Monitoring the Impact of Environmental Change on the Butterflies of the McDowell Sonoran Preserve

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INTRODUCTION

The fragile nature of butterflies makes them ideal subjects for early detectors of climate change. Since 2014, McDowell Sonoran Conservancy's Field Institute has participated in an annual fall butterfly count (a spring count was added in 2017) conducted in conjunction with the National American Butterfly Association, linking local data to the NABA's nationwide effort.

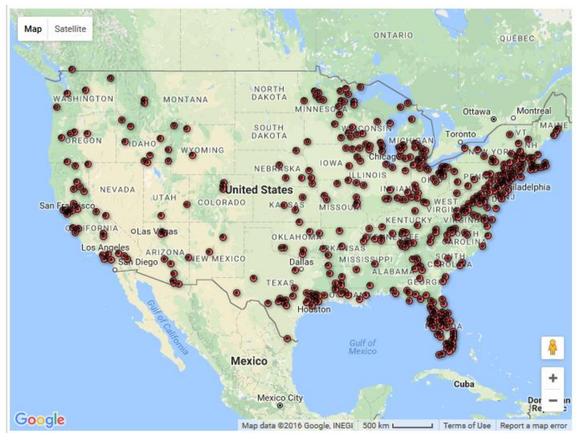

Figure 1. NABA Butterfly Counts – held on the 4th of July since 1975; now held in spring, summer and fall.

OBJECTIVES

The objectives of the project are the following:

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

METHODOLOGY

Counts are conducted under the guidance of Dr. Ron Rutowski and employ the count methodology used by NABA[1].

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

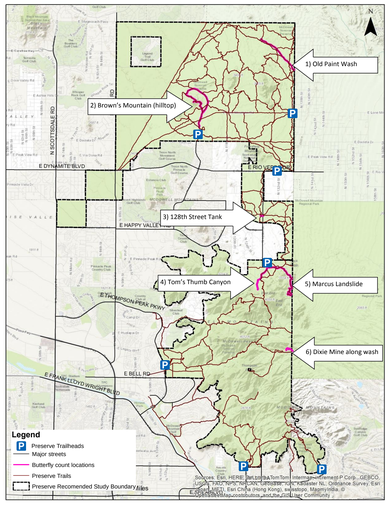

Figure 2. Preserve count locations

After attending an identification training class, citizen scientists assist experienced butterfly identifiers in the field during the counts. To assist the counters, each participant is given Preserve guides[2,3]. The counts are conducted at all six sites on the same day and at the same time.

Photo D. Langenfeld

RESULTS

We have a good start in establishing a multiyear database documenting butterfly species and abundance in the Preserve.

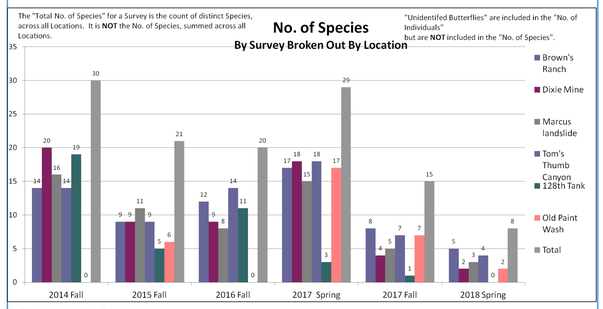

Figure 3. Number of species by survey broken out by location.

To date, we have found butterfly species richness in the fall is correlated negatively with rainfall the preceding winter and positively with rainfall the preceding summer.

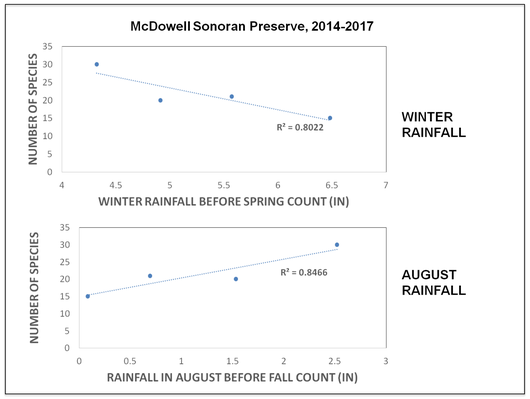

Figure 4. Precipitation vs. Number of species

There is a strong correlation between number of individuals and number of species seen on a count (at least for the fall counts).

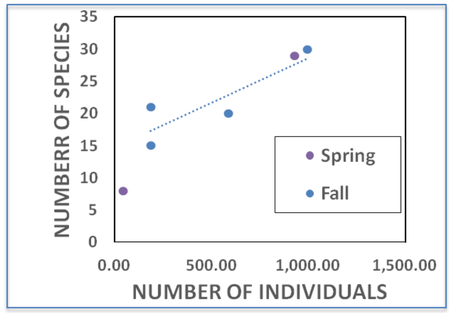

Figure 5. Number of individuals vs. number of species seen on a count.

CONCLUSIONS

The analyses indicate an impressive level of year-to-year variation in both seasons. The causes will be more clearly indicated when we have more data.

Butterflies are a beautiful and important part of the Preserve's wildlife. With the assistance of citizen scientists, the Field Institute will continue to collect data about butterfly populations in the Preserve in an effort to predict long-term relationships between them and environmental changes.

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

Photo D. Langenfeld

- Dr. John Weser, Scottsdale Community College
- Experienced butterfly identifiers
- McDowell Sonoran Conservancy Field Institute Citizen Scientists