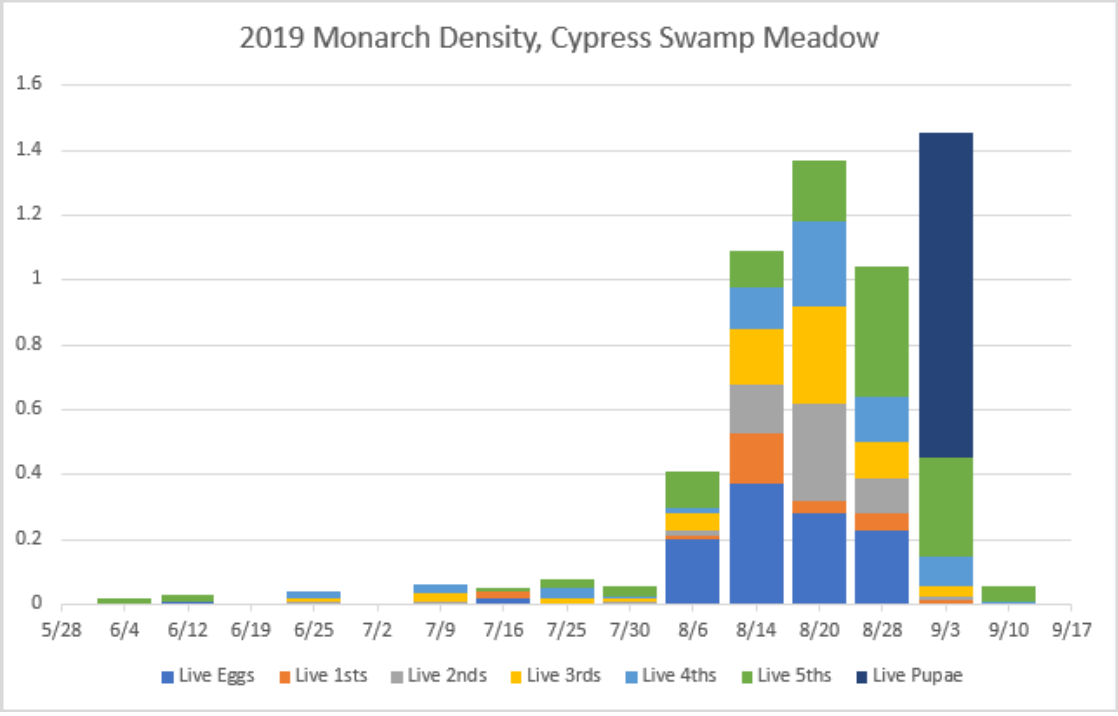


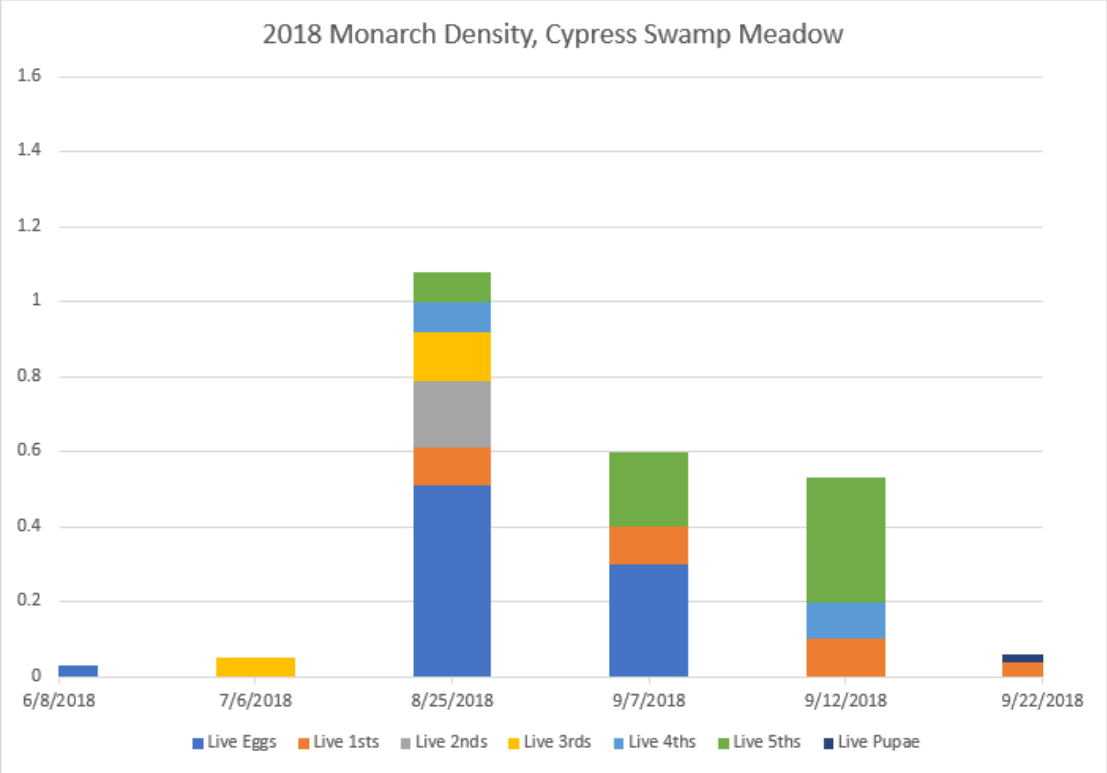
Data for 1994-2003 collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Natural Protected Areas (CONANP) in Mexico. Data for 2004-2019 collected by World Wildlife Fund Mexico in coordination with the Directorate of the MBBR.

