

# Fire as a piece of the puzzle in coastal sage scrub restoration

Dr. Joanna Tang\* | Dr. Frank Davis | Dr. Carla D'Antonio

\*[joanna@vollmarconsulting.com](mailto:joanna@vollmarconsulting.com)







*Salvia leucophylla*  
San Luis purple sage

A close-up photograph of a Salvia leucophylla plant. It features silvery, fuzzy leaves and clusters of small, light purple flowers. The background is a blurred natural setting.



*Artemisia californica*  
CA sagebrush

A photograph of an Artemisia californica plant, also known as California sagebrush. It shows a dense, upright shrub with fine, needle-like leaves and a brownish, woody base. The background is a hilly landscape with other vegetation.



*Emmenanthe penduliflora*  
whispering bells

A photograph of an Emmenanthe penduliflora plant, commonly called whispering bells. The plant has green, lobed leaves and several bright yellow, bell-shaped flowers. It is growing in a rocky, sandy soil.



*Acmispon glaber*  
deerweed

A photograph of an Acmispon glaber plant, also known as deerweed. It shows a low-growing, branching shrub with green leaves and clusters of small, yellow and orange flowers. The background is a natural, rocky hillside.

CSS: deciduous aromatic  
shrub/sub-shrub matrix

“soft chaparral” | coastal moisture, more open canopy





Does CSS heterogeneity affect  
fire behavior & fire impacts?



# Acknowledgements

Research conducted on Chumash land

- **La Kretz Research Center at Sedgwick Reserve**

- Kristen Zumdahl
- Angela Giordani

- **Midland School**















Burn  
temperature  
higher under  
shrubs





Species richness  
similar post-fire



# Soil Seed Bank Germination

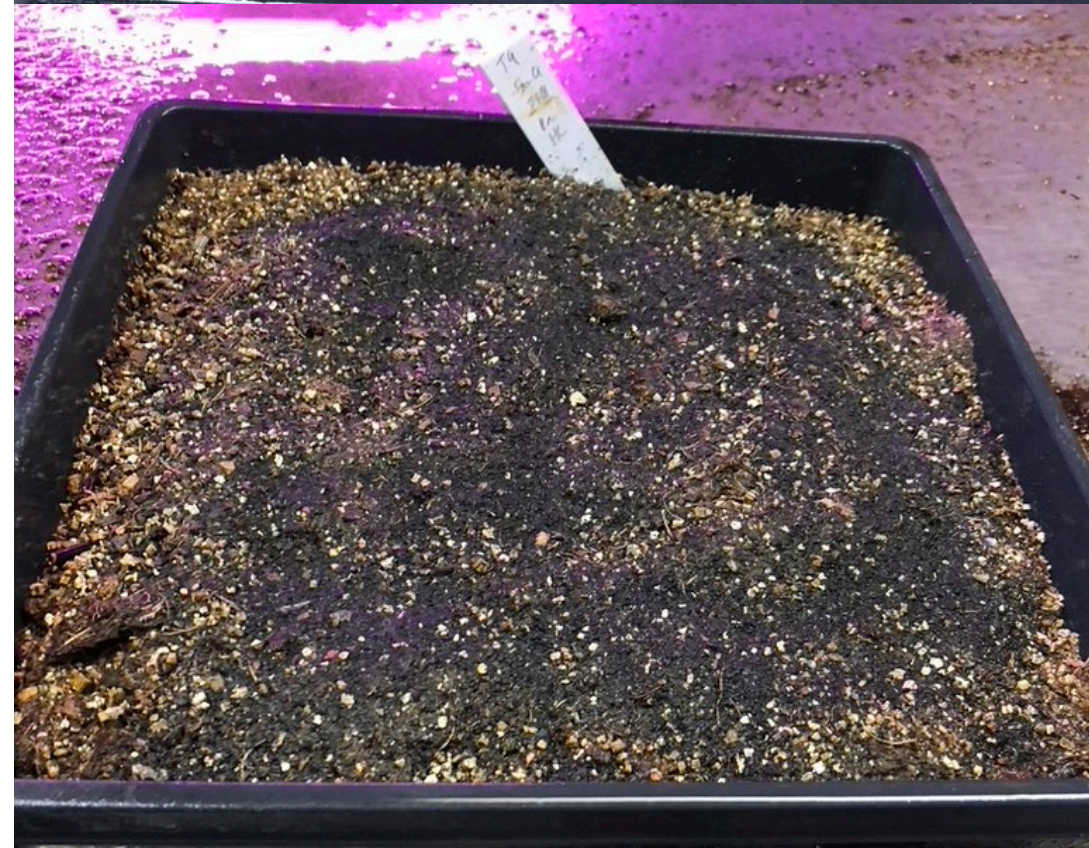
- 2-4 cm-deep soil cores excavated from quadrats along permanent monitoring transects
- Pre- & post-burn

