

2022 San Benito County Weed Management Area  
Rancher Seminar  
December 6, 2022



## Tumbleweed Control on California's Central Coast

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# Native Range



<http://geology.com/world/world-map.shtml> © 2007 Geology.com



# Introduced to Pacific Coast in 1895



<http://www.digital-topo-maps.com/county-map/california.shtml>

# Tumbleweed Biology



# What We've Learned From Local Ranchers

Tumbleweed is

- a much bigger problem in drought years and doesn't come up as much in wet years
- eaten by cattle when it is young
- a summer annual and is likely to be more widespread in areas that are not grazed in summer (because cattle aren't there to control it when it starts growing more quickly)
- more widespread in steep areas or other areas that are inaccessible to cattle

But, heavy grazing can also lead to an invasion

Heavy  
grazing



Moderate  
grazing



Photo credit: Royce Larsen

Some Ranchers Rely on Tumbleweed in Dry Years



# Study Sites: Southern San Benito County, CA

## Soils

- Loam
- Clay loam
- Silt loam

Slope - flat

Elevation – 1,000 ft.

Rainfall – 11 in.

## Treatments

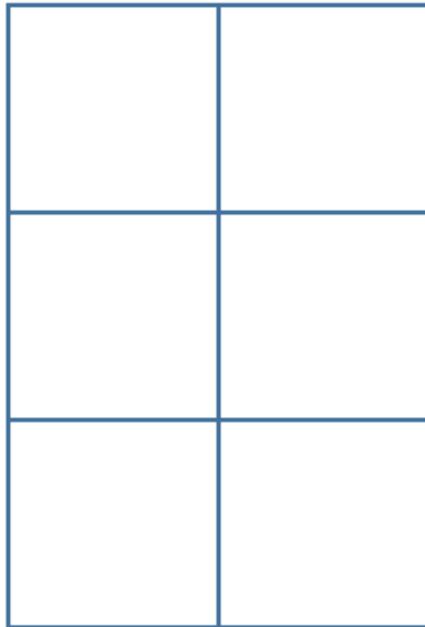
- Herbicide
- Seeding
- Grazing



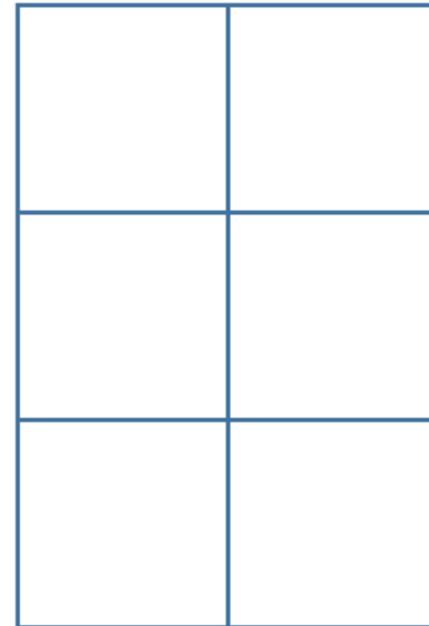
<https://www.digital-topo-maps.com/county-map/california.shtml>

Plot Layout – Each Replicate has 2 sections: Grazed & Ungrazed  
We looked at herbicide, seeding, and grazing as control treatments

