Monterey County Water Resources Agency
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# Tumbleweed Control on California's Central Coast

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# Needs Assessment

# Collaborators: Elise Gornish, Richard Smith, Josh Davy

# Native Range


http://geology.com/world/world-map.shtml

# Introduced to U.S. in 1873

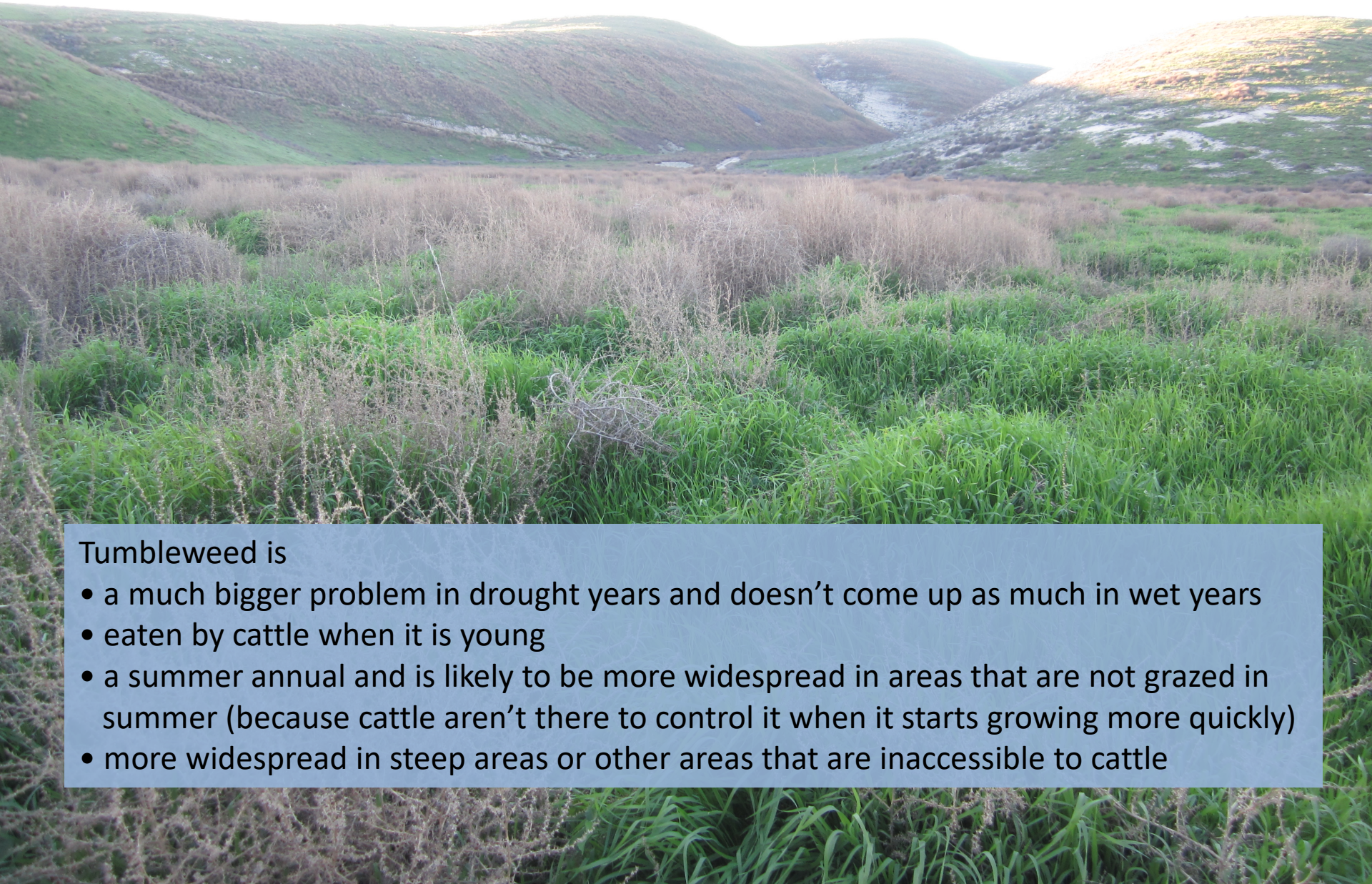