**How do prescribed fire and isolated fire effects  
impact germination?**



# Treatments

- Pre Control: no treatment
- Pre S: cold-Stratified for 5 weeks @ 40°F
- Pre HC: cold-stratified & treated with Heat (10 min @ 200°F) & Charate
- Post Control: fire, no lab treatment
- Post S: fire, cold-Stratified for 5 weeks @ 40°F

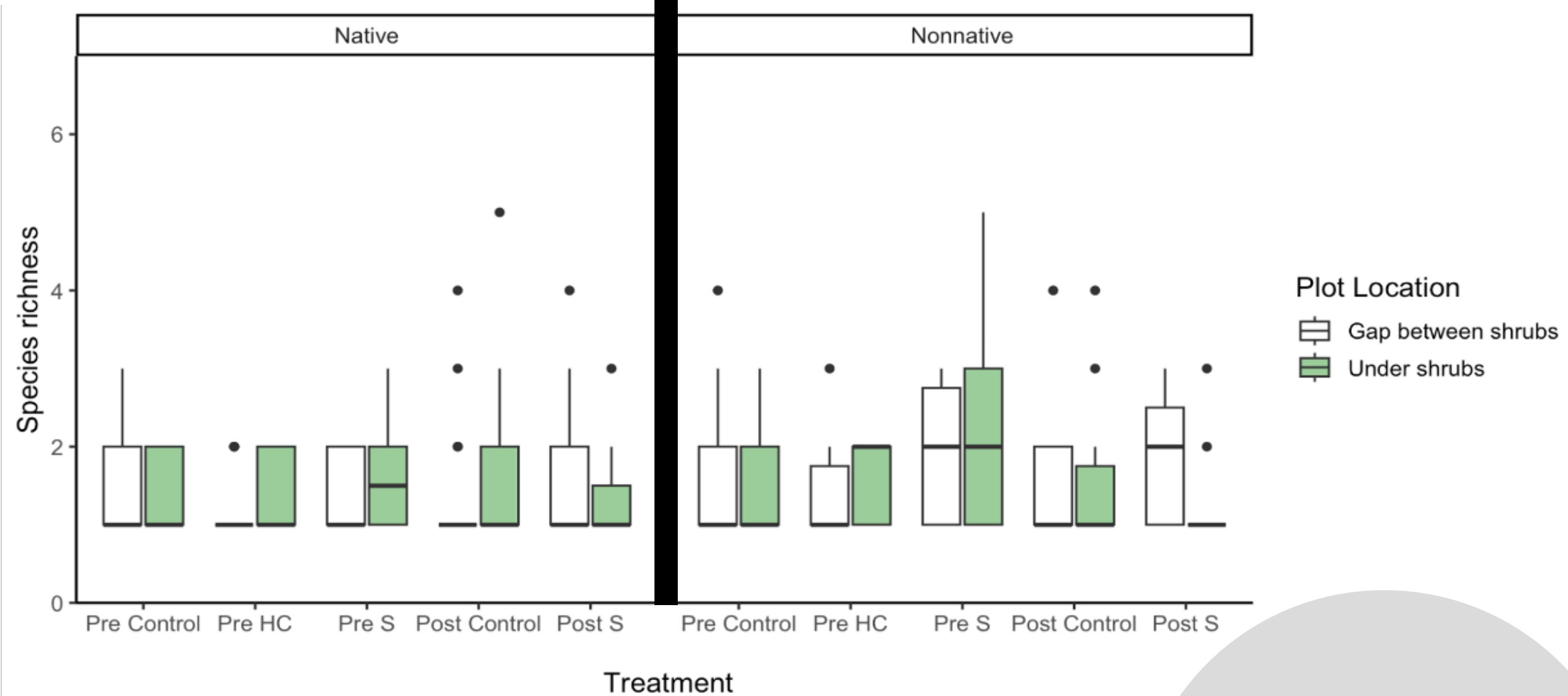




All subsamples germinated Jan 2024 in  
55-75°F greenhouse, watered daily







Species richness  
similar across  
treatments



# Conclusions & Implications

---

- Patchy CSS canopy can cause heterogenous fire behavior
- Prescribed fire did not significantly degrade nonnative seed bank
  - Possible negative effect on *Bromus* spp. & positive effect on *Festuca bromoides*
- Post-fire community primarily driven by seed bank
  - Fire outcomes reflect & reinforce landscape plant beta diversity
- Fire can be used alongside other invasive species management techniques to preserve & restore CSS