## Ungrazed Section



## Grazed Section

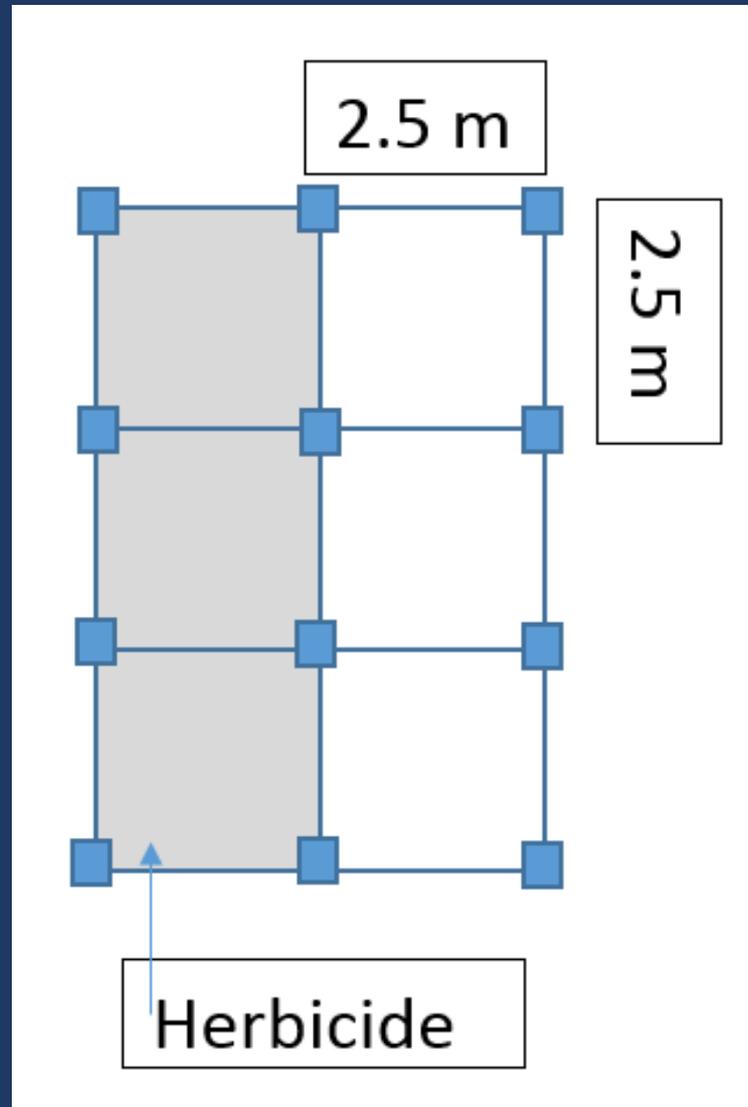


# Cattle Grazing

- Grazing Start: Sept, Oct, Nov, December
- Grazing End: May or June



# Plot Layout – Herbicide Treatment

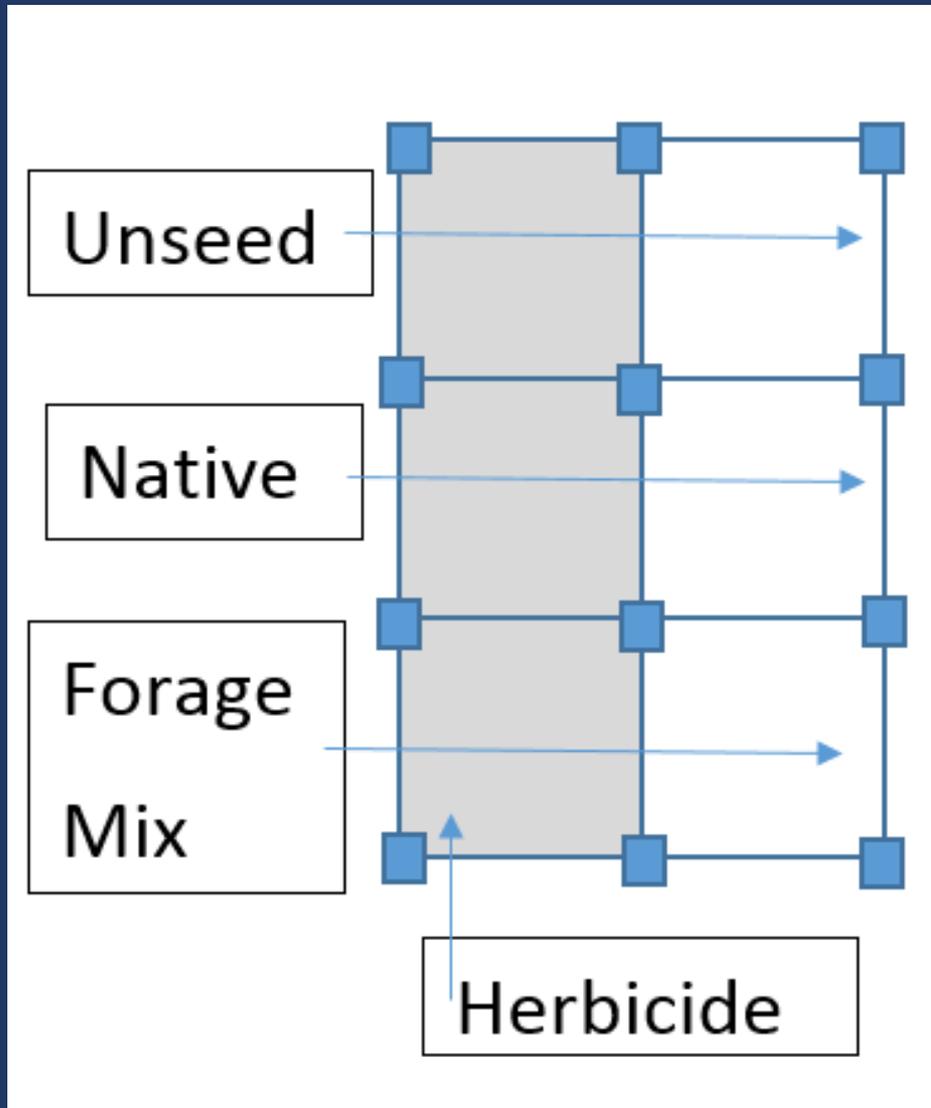


# Setting Up Plots, 3/22/2016

- Herbicide: 2 oz/ac of Telar XP combined with 4 pt/ac of 2,4-D DMA
- Backpack sprayer



