



# Butterfly diversity and abundance in a restored grassland site in Cuyahoga Valley National Park



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## Introduction

Cuyahoga Valley National Park in Ohio is well-known for having a history of restoration. One site in particular, locally known as the Coliseum, underwent a massive transformation in the late 90s. Beginning as an assortment of disconnected farms, the site was consolidated into a single parcel and developed in 1974 into a stadium which played host to the Cleveland Cavaliers for its 20 year lifespan.



Top: The Richfield Coliseum, operational 1974-1994.

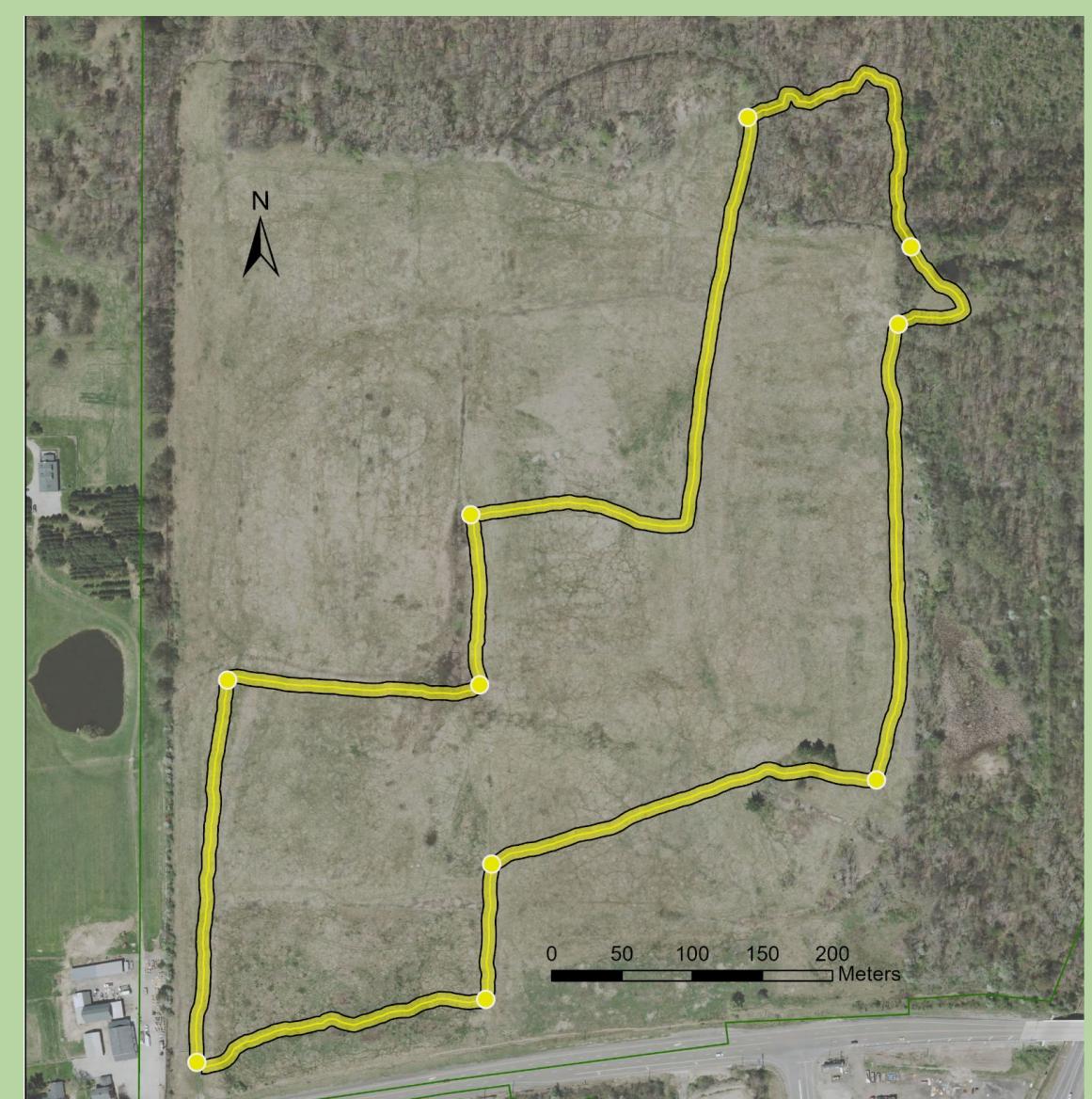
Bottom: The Coliseum Grasslands, 2024.

Photo credits: Top: NPS Collection. Bottom: Aaron Self

After closing its doors in 1994, the Richfield Coliseum sat abandoned before being demolished, and ownership of the land passed to Cuyahoga Valley National Park. Beginning in 1999, the site underwent restoration, converting the land to a sprawling grassland where many species, notably butterflies, flourish.

In 2012, the Coliseum was added to a pre-existing butterfly monitoring protocol within the park. This protocol was designed by the Ohio Lepidopterists as part of a statewide monitoring effort with over 150 sites. At the Coliseum, surveys were conducted by NPS staff.