http://wallpapercave.com/us-map-wallpaper

# Introduced to Pacific Coast in 1895


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

# Tumbleweed Biology

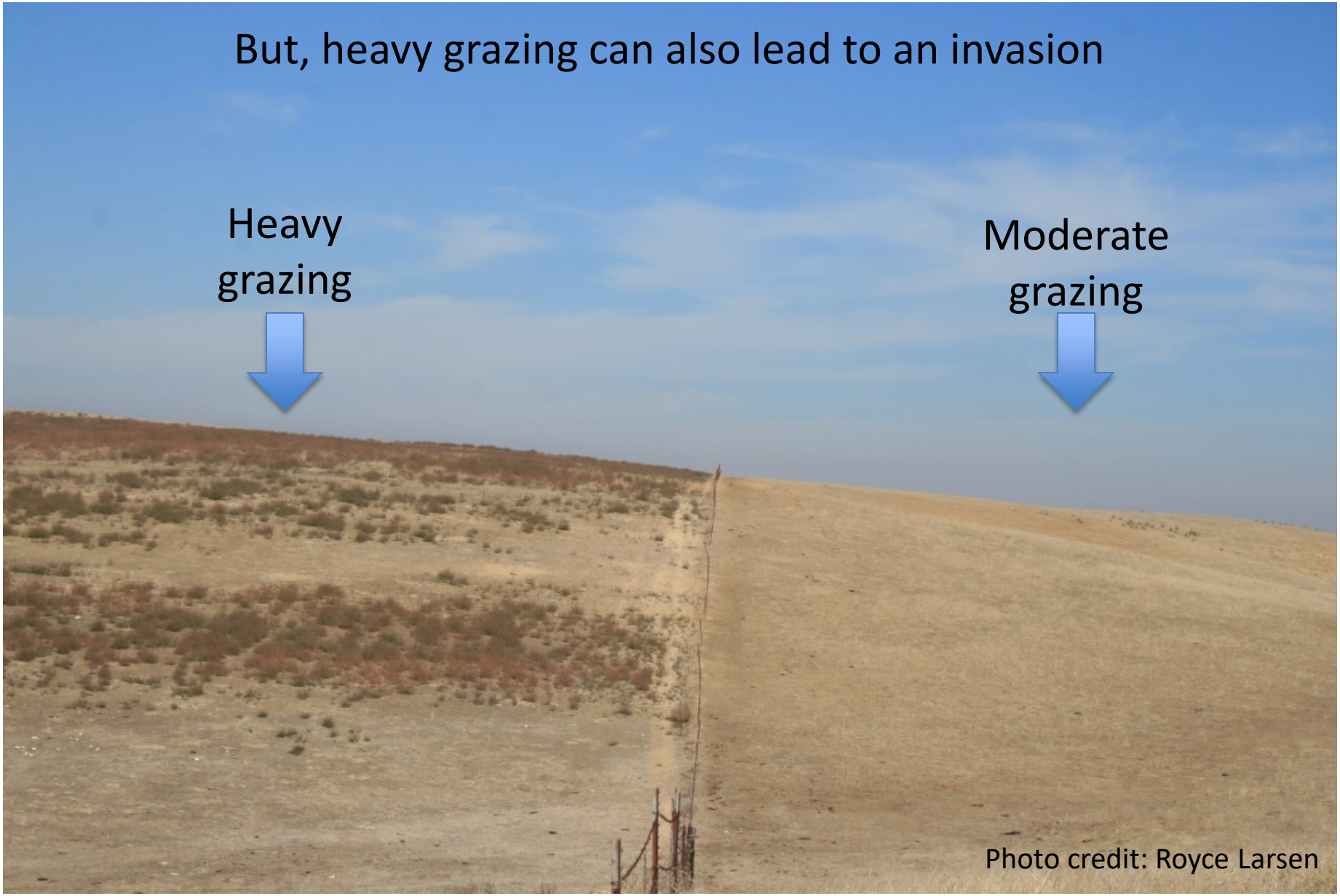
# What I've Learned From Local Ranchers



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



# 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.

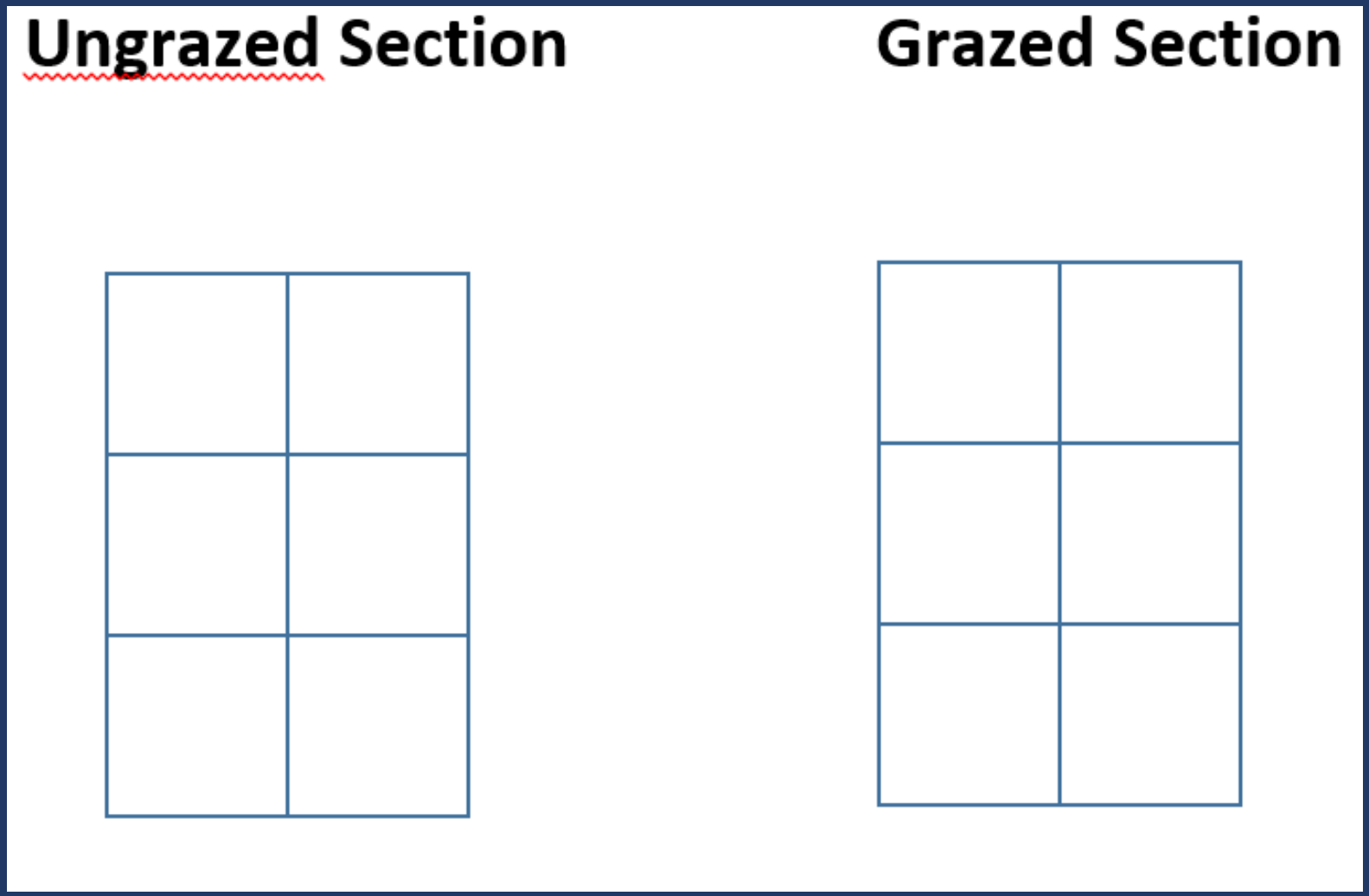
Rainfall – 11 in.

