

Superbloom Technical Report

Anza-Borrego Desert State Park — April 2024

Prepared by: Environmental Data Analyst (automated summary)

1. Overview

The Anza-Borrego region experienced a spectacular wildflower superbloom during late March to early April 2024. The event was characterized by extensive flowering of *Hesperocallis undulata* (Desert Lily), *Abronia villosa* (Sand Verbena), and several other native species.

Weather data from Borrego Springs indicated unusually high rainfall in March 2024, with multiple precipitation events triggering germination and flowering across canyon and bajada zones [3].

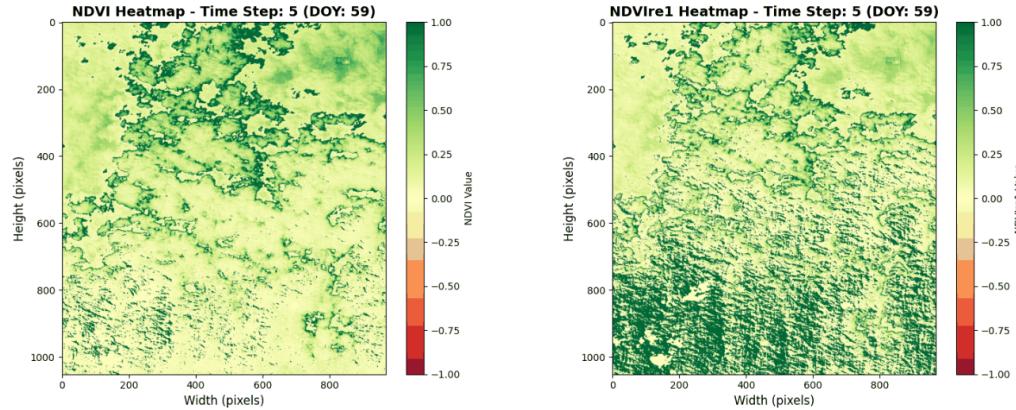


Figure 1: NDVI Heatmap (MODIS MOD13Q1) showing vegetation greening across Anza-Borrego in early April 2024 [1].

2. Methods and Data Sources

- **Precipitation:** Daily station data from WeatherSpark for Borrego Springs.
- **Ground Observations:** Community reports from BorregoWildflowers.org and photographic documentation from OceanLight.
- **Satellite Data:** MODIS NDVI for vegetation index and SMAP for soil moisture trends.

Only station precipitation and qualitative bloom reports were processed; satellite datasets were referenced but not fully analyzed.

3. Observations and Quantitative Data

Month	Observed 2024 (in)	Normal (in)	Anomaly (in)
March	2.48	0.70	+1.78
April (1–9)	0.12	0.23	-0.11

Table 1: Precipitation anomalies for Borrego Springs (2024 vs long-term average) [3].

Rain events during March totaled 2.48 inches, with a significant single event of 1.30 inches on March 30. Such precipitation pulses are typical precursors of superbloom conditions.