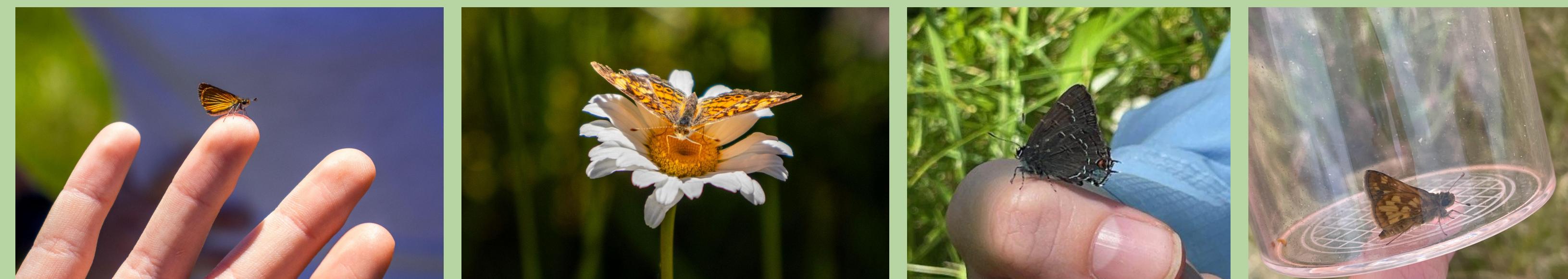
With over ten years of data at this site, we aim to provide insight into butterfly populations in restored grassland habitat.



The butterfly survey transect at the Coliseum.

## Materials and methods

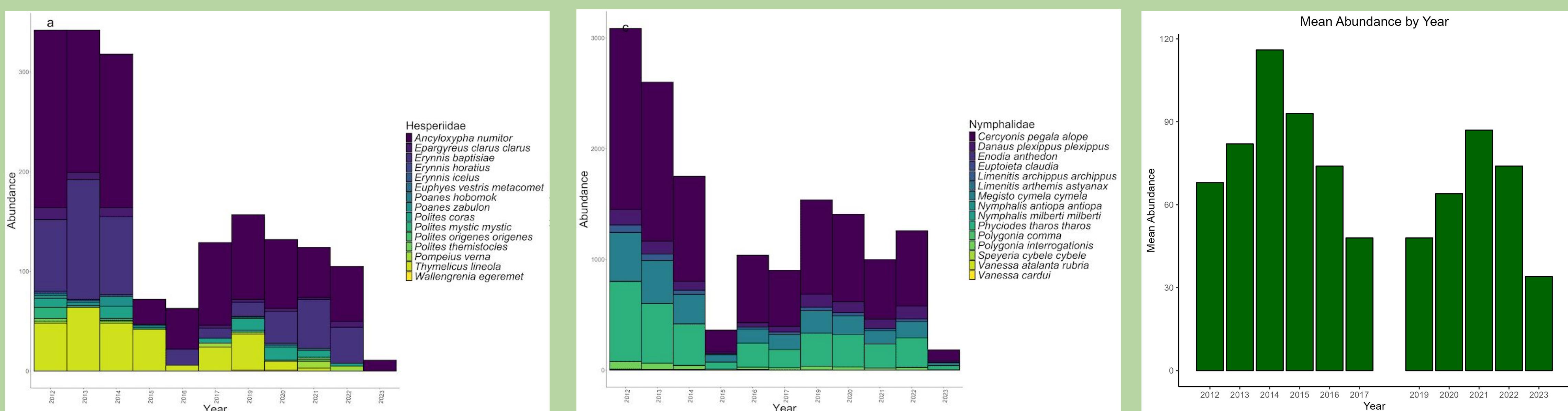
- Surveys were conducted May-September (weather permitting) from 2012-2023 using a modified Pollard walk protocol. Survey dates were reliant on staff availability and tended to be inconsistent in years with less available staff.
- Surveys were walked along an approximately 1.4 mile transect, divided into 10 sections. All butterflies within a 15m x 15m x 15m cube centered on the observer were recorded.
- Butterflies were identified to species, either by sight or by capture. Photos were also used for identification.



From left to right: *Ancyloxypha numitor* perched on a hand, *Phyciodes tharos* resting on a flower, *Satyrium calanus* observed at the Coliseum, and *Polites peckius* captured for identification.

