



Clark County Rare Plant Research: Persistence in a Novel Solar Environment and Restoration in a Disturbed Gypsum Landscape

August 31, 2026



SCIENCE THAT MATTERS NOW.®



Two Projects. One Goal.

Project 1: Evaluating the Effects of Solar Panel Microsites on Threecorner Milkvetch Establishment Using Soil Seed Banks

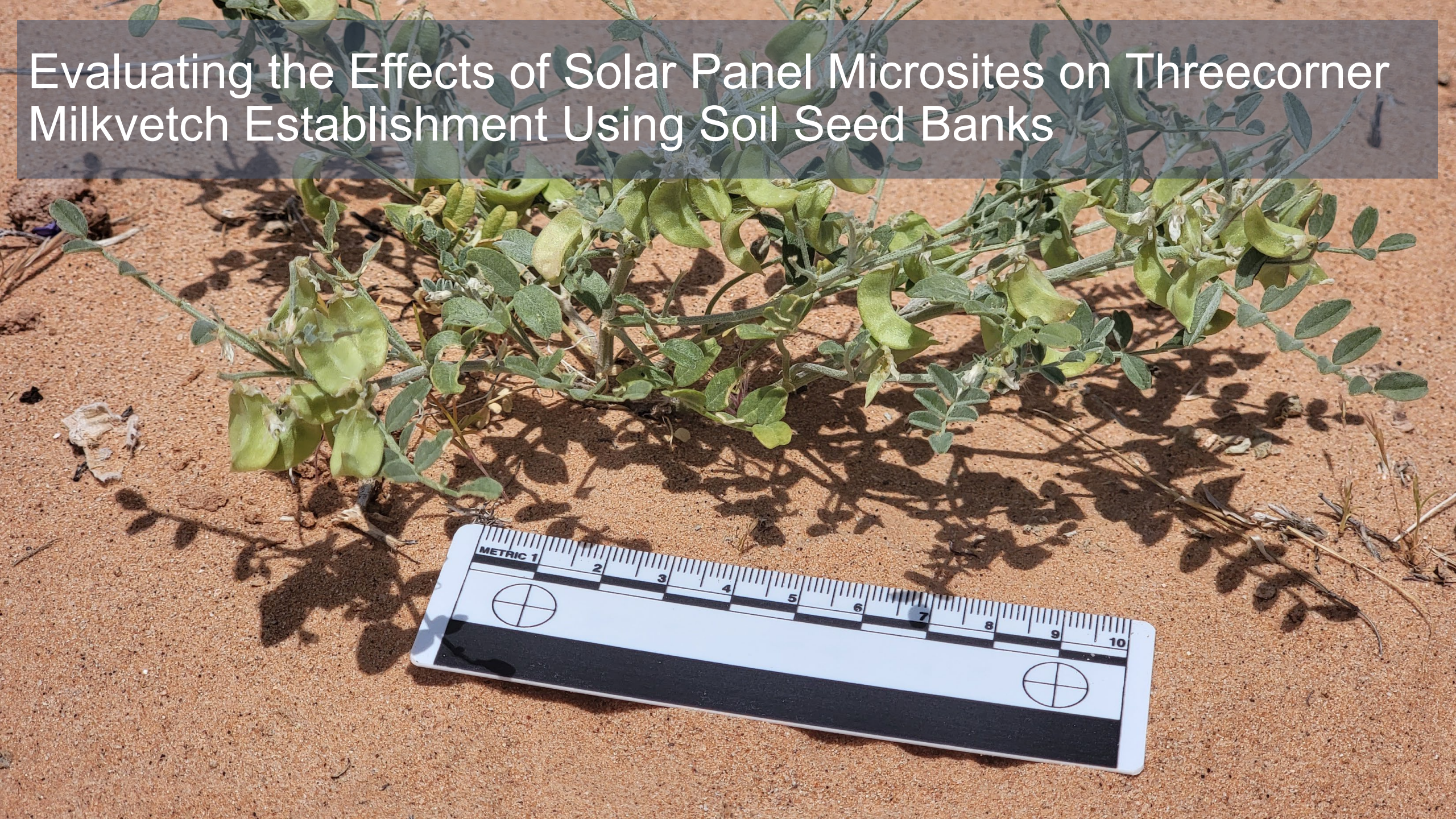
Project 2: Las Vegas Bearpoppy Restoration at Rainbow Gardens

