



Butterflies, Volunteers, and Long-term Data

A Recipe for Success

Key Recipe Ingredients

- Butterflies— ecologically important insects that are indicators of ecosystem health
- Dedicated volunteers—more than 55 since 1996
- Long-term datasets, which enable a clearer picture of the butterfly community over time
- A standardized protocol for surveying butterflies
- Committed park staff to lead the project over the long term—30 years so far!
- Restored habitat for butterflies and other species
- Partnerships between the park, organizations, and individuals

Cuyahoga Valley National Park Setting

Cuyahoga Valley National Park (NP) is located in northeast Ohio between two cities. The Cuyahoga River, a historic canal towpath, a scenic railroad, and an automobile byway run through the heart of the valley. The area's history of human use has led to the need for habitat restoration in some locations. The park includes multiple sites that have been restored to native habitat, including [Terra Vista](#) (Terra Vista Natural Study Area) and Indigo Lake. These areas were once used for sand and gravel mining and quarrying, respectively, but now host native grassland and woodland habitat.

Butterfly Surveys in Restored Habitat

Volunteers and park staff have been collecting data on butterflies at Terra Vista continuously since 1996. They've been collecting data at Indigo Lake for all but one year since 2010. These long-term surveys are part of a statewide program run by the [Ohio Lepidopterists](#) and Cleveland Museum of Natural History. The surveys at Terra Vista are the longest-running volunteer program at Cuyahoga Valley NP and the longest-running butterfly surveys in the state!

Trained volunteers conduct the butterfly surveys at the park from April to October each year. They walk the same survey line each time and record all the butterflies they see. The volunteers count and identify the butterflies within 16.5 feet (5 meters) of the survey line. Surveys are conducted only when temperatures are above 59.9°F (15.5°C), wind speed is ≤24 miles/hour, and



An orange sulphur butterfly, one of the species found at Cuyahoga Valley National Park. Photo credit: © Sue Simenc

it's not raining. Once complete, volunteers submit their findings to the park and a statewide database.

Why Butterflies?

Butterflies are ecologically important as pollinators and herbivores; a major food source for birds; loved and watched by members of the public; and relatively easily surveyed by standardized methods. Butterflies are also indicators of the health of an ecosystem due to their sensitivity to changes in habitat, temperature, and climate.

Long-term Datasets Allow for the Evaluation of Trends

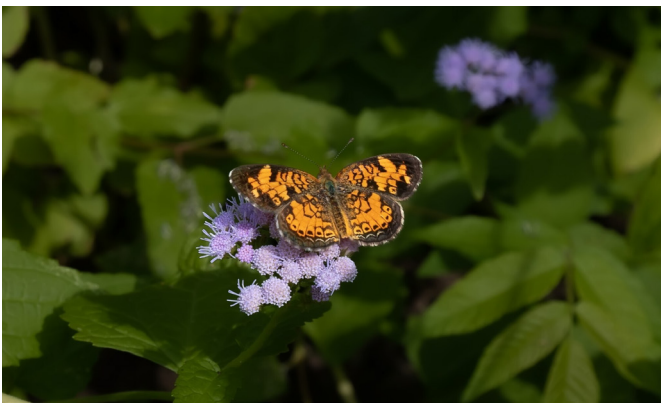
With long-term data, trends in the butterfly community can be evaluated. A study completed in 2025 used the data from Terra Vista and Indigo Lake to look at species richness (the number of species) and abundance (the number of individuals of a given species) through time. Study researchers—with the park, Kent State University, and Ohio Lepidopterists—also sought to determine whether climatic variables influenced the butterfly community. Data through 2023 were used for the study.

What Did the 2025 Study Reveal?

- There was a turnover in the butterfly community (species composition) at both Terra Vista and Indigo Lake. This means that the butterfly communities observed during the

earlier survey years were different than the communities observed in 2023.

- There were similar levels of butterfly species richness (# of species) at the two sites, but there were more species at Terra Vista. At Terra Vista, richness estimates were highest around the year 2000, then they decreased but stayed relatively consistent up to 2023. At Indigo Lake, richness estimates generally decreased throughout the entire period, especially in the last five years of the study.
- Butterfly abundance fluctuated annually. For some species, the increases and decreases in abundance from year to year were relatively consistent between sites. For other species, the opposite was true.
- Degree days (a metric calculated using maximum and minimum temperature within each year) and average daily precipitation played a role in variability in the butterfly community.
- As the study researchers concluded, the patterns in community composition, species richness, and abundance described above suggest changes in the butterfly community over time. They also highlight the importance of long-term data to accurately detect trends.



A pearl crescent butterfly, the overall most abundant species at Terra Vista Natural Study Area. Photo credit: © Jim Kaftan

What Questions Remain?

Based on their analysis of the data, the study researchers were not able to determine which factors were primarily responsible for the butterfly community shifts observed. The researchers suggested the shifts may be due to changing climate patterns, but other factors related to park management, habitat, and/or land-use history probably contribute as well.

Researcher Recommendations

Researchers suggested a number of considerations for improving future analyses and habitat for butterflies in the park. For example, detailed surveys of the plant community were outside of the scope of the monitoring effort. However, more such information would provide better context to the data. This could be as basic as making counts of flower density or vegetation

height at each site. Park management actions could include increasing habitat area by providing more plants that serve as nectar sources and caterpillar food (i.e., host plants), as well as enhancing spatial connectivity between sites. Continued monitoring and occasional reanalysis of the accumulating data will provide continued insight into Cuyahoga Valley's butterfly community.

Volunteers Make an Impact!

As shown here, volunteers are a vital ingredient to this recipe for success. Without their dedicated and careful work, the ability to study long-term trends in the butterfly community at Cuyahoga Valley NP would not be possible.



A group of volunteers and NPS staff from the service-wide citizen science team, Cuyahoga Valley National Park. Photo credit: NPS

If You Would Like to Become a Trained Volunteer

To learn more about opportunities to volunteer on the butterfly surveys (or other long-term studies in the park on birds, bats, amphibians, and trillium), contact the park volunteer office by emailing Volunteer@forcvnp.org.

This brief is based on the following project publication, funded partially by the [NPS NRCA Program](#):

Franzem, T.P., L. Kuck, J. Wiedmann, M. Gutierrez Ramirez, and C.A. Bahlai. 2025. Patterns of richness in a long-term citizen science butterfly dataset from Cuyahoga Valley National Park. *Ecosphere* 16(9): e70400. <https://doi.org/10.1002/ecs2.70400>.