The background of the slide features a wide-angle photograph of a desert landscape. In the foreground, there are rolling green hills and fields, likely shrub-steppe vegetation. In the middle ground, more hills and fields extend towards the horizon. The sky above is a clear, pale blue with wispy, white clouds.

# Shrub-animal density dependence in desert ecosystems: April Progress Report

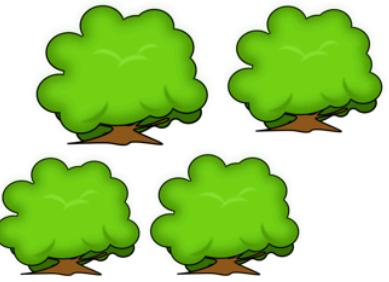
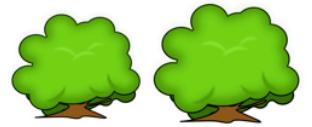
By: Mario Zuliani

# Review of Chapter Timeline

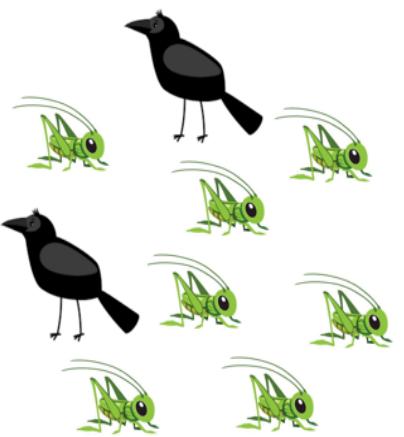
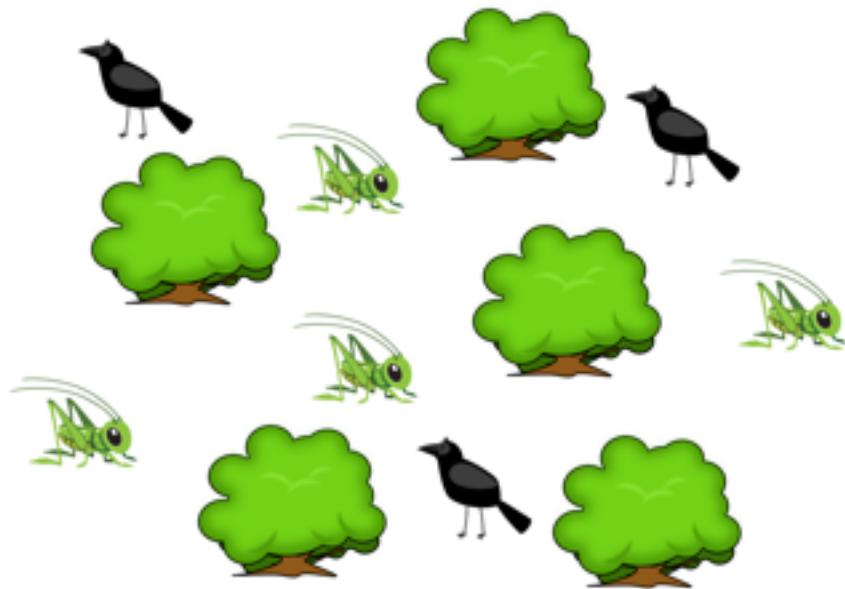
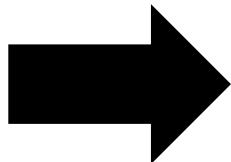
Chapter	Title	Progress	ST Goals	LT Goals
1	Making a deal with the Devil	Literature review started September 2018	Collect preliminary data and have reviewed/analyzed by December 2018/January 2019	Analyses complete by July/August 2019. Draft by September 2019?
2	Shrub-animal density dependence in desert ecosystems	Field Season to start May 2019	Data analysis by September/October 2019	Second field season May 2020?

# Theory

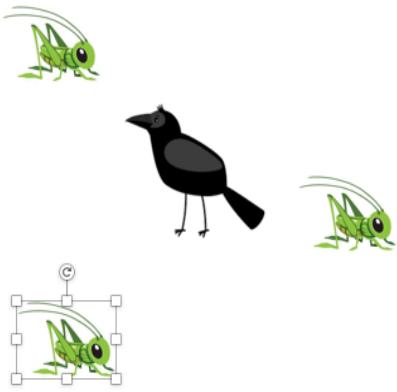




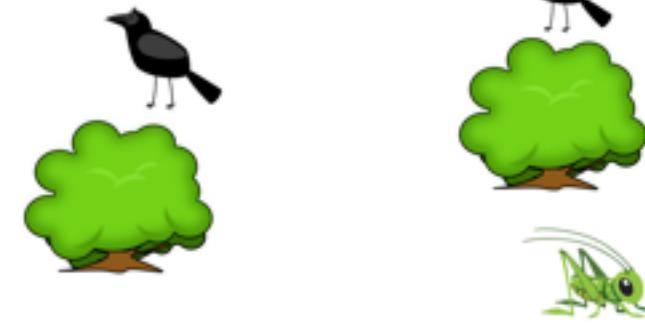
VS.



VS.



VS.



# Chapter 1: Making a Deal with the Devil

## Purpose:

- A systematic review to gain insight on the relationship between shrub and Animal densities recorded in literature
- Focus on papers where facilitation occurs and if densities are recorded



# Chapter 1: Making a Deal with the Devil

## Questions:

- What activities are being observed with shrubs?
- If there are interactions then is only one species benefiting?
- Direct and indirect effects?
- Are shrub and/or animal densities recorded?