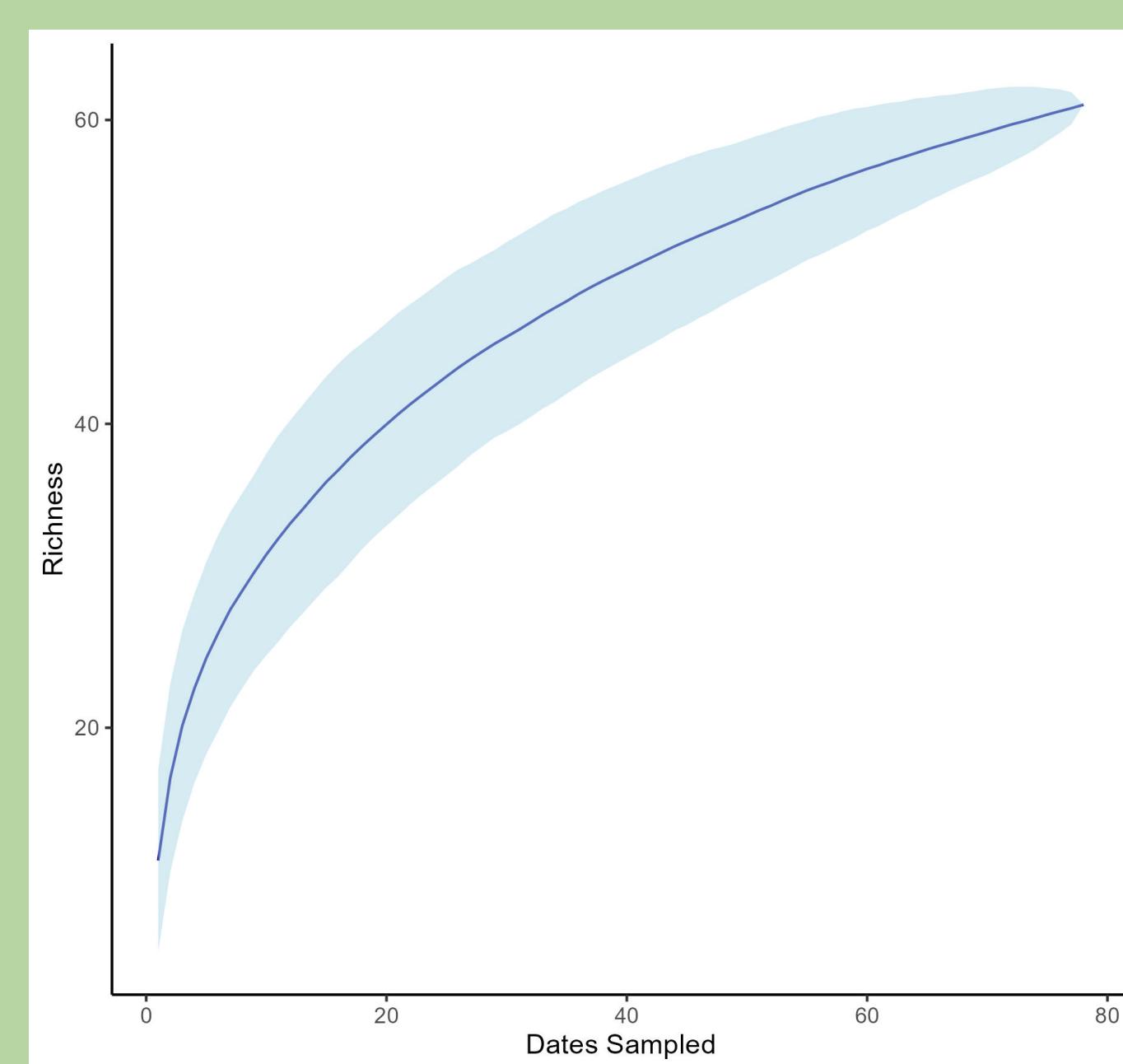
Photo credits, from left to right: Aaron Self, Aaron Self, Mariamar Gutierrez Ramirez, and Leo Kuck.

## Results



Year	Species	Surveys
2012	36	16
2013	27	14
2014	28	9
2015	14	2
2016	14	5
2017	21	5
2019	24	8
2020	21	7
2021	22	5
2022	18	6
2023	9	1
All Years	61	78

Left: A table showing total species detected in each year, as well as the number of surveys conducted in that year.  
Right: A species accumulation curve showing richness by number of dates sampled.



## Discussion

The butterfly community at the Richfield Coliseum provides an example of what to expect from a restored grassland. We exhibit here both the richness of the Hesperiidae and Nymphalidae families by year and the mean abundance per survey by year as a way of visualizing this community. We also use a species accumulation curve to showcase how effort has influenced the collected data.

Monitoring at the Coliseum has historically been inconsistent, relying on staff to complete surveys when they have the availability to do so. As staff numbers and duties fluctuate, so too does monitoring effort. In order to properly gauge the responses and shifts in butterfly communities over time, it is vital that monitoring efforts be upheld and be performed consistently. In doing so, we ensure that changes are seen as they happen, and their ramifications may be considered before it is too late to act. This is especially pertinent in the case of grassland habitat, where management to control succession and invasive species must be carefully balanced with impact on the natural communities that dwell there.

In the future, steps should be taken to ensure that data is collected consistently. Progress has already begun on that front in 2024, with the most surveys since 2012 due to the hiring of an intern with surveys as a part of their regular duties. Looking further, the monitoring can be made more sustainable by use of trained volunteers rather than staff, which has worked well for the other sites under this protocol in the park. With some adjustment, we can ensure this monitoring is able to continue for many years to come, to hopefully enhance our idea of what a butterfly community in a restored grassland looks like and how it shifts along with our changing world.

## Acknowledgements

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