Goal: Broaden our understanding of rare species and anthropogenic factors that affect our natural resources

Today's Presentation: Project overview



Evaluating the Effects of Solar Panel Microsites on Threecorner Milkvetch Establishment Using Soil Seed Banks



Renewable Energy



Utility-scale
solar energy
(USSE)



Environmental
tradeoffs



Minimization
Strategies

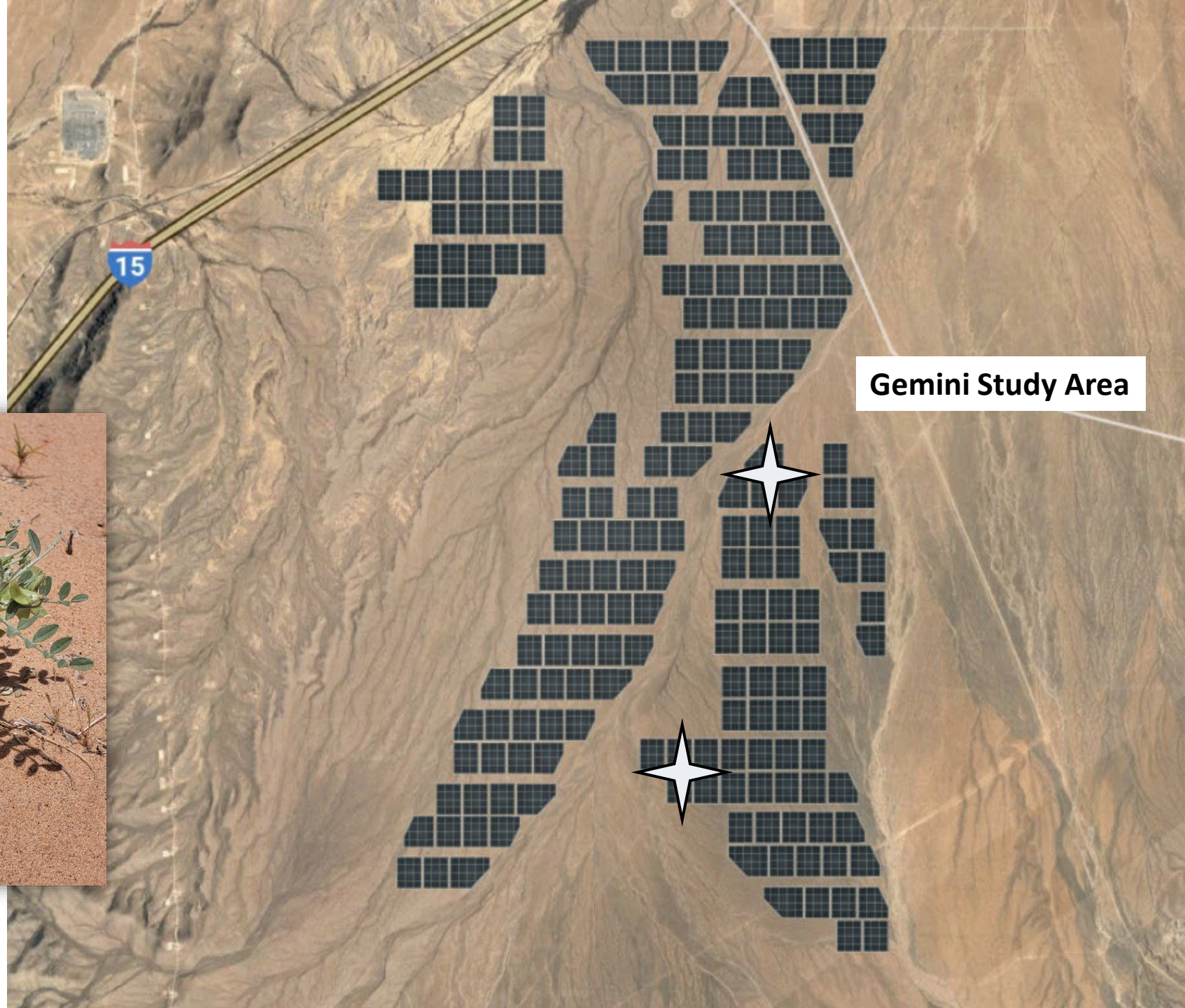


Gemini Solar

Threecorner milkvetch

Astragalus geyeri var. *triquetrus*

Pea Family (Fabaceae)



Ongoing Monitoring Results



Threecorner milkvetch persisted in the seedbank through construction at Gemini



Impacts on germination and seedling survival



Low emergence under panel arrays and in driplines = potential loss of suitable habitat over time

Survey Results	2018 Pre Construction 713 ha.	2024 Post Construction 102 ha	2025 Post Construction 102 ha	2026 Post Construction 102 ha
Total Plants	12	93	1	106

Plants per Microsite	2024	2025	2026	Estimated Area per Microsite (ha)	Density per Microsite		
					2024	2025	2026
Under Panel	1	0	0	2.3	0.4	0	0
Panel Dripline	4	1	17	4.7	0.9	0.2	3.6
Interspace	86	0	89	32.6	2.3	0	2.7
On-Site With No Arrays	2	0	0	62.4	0.03	0	0

Seed Bank Study

Objective: Collect and analyze soil seed bank samples to compare aboveground vegetation to seed bank composition in panel microsites

Site Selection: 6 sites known to contain threecorner milkvetch based on population surveys

Timing: Sampling occurred after 2026 spring germination but before seed dispersal. Will be repeated in Spring 2027.