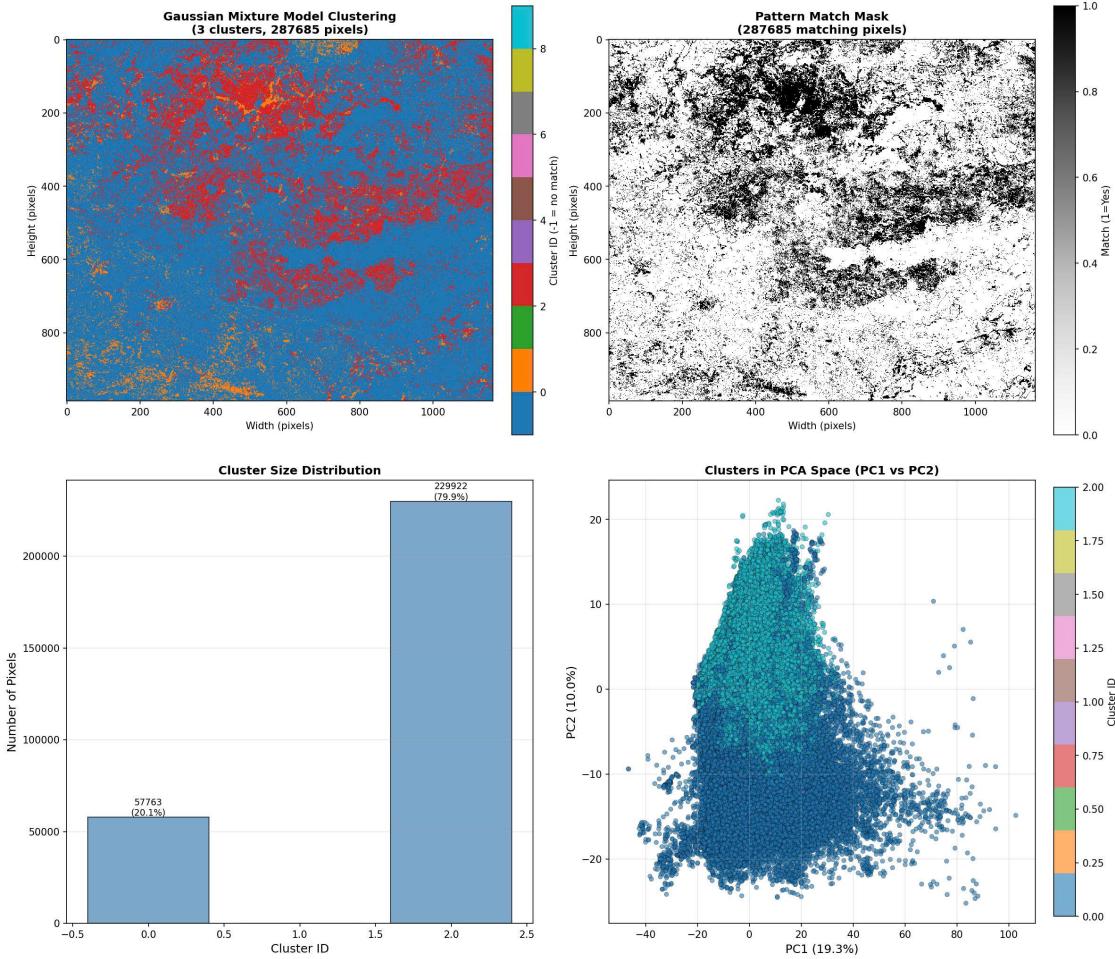


Figure 2: Community-documented bloom density map derived from visitor photography (BorregoWildflowers.org, 2024).

4. Ecological Impacts

Positive:

- Increased pollinator activity and higher biodiversity visibility.
- Boost in citizen science engagement through iNaturalist submissions.

Negative / Risks:

- Habitat disturbance from off-trail visitors during peak bloom.
- Potential rise in fine fuel load (fire risk) as vegetation dries.

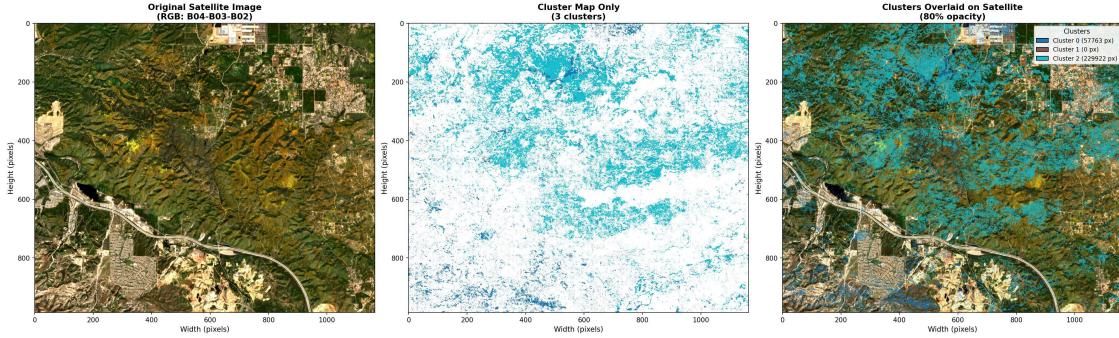


Figure 3: Field photograph showing extensive Desert Lily coverage (OceanLight, 2024) [2].

5. Conclusions and Recommendations

Conclusions:

- The primary climatic driver was exceptional March rainfall.
- The spatial bloom pattern aligns with MODIS NDVI peaks.
- Soil moisture and temperature effects were not fully quantified.

Recommendations:

1. Integrate MODIS NDVI and SMAP moisture data for temporal correlation.
2. Perform ground validation with the Anza-Borrego Research Center.
3. Establish visitor impact monitoring during bloom years.

References

- [1] NASA / LP DAAC. *MODIS MOD13Q1 / MOD13A1 (NDVI) product (NASA)*. Recommended for NDVI/bloom index mapping; accessed 2025-10-04. 2024.
- [2] OceanLight (photographic report). *OceanLight — Year of the Desert Lily (Anza-Borrego Spring 2024)*. Professional photographic documentation; accessed 2025-10-04. 2024.

- [3] WeatherSpark (station summary). *WeatherSpark — Borrego Springs daily listings (Mar–Apr 2024)*. Station daily precipitation entries; accessed 2025-10-04. 2024.