

## INTRODUCTION



Butterflies are excellent subjects for early detectors of climate change due to their strong ties to the plant community. Since 2014, the McDowell Sonoran Conservancy's Field Institute has conducted an annual fall butterfly count (a spring count was added in 2017) and submitted the data to a nationwide database hosted by the National American Butterfly Association (NABA) (Fig. 1).

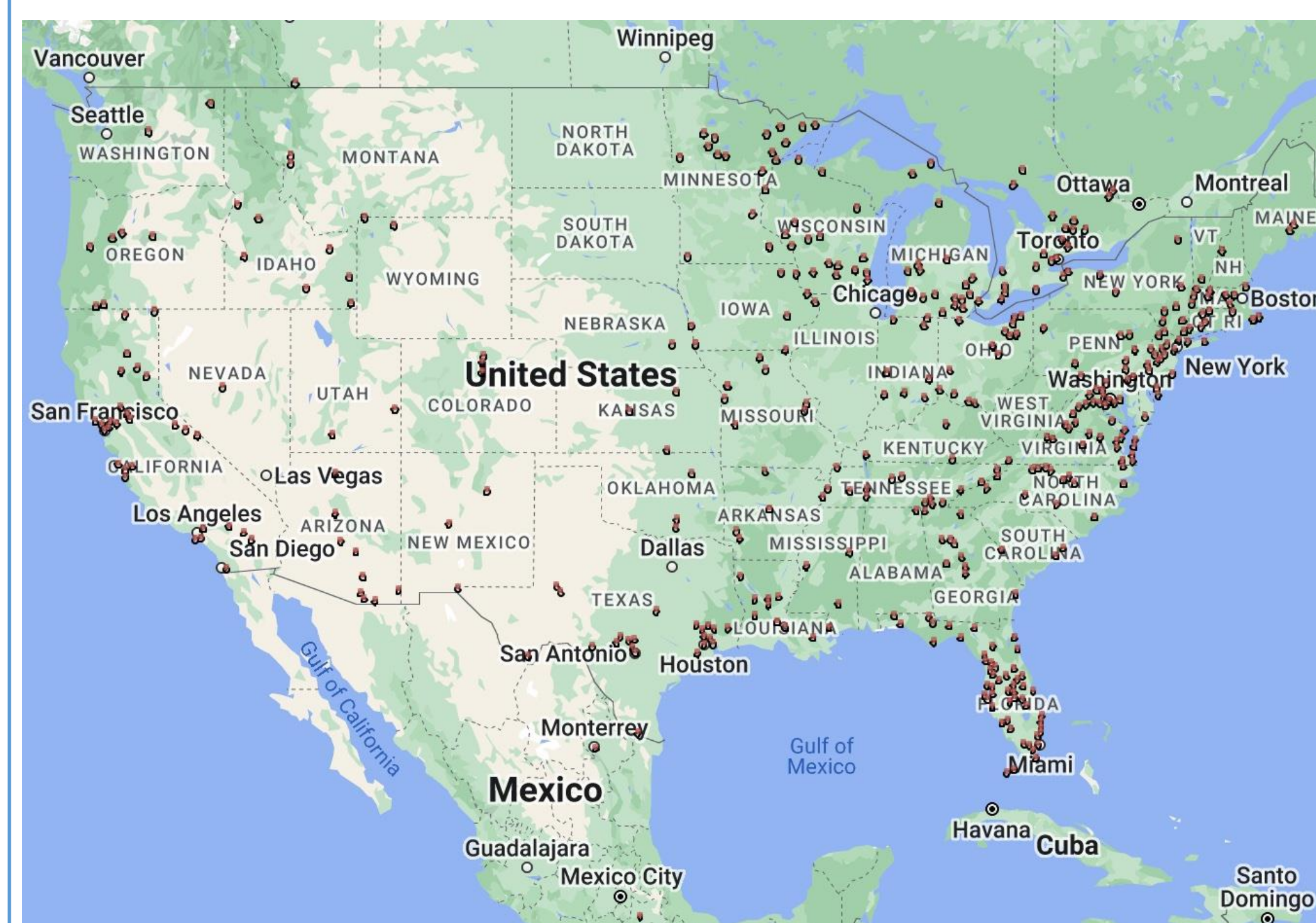


Figure 1. NABA Butterfly Counts – held on the 4<sup>th</sup> of July since 1975; now held in spring, summer, and fall.

## OBJECTIVES

The objectives of the project are the following:

1. Develop a baseline inventory of species richness and abundance of the butterfly community found in McDowell Sonoran Preserve.
2. Periodically monitor butterfly populations for changes in species richness and abundance.
3. Provide data for educational purposes and to inform conservation plans for maintaining the delicate ecosystem of the Preserve.