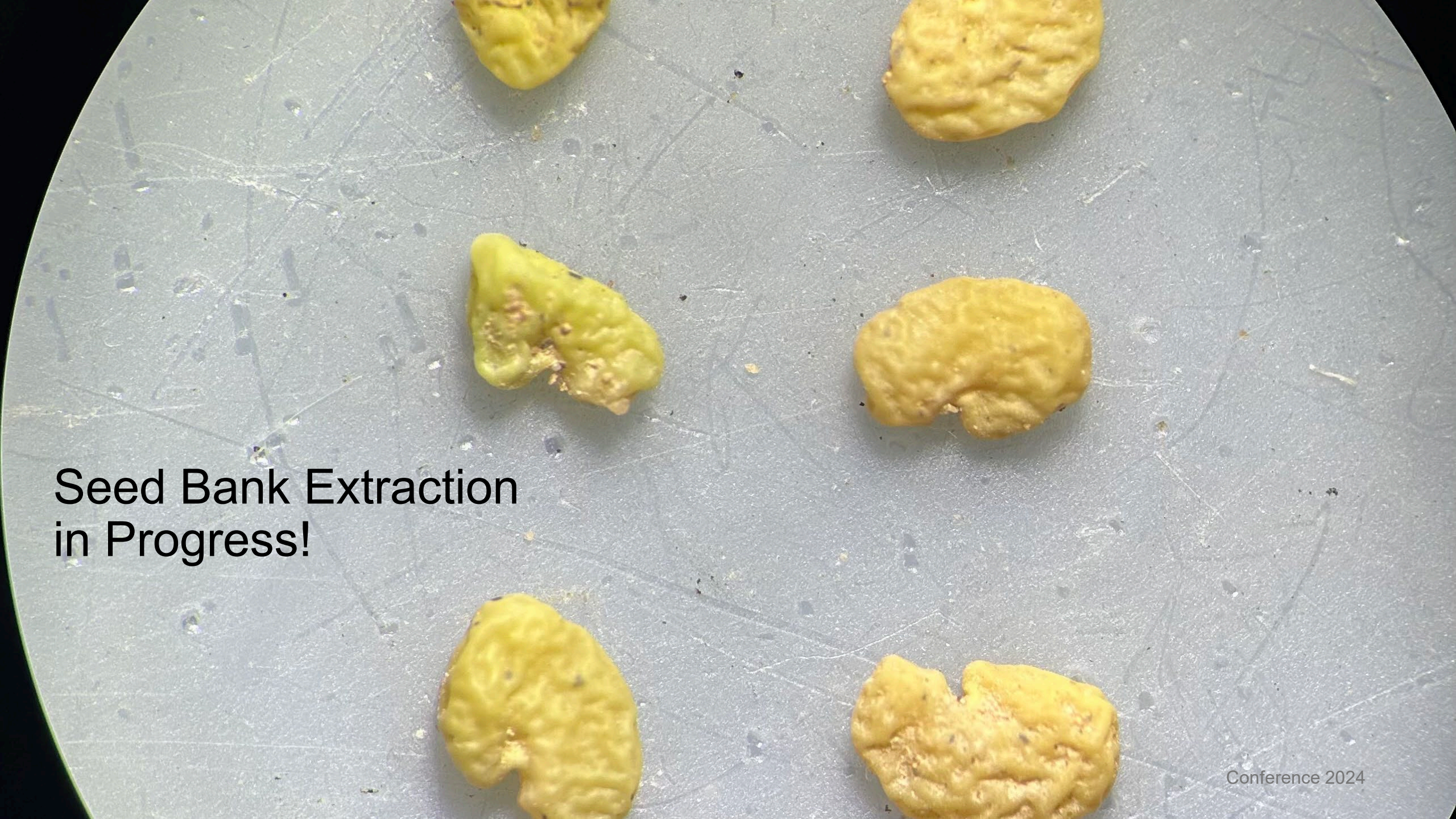
Seed Bank Study

Vegetation: Cover classes within a 1 m² sub-plot for each microsite

Core collection: Two samples per microsite (25 x 25 cm, 5 mm deep)

Seed Bank Analysis:
Extraction, using progressively finer stainless-steel sieves



The image shows six irregular, yellowish, fleshy seed samples scattered on a grey, scratched surface. The seeds vary in shape and size, with some showing more detail and texture than others. The background is a uniform grey with fine, light-colored scratches and marks.

Seed Bank Extraction
in Progress!