# Plot Layout – Seeding Treatment



- Seeding on Nov. 8, 2016
- 2% v/v Roundup PowerMax sprayed a couple hours before seeding

# Forage Seeding on 11/8/2016: Flecha Fescue and 11/25/2017: Blando Brome



## Seeding rate

- Flecha fescue = 10 lbs/ac
- Blando brome = 15 lbs/ac

# Native Seeding on 11/8/2016: Blue wildrye, California brome, pine bluegrass

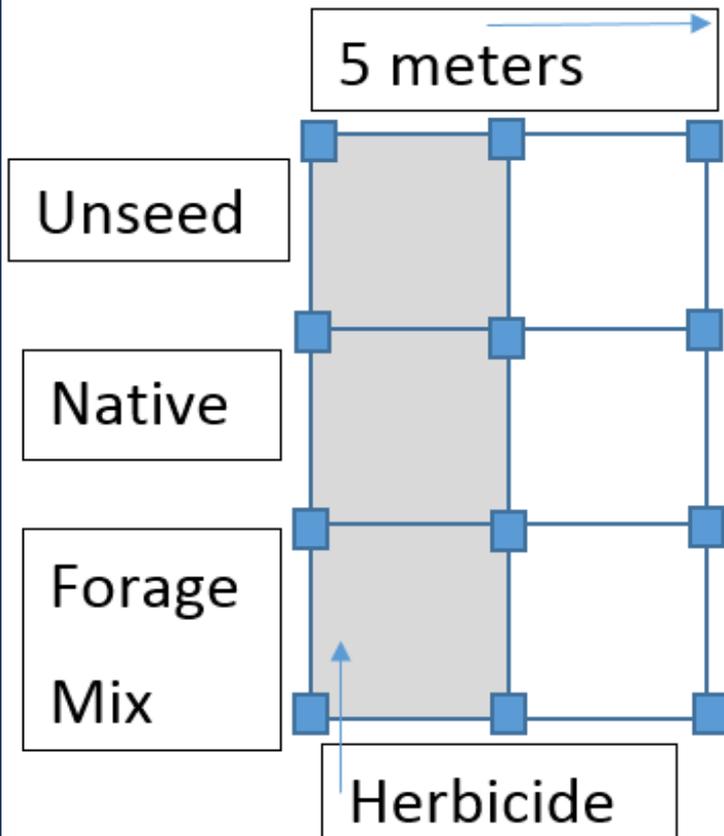


## Seeding rate

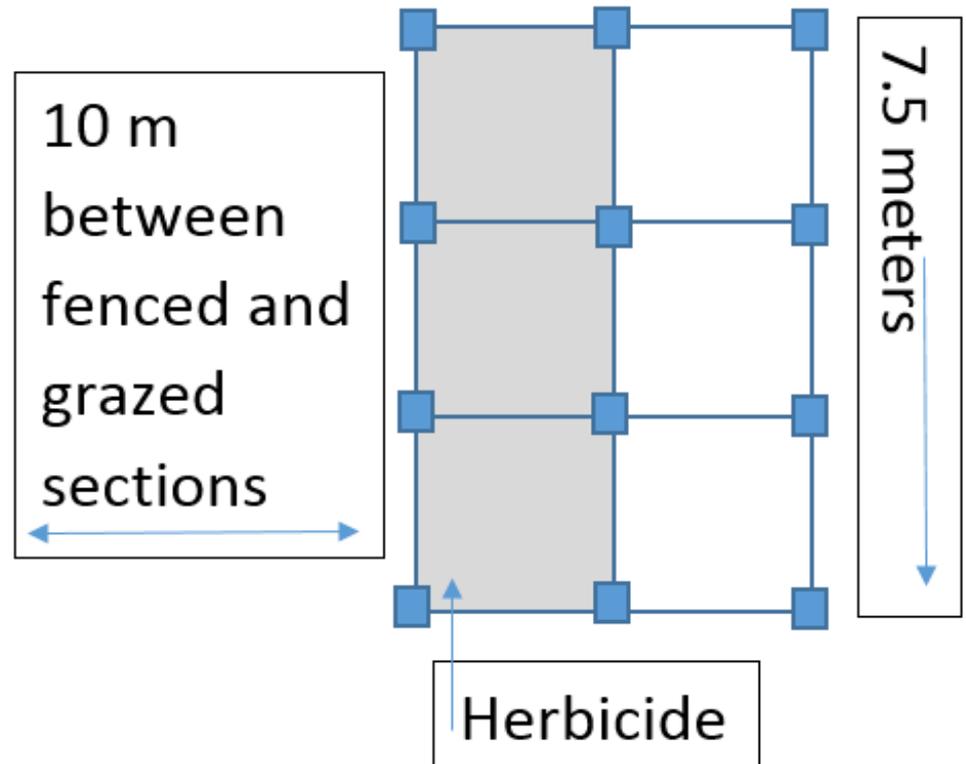
- Blue wildrye = 10 lbs/ac
- California brome = 10 lbs/ac
- Pine bluegrass = 5 lbs/ac