## METHODOLOGY

Counts follow the count methods promulgated by NABA<sup>1</sup>.

Six count sites (Fig. 2) were selected to be representative of habitat diversity in the Preserve and to ensure counts can be repeated year after year. The six sites fall within a 15-mile diameter circle, which is required to be a registered NABA count.

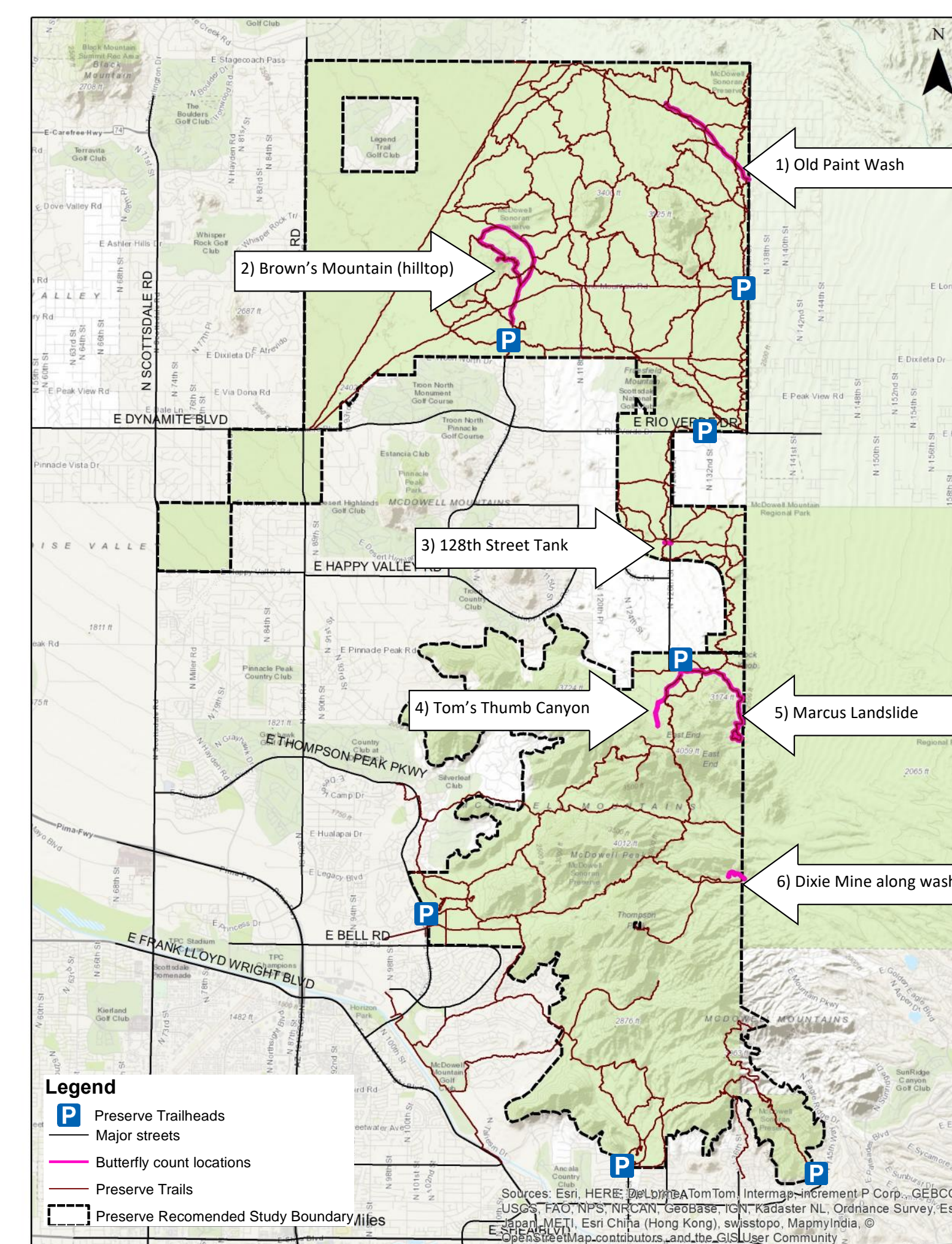


Figure 2. Six butterfly survey routes located in the Preserve.

After attending an identification training class and studying Preserve guides<sup>2,3</sup>, citizen scientists assist experienced butterfly identifiers with locating and identifying butterflies in the field during the counts. The counts are conducted at all six sites on the same day and at the same time.