Las Vegas Bearpoppy Restoration at Rainbow Gardens



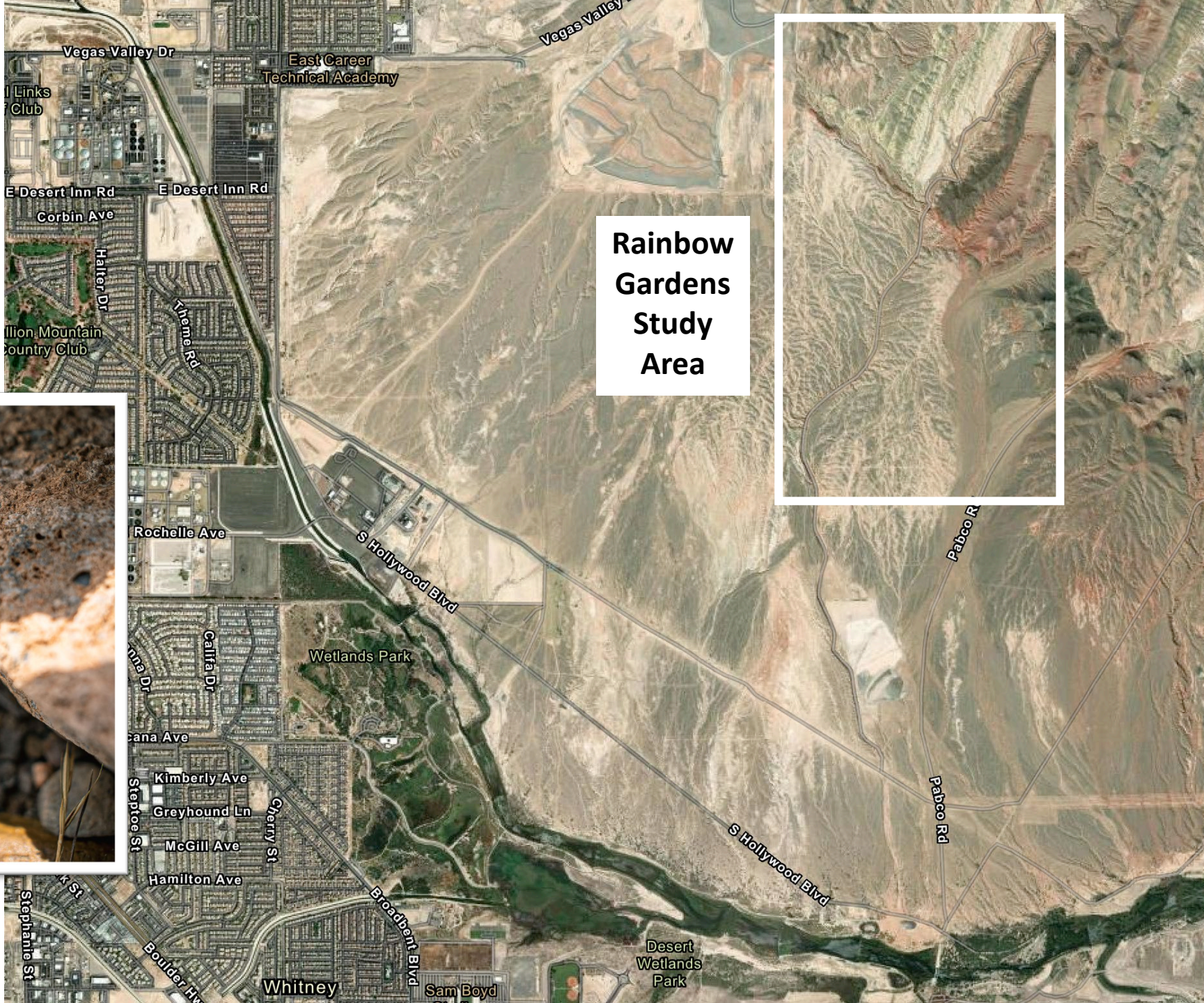
Photo by Ron Rierson

OHV trails and illegal dumping
everywhere!



Rainbow Gardens

Las Vegas Bearpoppy
Arctomecon californica
Poppy Family (Papaveraceae)



Rainbow Gardens Las Vegas Bearpoppy Study

Objective 1: Discern the impact of disturbance (e.g., compaction, OHV use, etc.) on seed germination

Objective 2: Determine best practices for Las Vegas bearpoppy restoration by conducting multiple treatment assessments



Rainbow Gardens Las Vegas Bearpoppy Study

Site Selection: Eight sites determined by Clark County, slated for restoration

Plots: 48 plots, 1m²

Treatments:

- Broadcast Seeding
- Supplemental Watering
- Disturbed: Compacted vs Decompacted
- Undisturbed, Biological Soil Crust (BSC) Development: High vs Low