Treatments

- Herbicide
- Seeding
- Grazing


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

# Plot Layout – Each Replicate has 2 sections: Grazed & Ungrazed

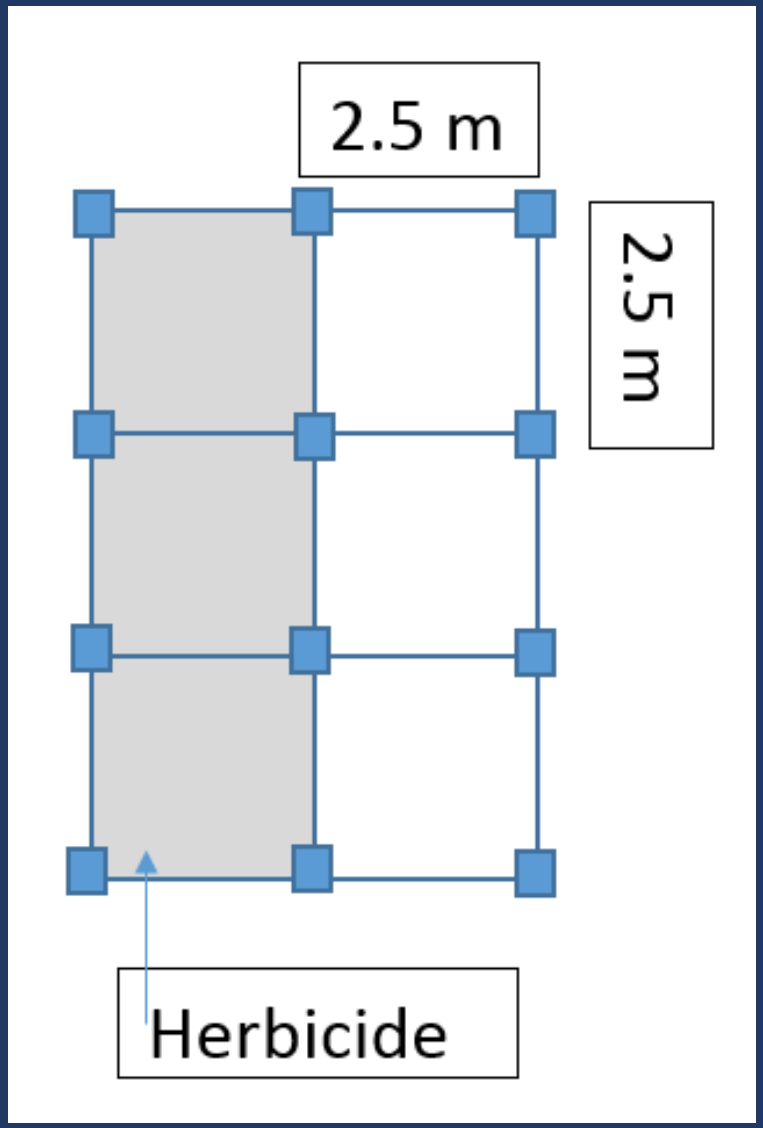


# Cattle Grazing Dates

Ranch 1: September 2015 – May 2016
September 2016 – June 2016

Ranch 2: December 2015 – May 2016
November 2016 – June 2017

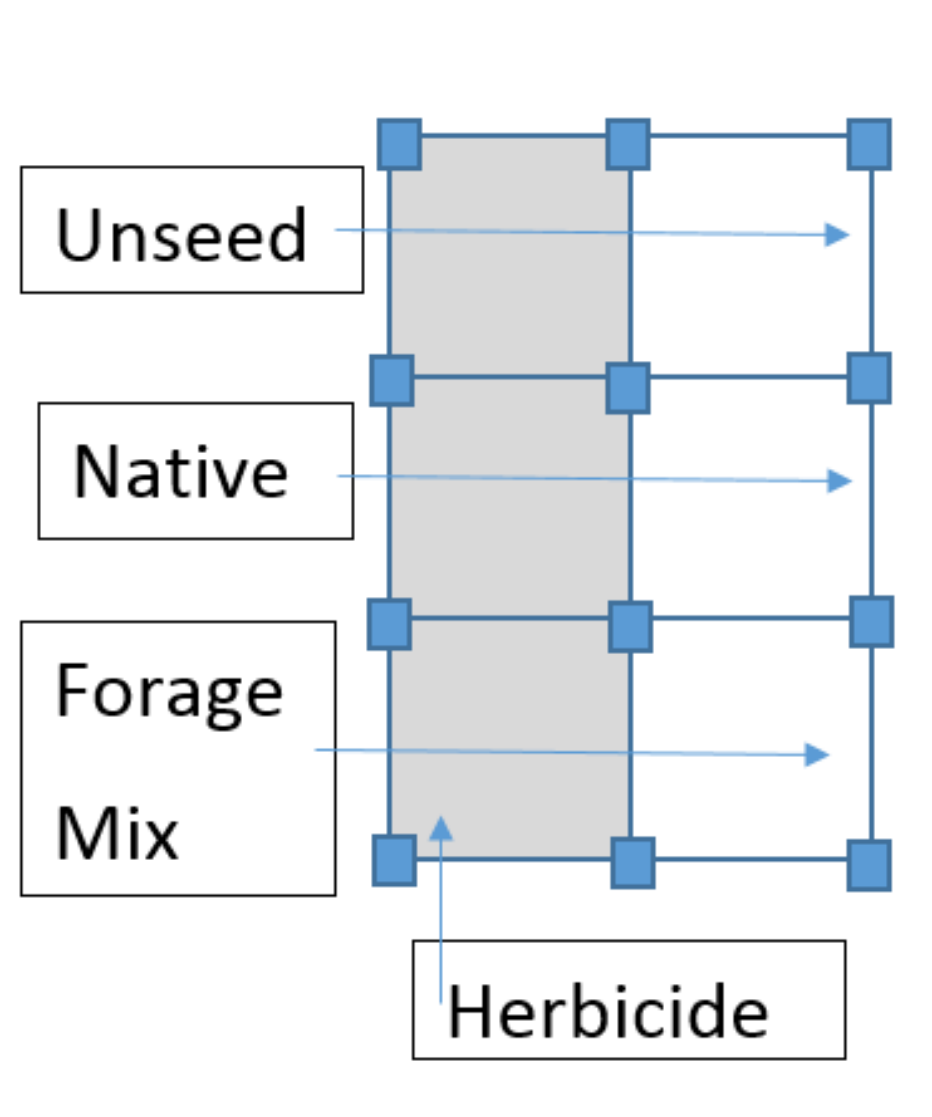
# Plot Layout – Herbicide Treatment



# 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

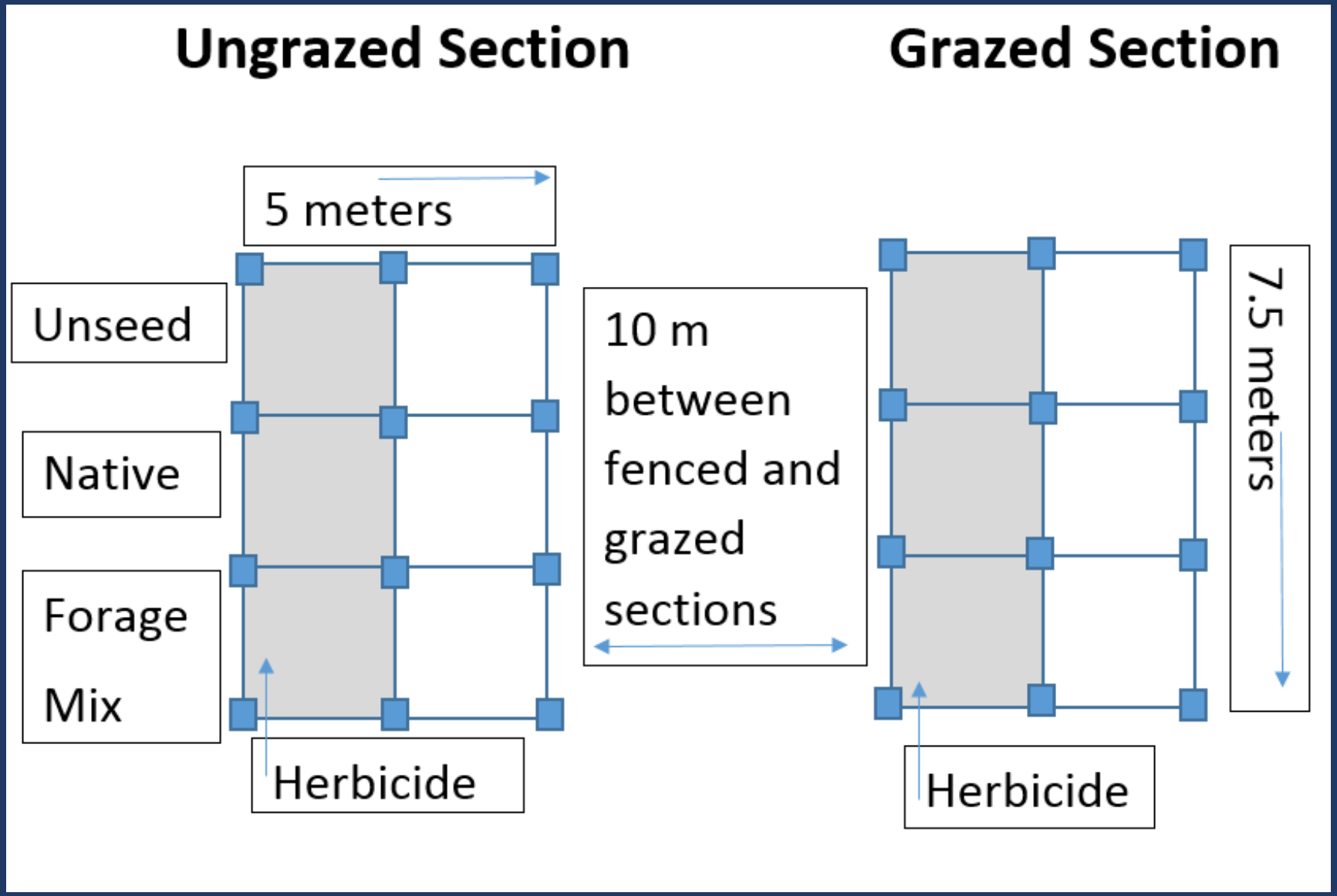
# Native Seeding on 11/8/2016: Blue wildrye, California brome, pine bluegrass