* Represents colony sizes measured in November of 2003 before the colonies consolidated. Measures obtained in January 2004 indicated the population was much smaller, possibly 8-9 hectares. CT

ACTIVITY 1 RESULTS:



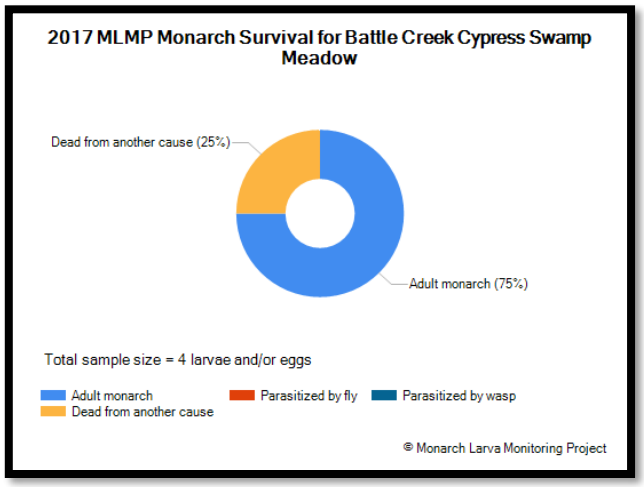


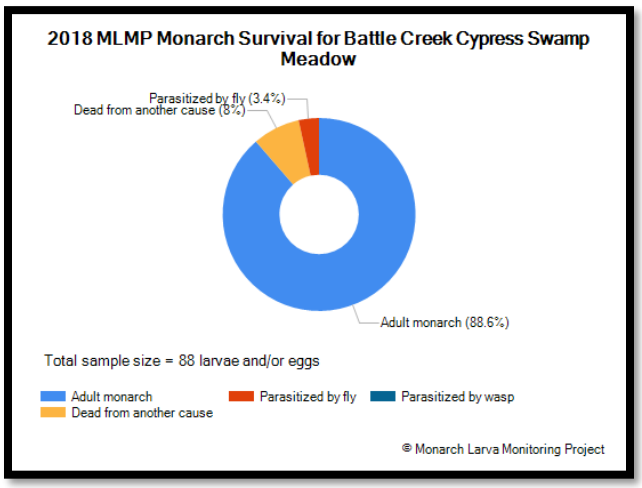


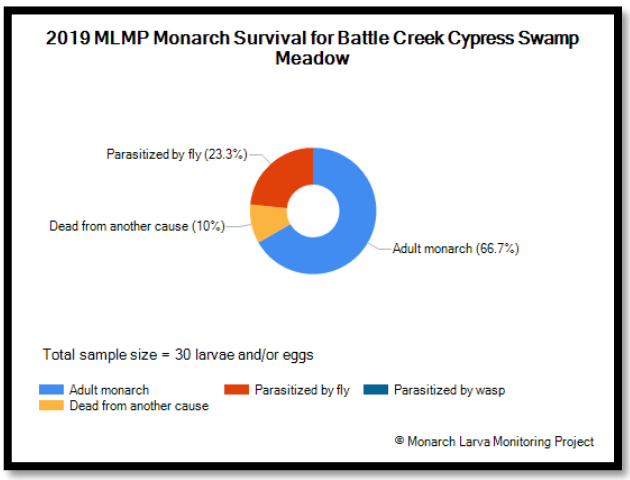
Activity 3: Estimating Monarch Survival

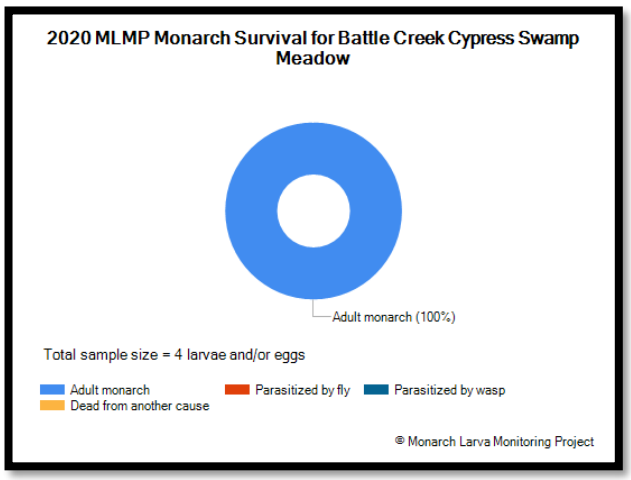
In the 2020 season I only sampled 4 instead of 30 monarch caterpillars because we had seen very few. This activity involves collecting 4th or 5th instar caterpillars from the meadow and rearing them in individual containers until they emerge. Healthy adults that emerge are tested for OE *Ophryocystis elektroscirrha* and then released. Any parasites like tachinid fly larva that emerge are kept in a container until they emerge as adults. They are frozen until the end of the season, and shipped to MLMP for ID & analysis.

Tachinid fly maggots ease themselves to the bottom of the container using these silken strings and then pupate within about 24 hours.


2017 MLMP Monarch Survival for Battle Creek Cypress Swamp Meadow
Dead from another cause (25%)
Adult monarch (75%)
Total sample size = 4 larvae and/or eggs
Adult monarch
Parasitized by fly
Parasitized by wasp
Dead from another cause
© Monarch Larva Monitoring Project


2018 MLMP Monarch Survival for Battle Creek Cypress Swamp Meadow
Parasitized by fly (3.4%)
Dead from another cause (8%)
Adult monarch (88.6%)
Total sample size = 88 larvae and/or eggs
Adult monarch
Parasitized by fly