Photo D. Langenfeld

## RESULTS

Fifty-nine butterfly species have been observed in the Preserve, to date. The number of species and individuals observed varies greatly from count to count. For example, counters tallied nearly 10,000 individuals in fall 2021, but only 25 individuals in Fall 2020. The effort put into counting is similar across counts as are the weather conditions.

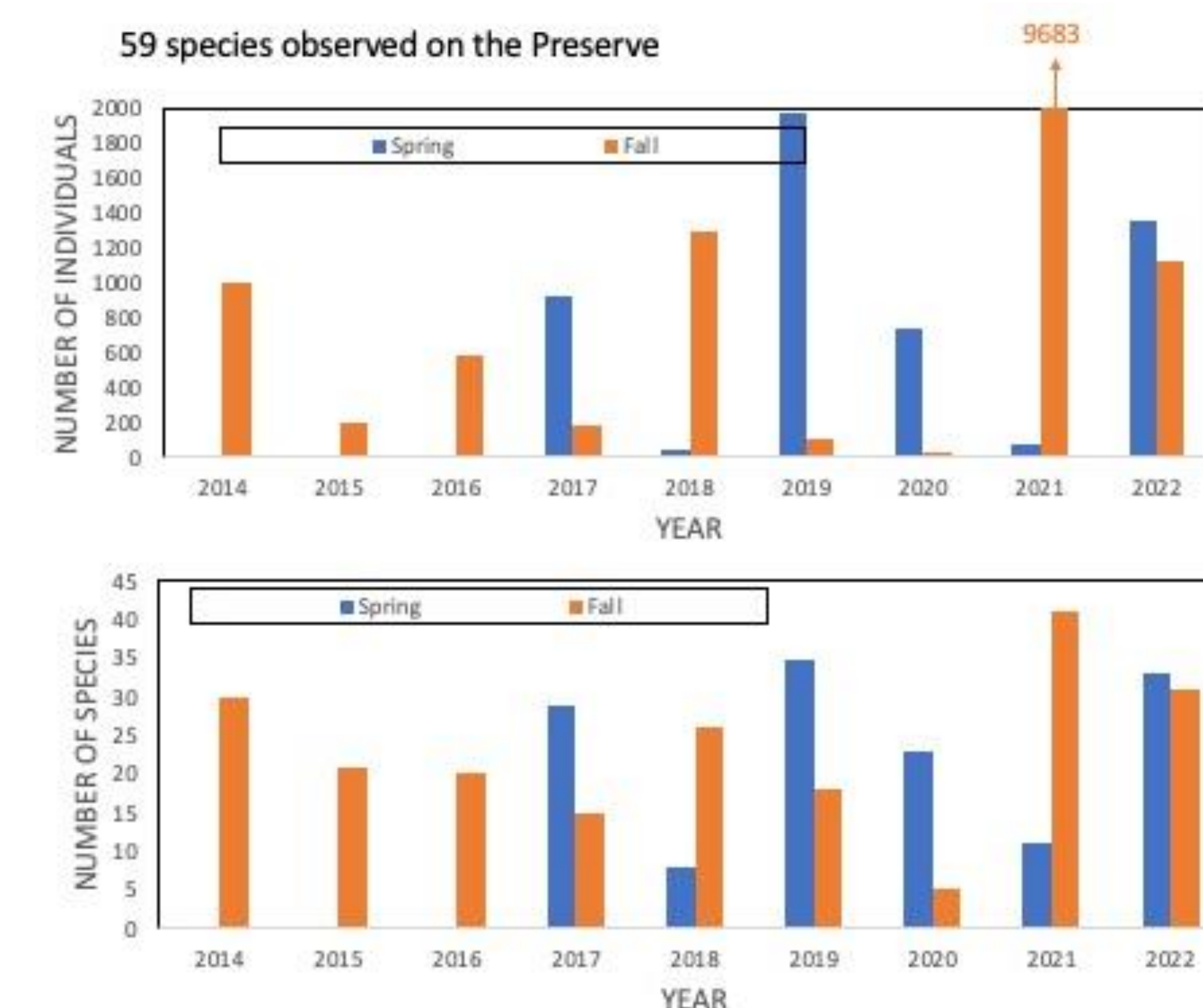


Figure 3. Annual and seasonal monitoring demonstrates the large variation in the butterfly populations on the Preserve.

Rainfall in the months preceding a count has a significant effect on the diversity and abundance of the butterflies seen. In especially dry years, when host and food plants are rare or dormant, fewer species and individual butterflies are counted.