Seeding rate

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

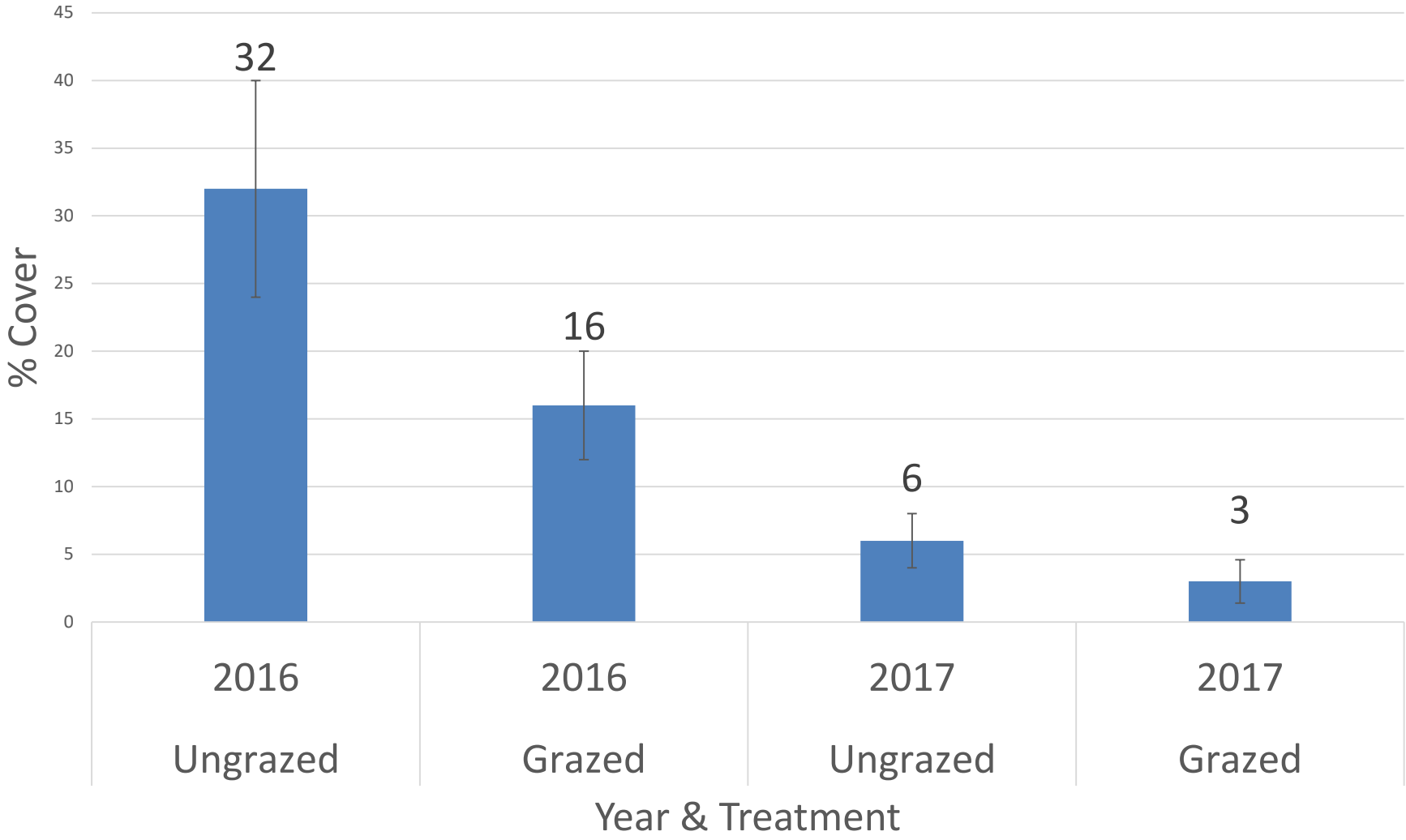
# Plot Layout – 9 replicates, clusters of 3