Parasitized by wasp
Dead from another cause
© Monarch Larva Monitoring Project


2019 MLMP Monarch Survival for Battle Creek Cypress Swamp Meadow
Parasitized by fly (23.3%)
Dead from another cause (10%)
Adult monarch (66.7%)
Total sample size = 30 larvae and/or eggs
Adult monarch
Parasitized by fly
Parasitized by wasp
Dead from another cause
© Monarch Larva Monitoring Project


2020 MLMP Monarch Survival for Battle Creek Cypress Swamp Meadow
Adult monarch (100%)
Total sample size = 4 larvae and/or eggs
Adult monarch
Parasitized by fly
Parasitized by wasp
Dead from another cause
© Monarch Larva Monitoring Project

CYPRESS SWAMP MEADOW MANAGEMENT

An Idea In Fall 2019:

I read an article about how a mid-season mow can rejuvenate the milkweed so that it is healthier and more appealing to female monarchs as they look for suitable plants to lay their eggs. By the time September 2019 came along, most of the milkweed was dead in the Cypress Swamp Meadow, and there were still several caterpillars struggling to find the last few leaves. I was hoping that in 2020, if we mowed or trimmed the milkweed at the end of June/first week of July, the milkweed would last through August/Sept when larva density would be at its highest. I planned to do this in Section A of the meadow (closest to the tenant house) and planned to leave Section B (in the middle) as the control site. Throughout 2020 the monarch larva density and survivorship would be compared between the 2 sections. Before mowing, I planned to have volunteers examine the milkweed for eggs or larva so they could be relocated.