Plot Treatment	Broadcast Seeding (watering)	Broadcast Seeding (no watering)	No-Seeding (watering)	No-Seeding (no watering)
	Number of Plots	Number of Plots	Number of Plots	Number of Plots
Disturbed/compacted	3	3	3	3
Disturbed/tilled or raked	3	3	3	3
Undisturbed “High” biological soil crust (BSC)	3	3	3	3
Undisturbed “low” BSC	3	3	3	3

Broadcast Seeding and Supplemental Watering

Seed: 120 bearpoppy seeds per plot, half with heat incubation/cold stratification

Watering: 6mm per site per week (unless significant rainfall)

Goal to reach thresholds from Meyer and de Queiroz (2023)

60 mm rainfall germination threshold (higher the better), 80 mm seedling survival threshold, and 90 mm seedling survival/recruitment threshold for bearpoppy



- Disturbed: Compacted vs Decompacted

Disturbed: OHV traveled areas, high pocket penetrometer readings

Decompaction: Used rake to break apart the soil surface



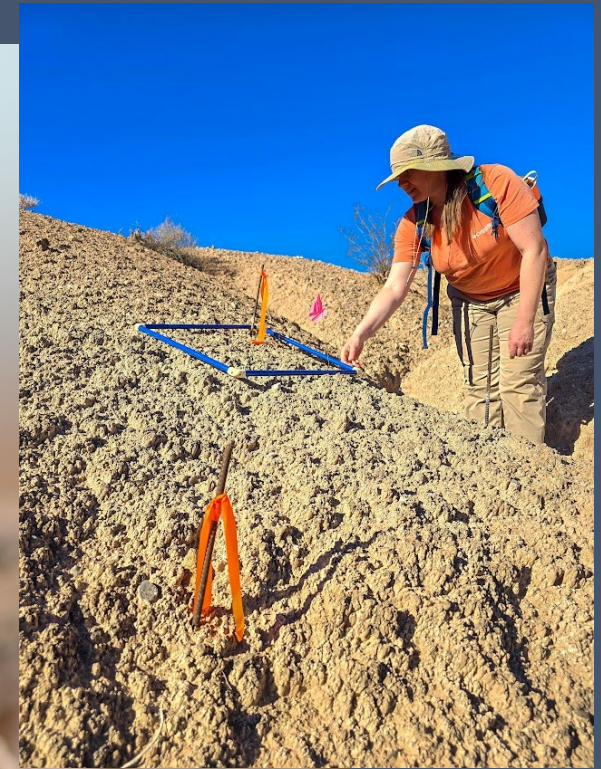
Undisturbed with BSC Development

Undisturbed: low pocket penetrometer readings, no OHV disturbance

BSC Development: In consultation with Katelyn Gobbie (UNLV)

High: High biocrust formation (darkening, lichen present)

Low: Light cyanobacteria/incipient biocrust formation (early successional stage)





Thank You

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- Seth Munson
- Claire Karban
- Lesley DeFalco

BLM: Lara Kobalt
Lillian Setters

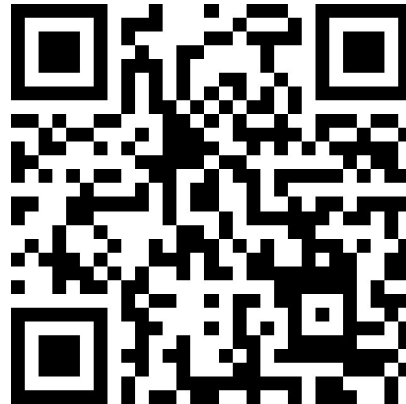
Gemini: Bre Moyle

UNLV: Lindsay Chiquoine
Katelyn Gobbie

DRI Technicians and Staff

- Tsvetelina Stefanova
- Roxanna Neilson
- Vanessa Flores
- Alisha Brown
- Amelia Porter
- Ashlyn Gnoyski
- Etienne Nunez
- Brianna Kramer

Contact: Tiffany.pereira@dri.edu
[@driecologylab](https://twitter.com/driecologylab)



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