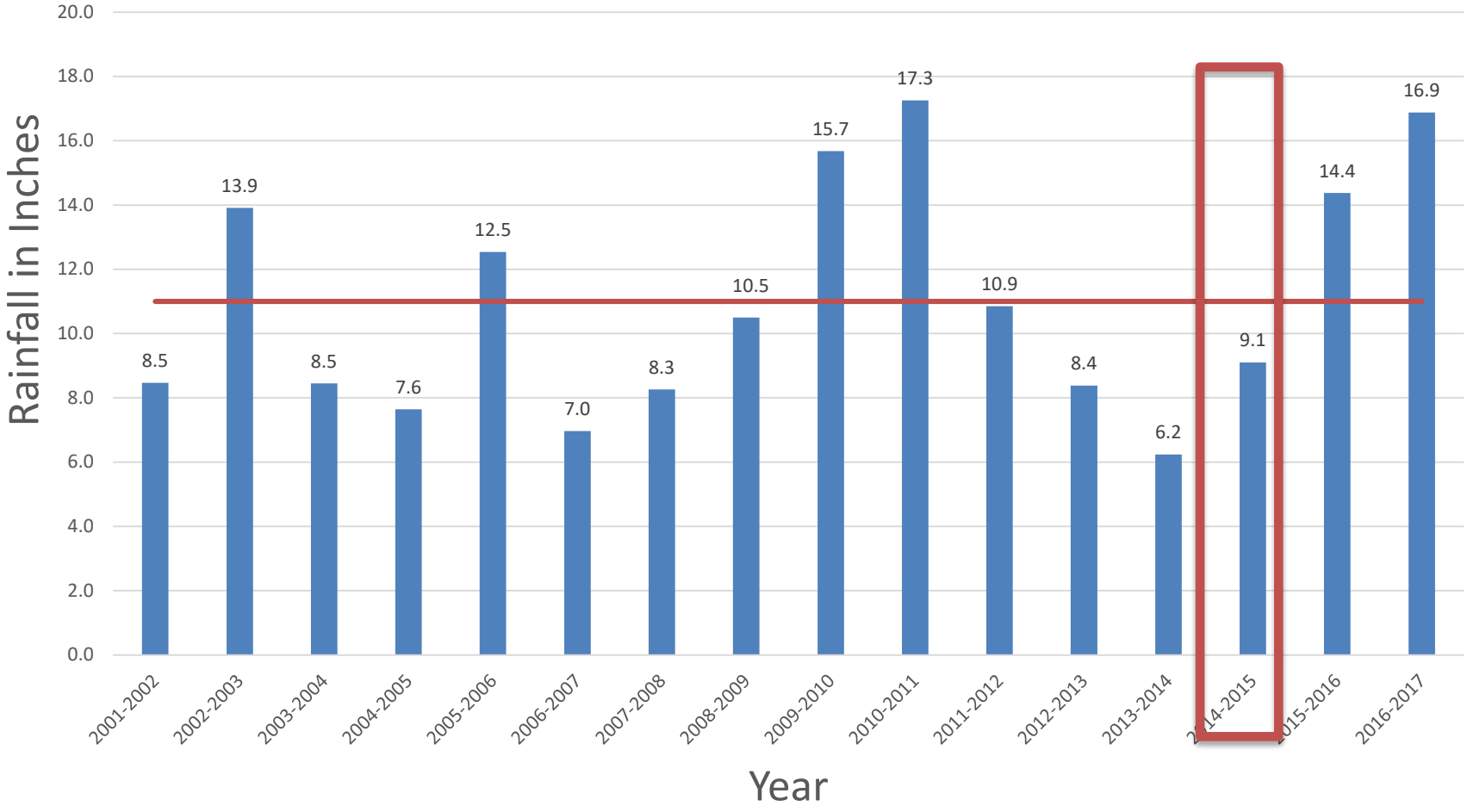
# Data Collection

- Collected data in spring 2016 and 2017
- Measured % cover of all species within in each subplot inside a 1 meter square