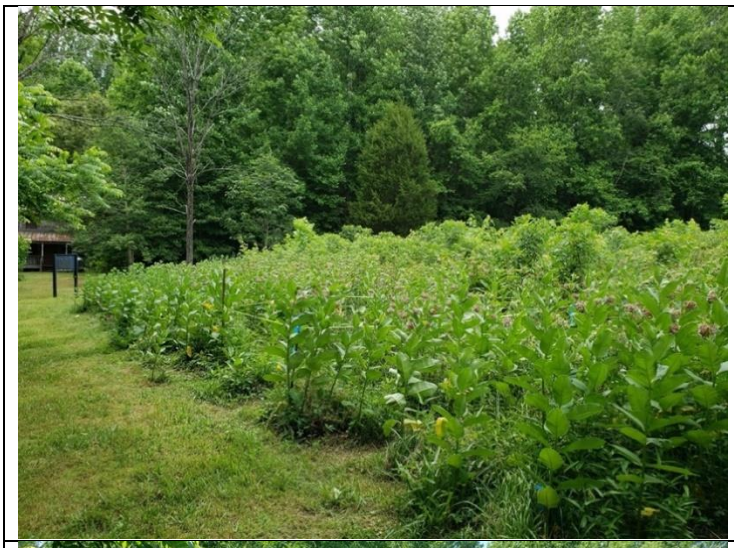
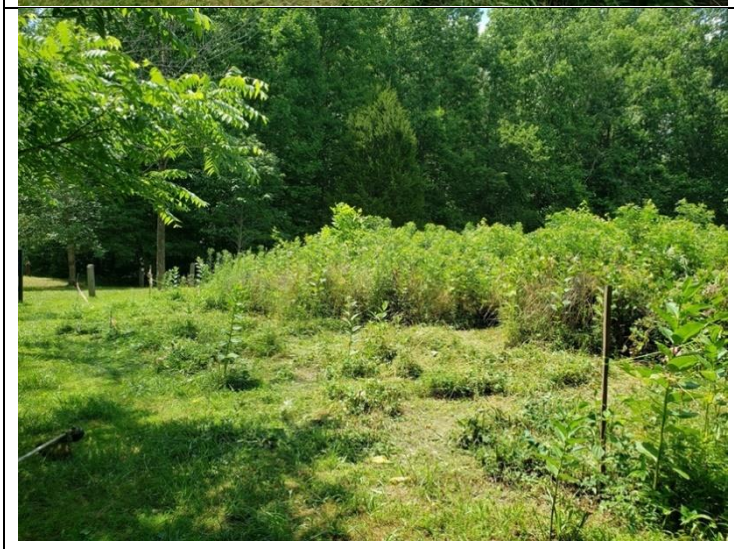
12/10/19: After I typed the previous paragraph, I talked to park maintenance supervisor, Beau Sanders. He coordinated a controlled burn of the meadow in March/April 2020.

What We Did In 2020:

We were unable to bush hog or burn the meadow this year due to COVID 19. Instead of comparing Section A to Section B as originally planned, I compared two side-by-side sections near the tenant house that were created for social distancing. The pink-flagged section was cut back on June 23, 2020, with pruners to about 6 inches and I trimmed the surrounding plants with a string trimmer to allow more sunlight to reach the new milkweed sprouts. The blue-flagged section beside it was left untouched as the control area.

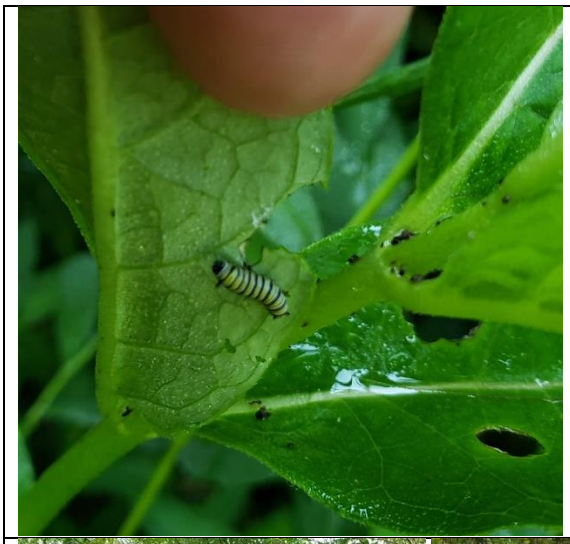
Based on past data and our examination of the milkweed as we cut it, this was a perfect time of year to do a mid-season cutting of milkweed. We only found one egg out of 267 plants so there will be minimal mortality if you simply cut it with a mower or trimmer in late June/Early July.