# Plot Layout – 9 replicates, clusters of 3

## Ungrazed Section



## Grazed Section



10 m  
between  
fenced and  
grazed  
sections

# Data Collection

- Collected data in spring 2016 – 2020. These years were analyzed in our pub.
- Measured % cover of all species within in each subplot inside a 1 meter square
- Additional data collected: 2021 and 2022
- Total of 7 years of data collected
- Plan to continue collecting data for a couple more years at least



## Research Article

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# Russian thistle (*Salsola* spp.) control in California rangelands over five years

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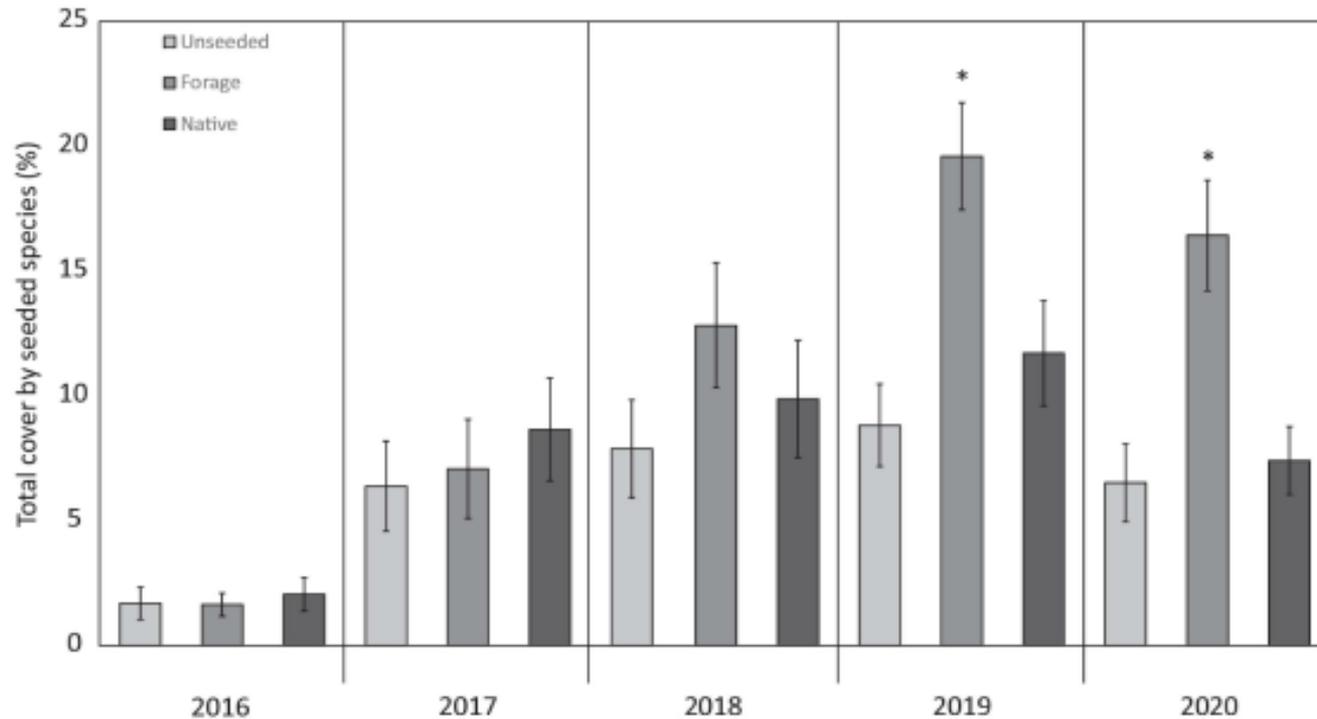
## Abstract