# Tumbleweed in 2016 and 2017

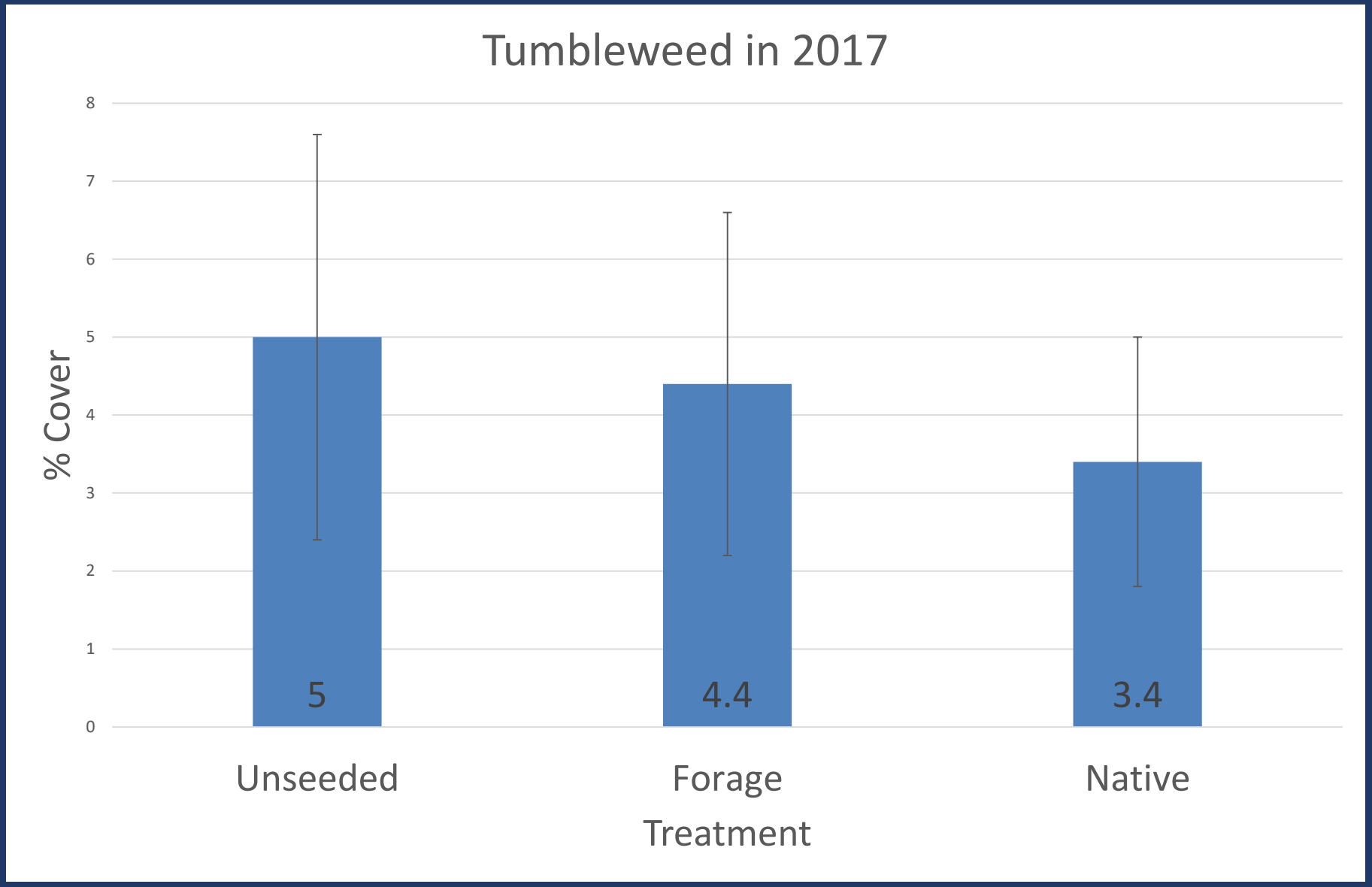


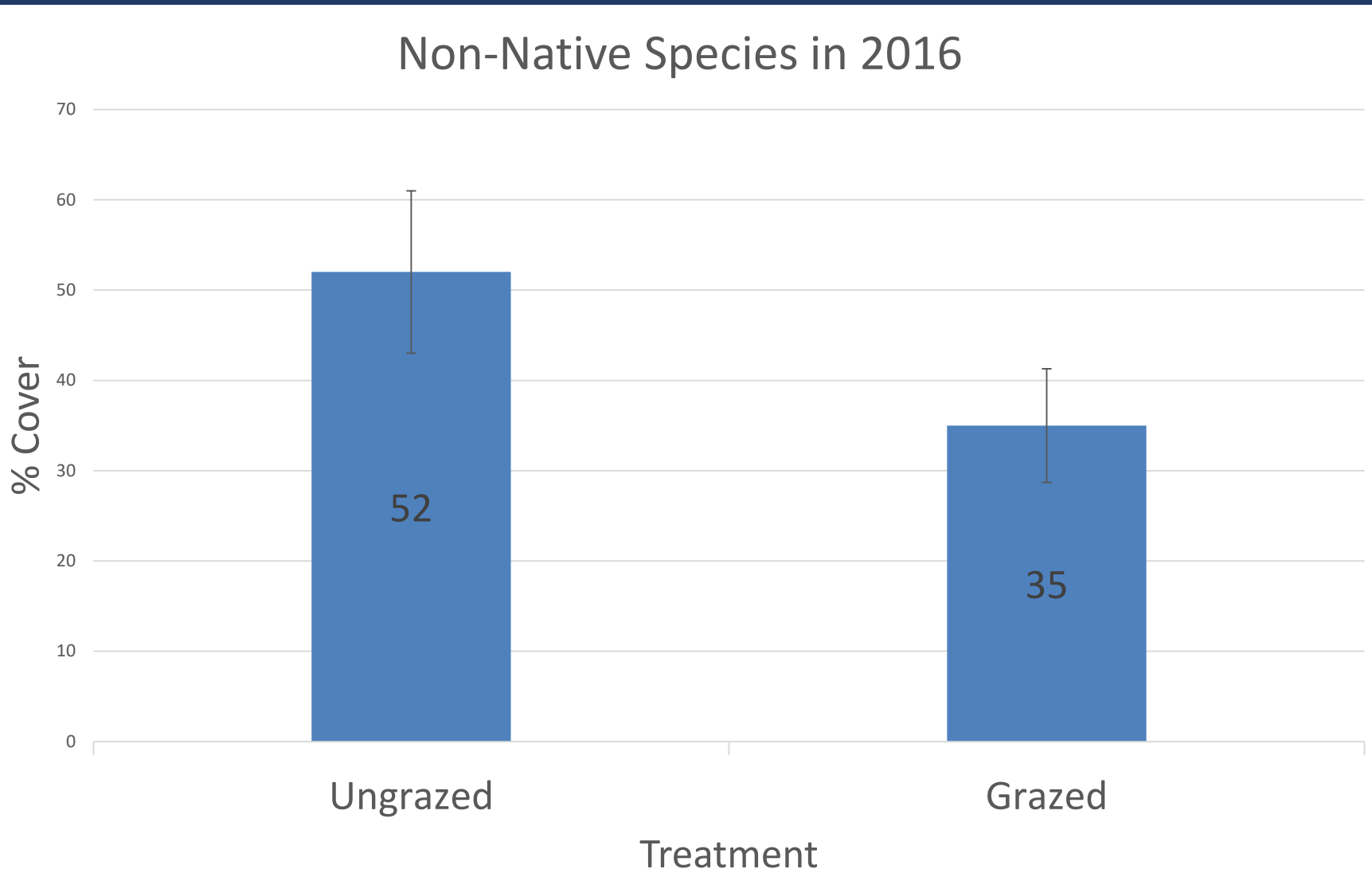
# Pinnacles National Park Rainfall

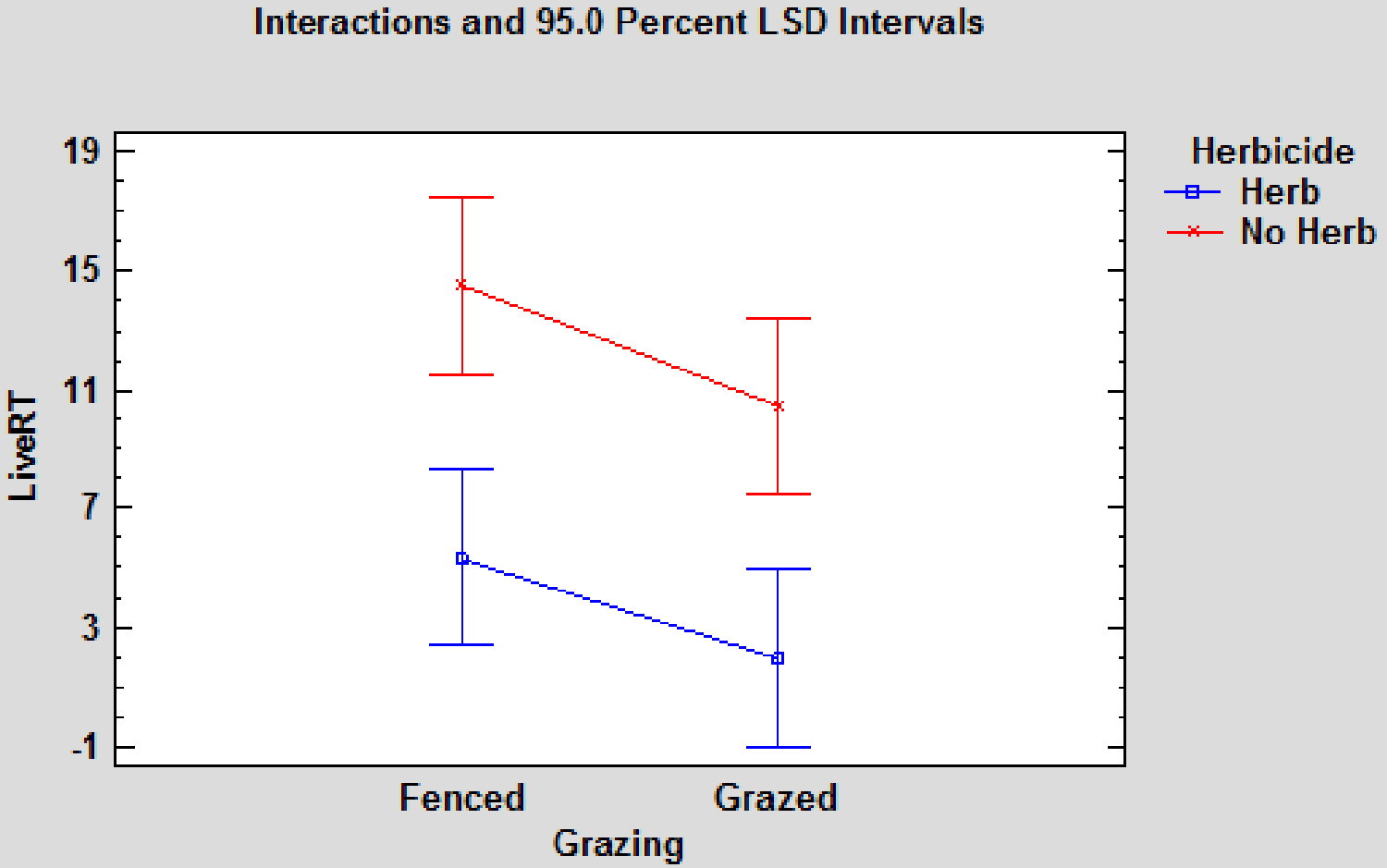



Average Annual Rainfall (Red Horizontal Bar) = 11.0”

June 2015 – I started interviewing ranchers


Tumbleweed in 2017
% Cover
8
7
6
5
4
3
2
1
0
5
4.4
3.4
Unseeded
Forage
Native
Treatment