RESULTS:

	**Pink Section on Left & Blue Section on Right** June 16, 2020 The week before the experimental cutting. Milkweed was in full bloom
	**Pink Section** June 23, 2020 Taken immediately after cutting. A few plants with tussock moth caterpillars & 1 monarch egg were left untouched. Most of the milkweed had finished blooming. If we waited until the first week of July, that would have worked well too before most of the seed pods formed.
	**Pink Section** June 30, 2020 (one week after cutting) New sprouts already!

	**Pink Section** July 17, 2020 (3 ½ weeks after cutting) New growth is at least 2ft tall.
	**Pink Cut Section (Left) Compared to Blue Uncut Section (Right)** August 3, 2020 (6 weeks after cutting) A second bloom for the pink section attracts more pollinators.
	**Pink Section** August 11, 2020 One of two newly-emerged monarchs that we noticed that morning

	**Pink Section** September 1, 2020 Still has many green leaves. Very few seed pods on the milkweed. This section had the most aphids too.
	**Blue Section** September 1, 2020 Milkweed is mostly dead; only a few leaves left.
	**ALL SECTIONS** September 1, 2020 In the milkweed access paths recently cut with a string trimmer, new milkweed plants sprouted. At least half had monarch eggs on them. This plant had 3 on it, and another had an egg accidentally laid on a blade of grass next to it. We found 32 eggs and 4 caterpillars out of 133 plants today.



September 8, 2020

One of very few monarch caterpillars that we found after seeing many eggs the previous week.

Only 1 or 2 out of 100 live to adulthood.

ALL SECTIONS STILL HAD GREEN MILKWEED IN LATE OCT IN ACCESS PATHS THAT HAD BEEN TRIMMED IN AUG

Blue Section (Left) & Pink Section (Right)
September 15, 2020

Blue Section – old milkweed stalks dead, there were still new plants in the access paths

Pink Section – milkweed still had green & yellow leaves, and there was new growth in access paths

September 22, 2020

Since we observed no monarch larva, we decided this would be the last day for larva monitoring, and the following week we would begin searching for adults to tag.

Overall, the pink (cut) section has the most milkweed left out of all 6 sections. It has 50+ plants with leaves throughout the entire section, whereas the other sections have 12 - 20, and only in the access paths cut with the string trimmer.

Summary

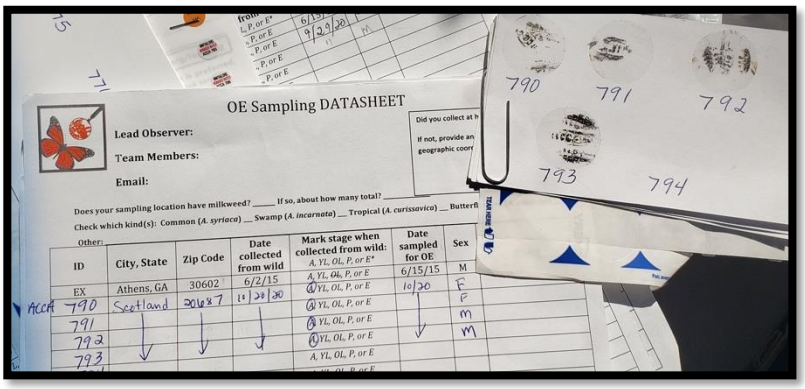
This year there wasn't a significant difference between the monarch larva density in the pink experimental cut section compared to the blue uncut section beside it. Some possible factors which may have affected results were: seeing much fewer monarchs than the previous two years, having a rainy summer, allowing less-experienced volunteers to monitor the experimental section, and being unable to bush hog or burn the meadow this year which allowed the shrubs and trees to out-compete the herbaceous forbs that would attract adult monarchs to the meadow. However, based on our results, there is no question that the mid-season mowing or string trimming of the milkweed results in new growth and green leaves through August and September when larva density has been historically higher.