Russian thistle, also known as tumbleweed (*Salsola* spp.), is a problematic invasive plant found on natural and working landscapes. On a California rangeland, we tested the singular and interactive treatments of grazing, herbicide, and seeding to determine how these approaches might influence *Salsola* cover across a 5-yr experiment. Total *Salsola* cover declined by 3% annually during the study. A single spring treatment of chlorsulfuron + 2,4-D followed by glyphosate applied in the fall just before seeding, and then 2,4-D the following spring, significantly reduced *Salsola* cover compared with the untreated control. Seeded forage species cover increased over time and was significantly higher than seeded native species cover at 5 yr after seeding. However, the seeding treatment had no effect on *Salsola* cover. Although grazing did not reduce *Salsola* cover, due to the beneficial effects of grazing on reducing other nonnative species, this study supports the use of an integrated approach of herbicide application, grazing, and seeding to achieve management goals on an arid working landscape.

## Introduction

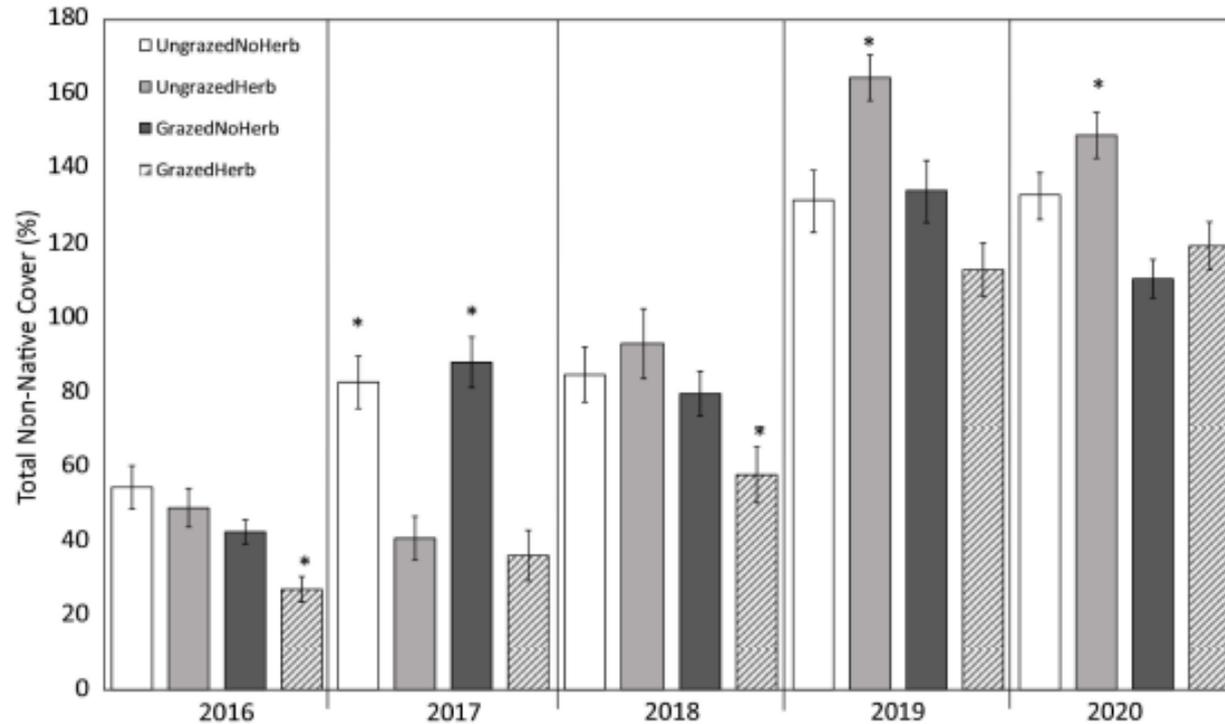
Russian thistle, also known as tumbleweed (*Salsola* spp.), is a problematic C<sub>4</sub> weedy annual forb that has invaded almost every state in the United States from its native habitat in southeastern Europe, central Asia, and Australia. It first arrived in the United States in South Dakota in the late 1870s (Dewey 1893), probably as a contaminant in flaxseed from Europe. Multiple species are commonly referred to as Russian thistle or tumbleweed, including *Salsola australis* R. Br., prickly Russian thistle (*Salsola tragus* L.), and *Salsola ryanii* (Hrusa & Gaskin), which is a fertile hybrid of *S. australis* and *S. tragus*. However, in North America, the taxonomy and number of species in the *Salsola* genus has been inconsistent over the years, and debate about its taxonomy continues (Hrusa 2012; Ryan and Ayres 2000).