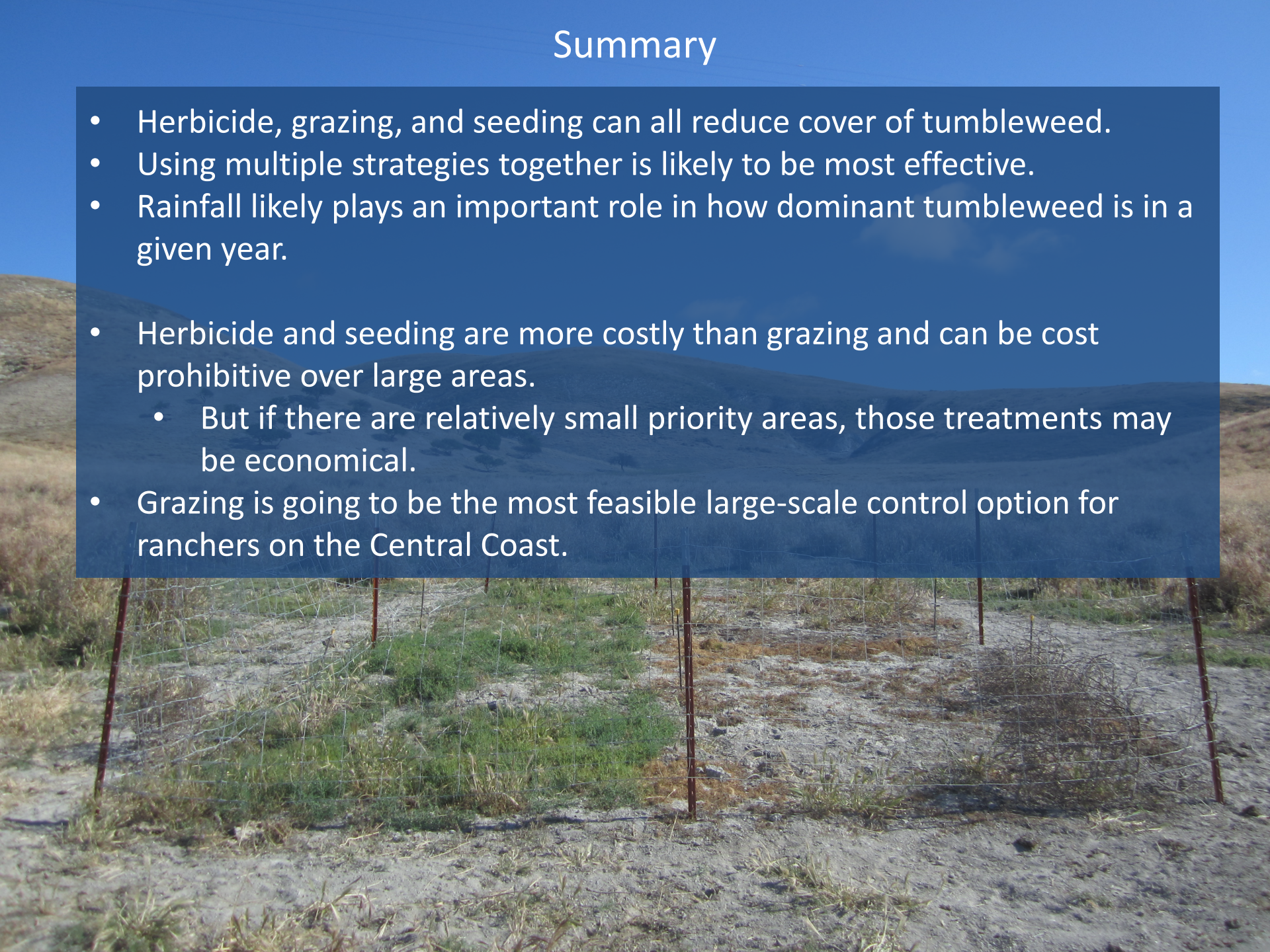

Non-Native Species in 2016
70
60
50
40
30
20
10
0
% Cover
52
35
Ungrazed
Grazed
Treatment


Interactions and 95.0 Percent LSD Intervals
LiveRT
19
15
11
7
3
-1
Fenced
Grazed
Grazing
Herbicide
Herb
No Herb

# Summary

- Herbicide, grazing, and seeding can all reduce cover of tumbleweed.
- Using multiple strategies together is likely to be most effective.
- Rainfall likely plays an important role in how dominant tumbleweed is in a given year.

- Herbicide and seeding are more costly than grazing and can be cost prohibitive over large areas.
  - But if there are relatively small priority areas, those treatments may be economical.
- Grazing is going to be the most feasible large-scale control option for ranchers on the Central Coast.



# Thank You!