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

"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 4th &5th 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.

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



2018 Results (received 3/25/19):
We found that of the 145 samples, 17 were heavily infected with the protozoan parasite OE. **Detailed 2018 Results can be found in the 2019 Monarch Annual Report**

2019 Summary:

- 204 adult monarchs were tested for disease
    - 20 were reared from caterpillars from the Cypress Swamp Meadow
    - 90 were migrating through Point Lookout Park
    - 138 were from/or migrating through White Oak Farm (the Cox Family)

- We were careful to use wet wipes on the days when we were catching & tagging multiple butterflies.
- Upon recommendation from PMH & MLMP, I only reared 30 caterpillars which was enough for their studies. Some studies are showing that rearing monarchs indoors may affect their ability to migrate, etc.
- The data sheets and samples were shipped to the University of Georgia in October 2019.

2019 Results: excel file labeled Steele samples
Sent to us: Friday, April 10, 2020 11:16 AM
"Overall, we found that of the 248 samples you sent us, 13 were heavily infected with the protozoan parasite OE."

2020 Summary:

- 4 were reared from caterpillars from the Cypress Swamp Meadow
- 4 were migrating through Point Lookout Park
- 2 were migrating through the Gatewood Preserve
- 178 were from/or migrating through White Oak Farm (the Cox Family)
- **2020 Data was mailed to University of Georgia on January 5, 2021.**
    - **Will need to add 2020 Data here when Project Monarch Health emails it to Grace in Spring 2021.**

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

"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.

Tagging Data

- **2017 -2019 Tags and Recoveries:** can be found in the Monarch Project 2019 Annual Report

- **2020 Tags ACCA625-ACCA824**
  - **We tagged 184 monarchs**
    - 4 at Point Lookout
    - 2 at Gatewood Preserve
    - 178 at White Oak Farm (Cheryl Cox)
  - **No recoveries posted as of 11/10/20**

MONARCH VOLUNTEERS

- **2019 Volunteer Hours: 146.5**
- **2020 Volunteer Hours: 91.75**
  Not too bad considering we needed to reduce maximum participants due to COVID

- **2020 Volunteers (*donated 10 or more hours to this project)**
  - Mary Ellen Boynton
  - Cheryl Cox*
  - Jennifer Horsmon*
  - Sue Huseby *
  - Lauren Kleist
  - Sandy Kleist
  - Jessy Oberright
  - Karen Ritchie*
  - Kestrel Watson
  - Julie Womer
  - Cora Womer

MENTIONABLE VOLUNTEER SUCCESSES IN 2020:

Sandy & Lauren Kleist – volunteered 7 weeks of the 2020 monarch season
Karen Ritchie – volunteered 10 weeks of the 2020 monarch season
Jennifer Horsmon – 10 consecutive weeks
Sue Huseby - 20 consecutive weeks
Cheryl Cox- tagged her 125th monarch this year at their family farm October 14th and could have tagged more! She found a monarch chrysalis earlier in the week and took it to her younger sister's school so they could watch it emerge. Cheryl was a guest speaker in their classroom and brought in a few monarchs to show the students how to tag the monarchs and test them for disease. It's exciting to see our conservation efforts passed on to others! On October 21, I gave her some more tags, and she managed to tag another 53 monarchs for a total of 178 monarchs in Sept-Nov 2020.

Our trained volunteers also monitored a couple weeks independently when I was unable to be there due to illness, and they kept the project going!

FUTURE IDEAS FOR 2021

- Grace Hanners will be taking over the project in 2021.
- I talked to Beau about mowing a few paths around the milkweed patches in the Cypress Swamp Meadow beginning in 2021. He said that after the initial creation of the paths, it would add only a couple minutes to their overall mowing time. This will save Grace (or volunteers) about an hour's worth of weekly string trimming. All they will have to do is keep the blackberry briars pruned back when they begin to hang over the paths.

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

2020 Annual Report

Date of Issue February 2021

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
Calvert County Natural Resources Division:
www.calvertcountymd.gov/NaturalResources

CCPR
CALVERT COUNTY
PARKS & RECREATION
NATURAL RESOURCES DIVISION

CALVERT NATURE SOCIETY
calvertparks.org