# Seeded Species



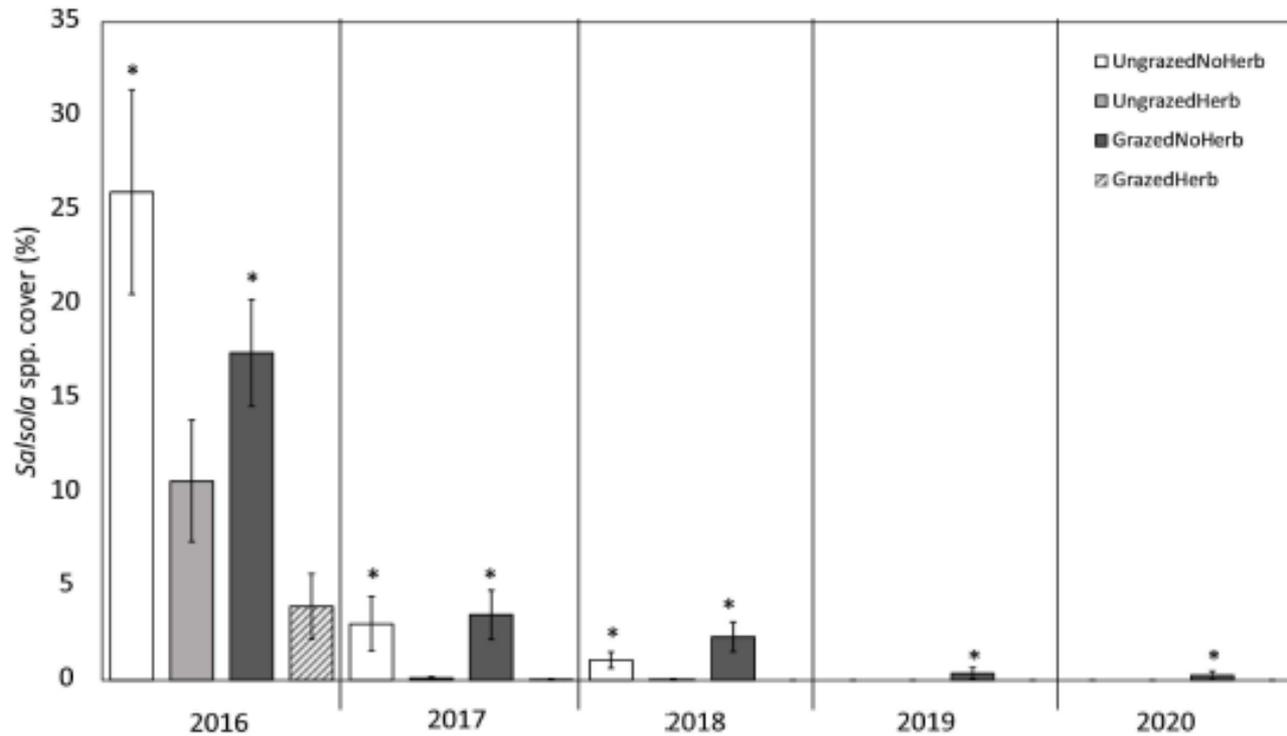
**Figure 1.** Mean  $\pm$  SE cumulative percent cover by seeded species through time across seeding treatments; untransformed data are shown. Individual percent cover of each seeded species is listed in Supplementary Table S4. Asterisks denote significant differences among treatments within year ( $P < 0.05$ ).

# Effect of Herbicide and Grazing on Nonnative Plant Cover



**Figure 2.** Mean  $\pm$  SE total cumulative percent cover by nonnative species through time across grazing and herbicide treatments; untransformed data are shown. Individual percent cover of each nonnative species is listed in Supplementary Table S5. Asterisks denote significant differences among treatments within year ( $P < 0.05$ ).

# Tumbleweed Cover



**Figure 3.** Mean  $\pm$  SE total percent cover of *Salsola* spp. through time across grazing and herbicide treatments; untransformed data are shown. Asterisks denote significant differences among treatments within year ( $P < 0.05$ ).

## Management Implications from our Paper

- With hotter temperatures and more dry years predicted for California, tumbleweed has the potential to become more persistent in arid and semiarid rangelands. This has important implications for management. At sites with adequate soil cover and competition with other plants, active *Salsola* control may not be required, as the site may naturally transition to a more desirable vegetation state.
- On the other hand, control may be economically prudent on sites where tumbleweed persists, for example, on arid or semiarid sites with bare ground, or during extended droughts, which may become more common in the future.
- Additionally, if a land manager finds mature, spiny tumbleweed plants difficult for humans, livestock, horses, and working dogs to travel through, or if skeletons are collecting against and weakening ranch fences, this may provide further impetus to incur the cost of controlling them.