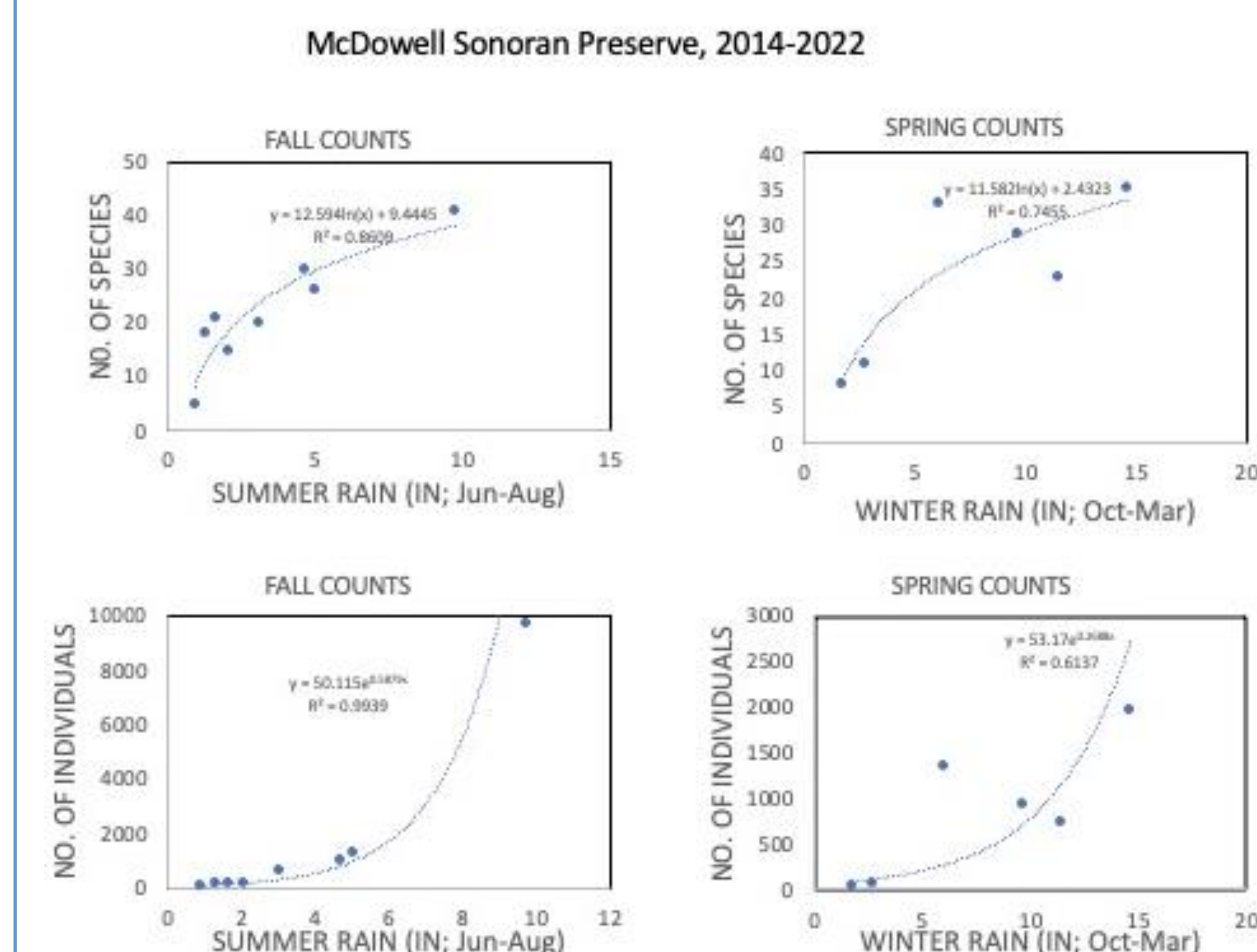


Figure 4. Butterfly species richness and abundance varies with the amount of rainfall in the months (fall: June-August; spring: October-March) preceding the counts in both the spring and fall.

## CONCLUSIONS

These results show that the butterfly community is influenced by precipitation patterns. This, in turn, raises concerns about the negative consequences for butterflies of the effects of extended dry conditions that are predicted with climate change.

Butterflies are a beautiful and important part of the Preserve's ecosystem. With the assistance of citizen scientists, the Conservancy's Parsons Field Institute will continue to collect data about butterfly populations in the Preserve to document and understand long-term changes in butterfly populations and the factors that contribute to these trends.



Photo A. Comstock

## REFERENCES

- 1 North American Butterfly Association. See <http://www.naba.org/counts/participate.html>.
- 2 Jensen, M.S. McDowell Sonoran Preserve Butterfly Brochure.
- 3 Jensen, M.S. 2017. Wildflowers, Butterflies and More. Flora photo ID guide.

## ACKNOWLEDGEMENTS

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