## Management Implications Continued

- **Our results suggest that herbicide was the only treatment that reduced tumbleweed cover.**  
Where long-term heavy grazing has occurred, reducing stocking rates to moderate levels is also expected to assist with control. Tumbleweed seeds are viable for up to 3 yr, so intense management of tumbleweed should be employed at least over that time frame, if a manager determines the benefit of control outweighs the cost.
- Because tumbleweed populations on rangeland can fluctuate from year to year, one approach could be to begin herbicide treatment during a year when tumbleweed cover is lower (and thus requires less herbicide) and continue diligent control efforts for 2 to 3 yr or until the seedbank is depleted.

# What we saw this year and future directions



4/16/22  
TUMBLEWEED  
3 covered No Herbs



4/26/22  
TUMBLEWEED  
3 Grazed, Herb







4/26/22  
TUMBLEWEED  
I Fenced, Herb



4/26/22  
TUMBLEWEED  
I Fenced No Herbs









4/28/22  
TUMBLEWEED  
[Redacted]  
9 Fenced, Herb



4/28/22  
TUMBLEWEED  
[redacted]  
9 Fenced, No Herb



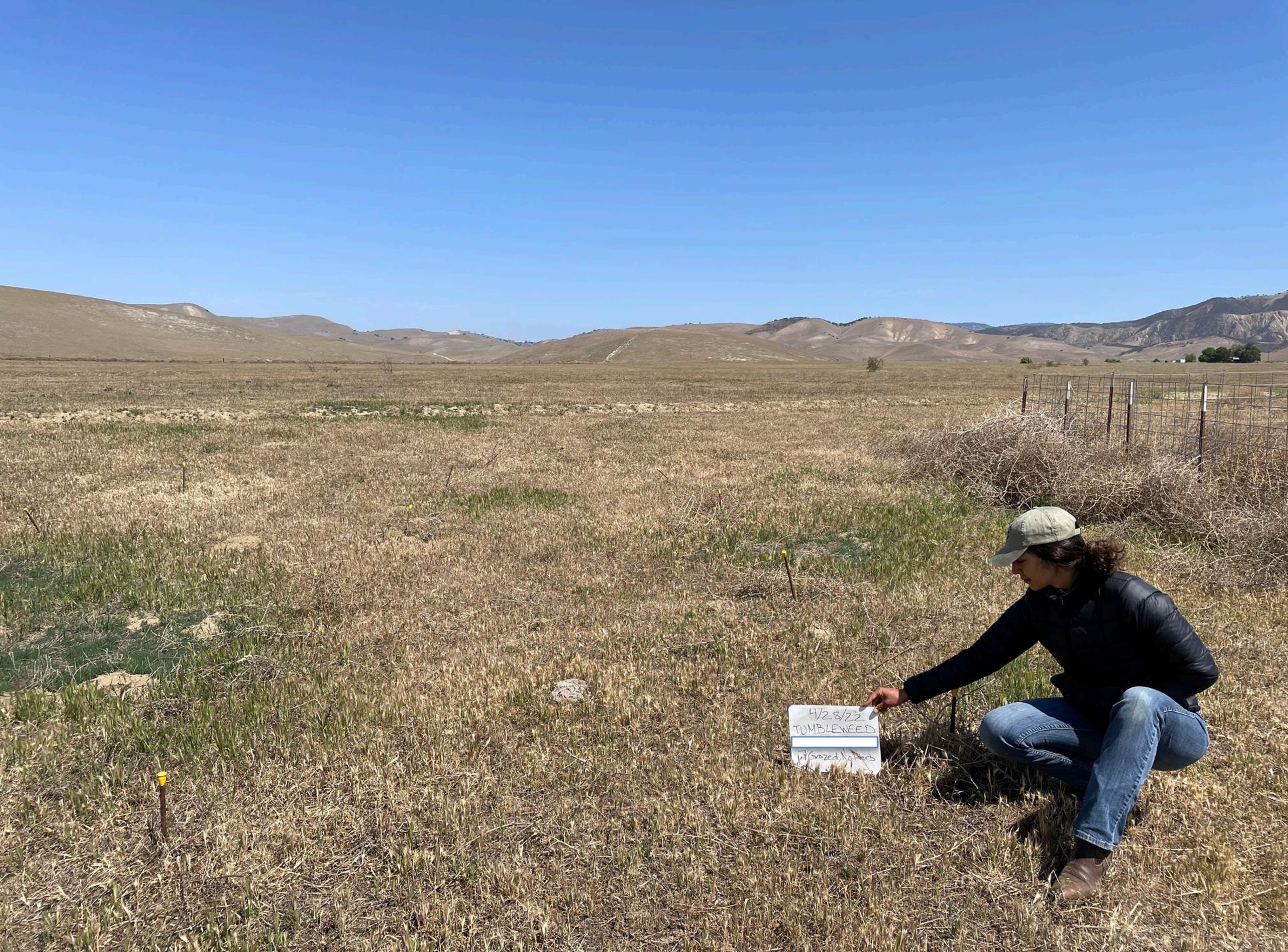
4/23/22  
TUMBLEWEED  
9 Grazed, Herb



4/28/22  
TUMBLEWEED  
Grazed No Herb



4/28/22  
TUMBLEWEED  
7 Grazed Herb

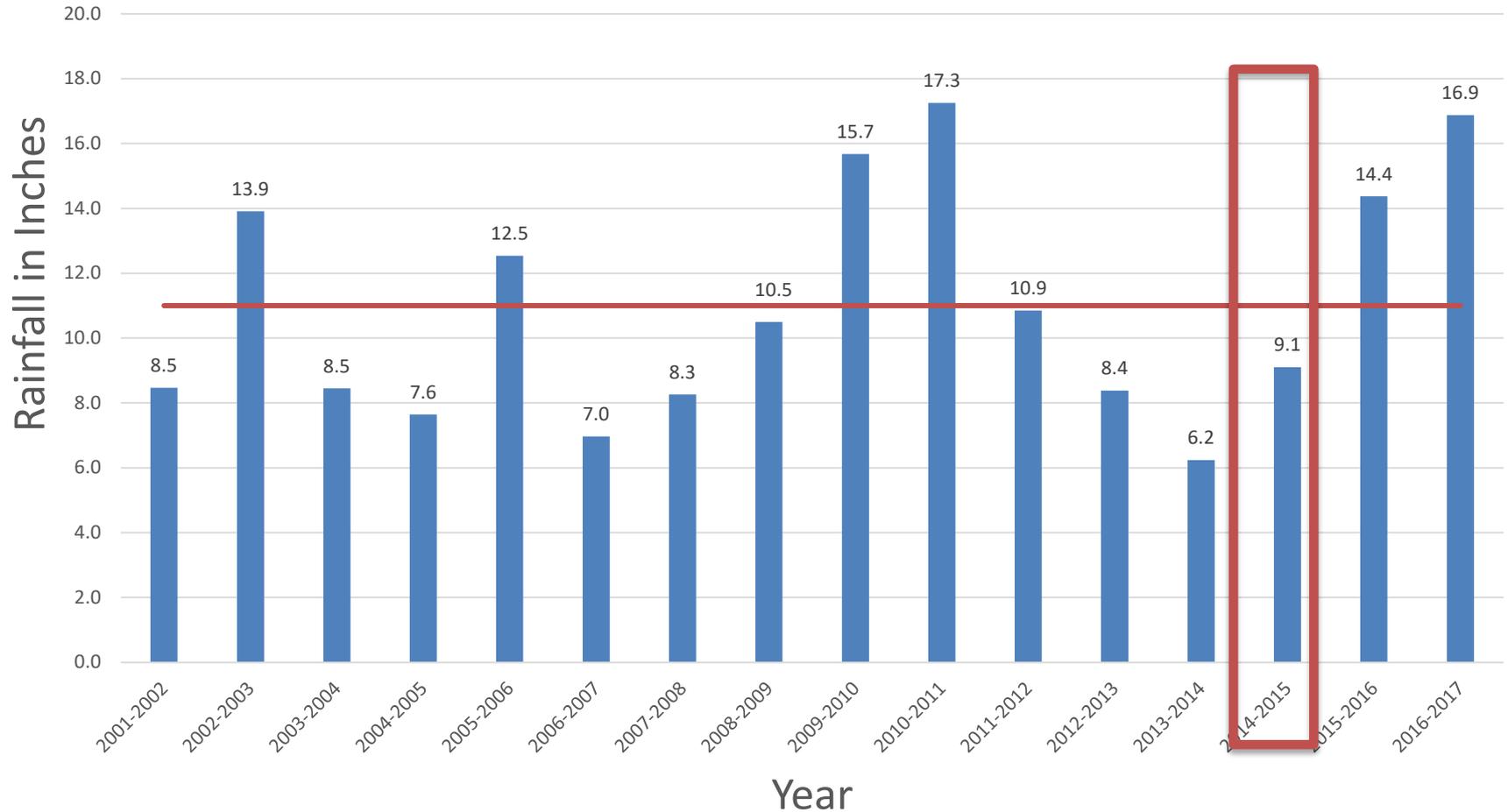


4/28/23  
TUMBLEWEED  
1/1 Swazed 10 plants

Thank You!



# Pinnacles National Park Rainfall



Average Annual Rainfall (Red Horizontal Bar) = 11.0"

June 2015 – I started interviewing ranchers