# Chapter 1: Making a Deal with the Devil

## Predictions:

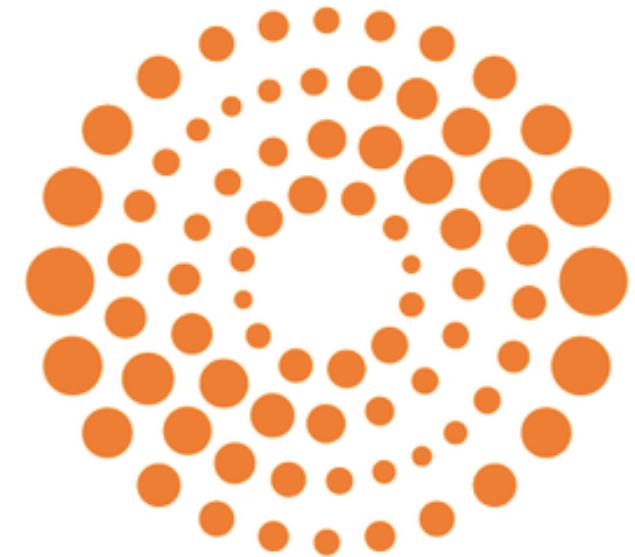
1. Many studies are going to focus solely on benefactor interaction
2. Costs to benefactor species will be overlooked in most papers
3. Shrub densities will not be focused on or included



# Chapter 1: Making a Deal with the Devil

## Methods:

- Web of Science Screening
- Generation of bar graphs and PRISMA
- Zotero Paper loading
- Screen eligible papers
- Systematic Review write up



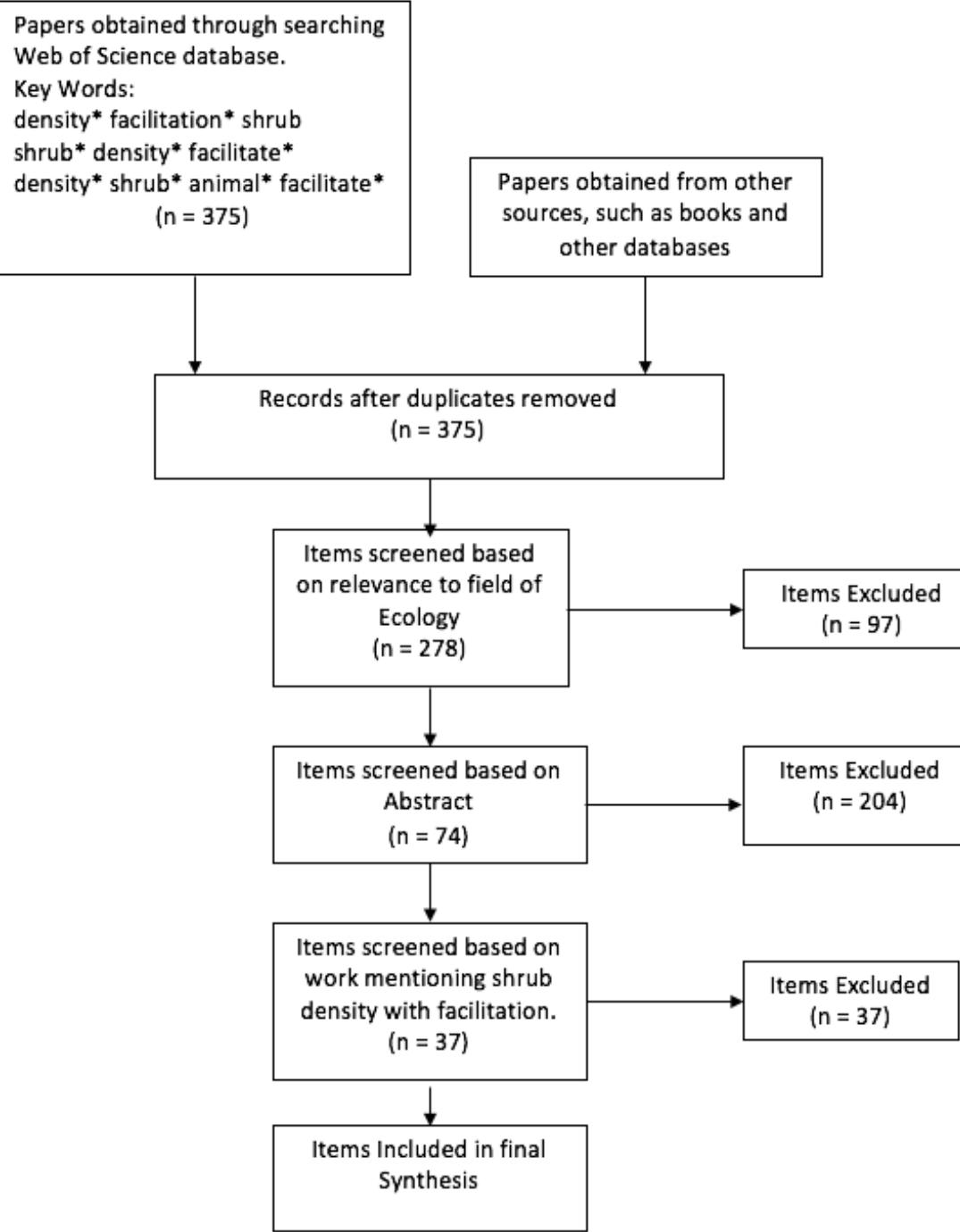
WEB OF SCIENCE™

# Chapter 1 Progress so Far

- Total papers reviewed = 375
- Total after Abstract and Full text review = 37
- Criteria for filtering:
  1. What field of study is the paper focusing on
  2. Is density, facilitation and shrub mentioned in the abstract
  3. Is there density data usable in the paper
  4. Are the benefactor and protégé species mentioned
  5. Do the papers conclude there is a presence of facilitation



**Identification**

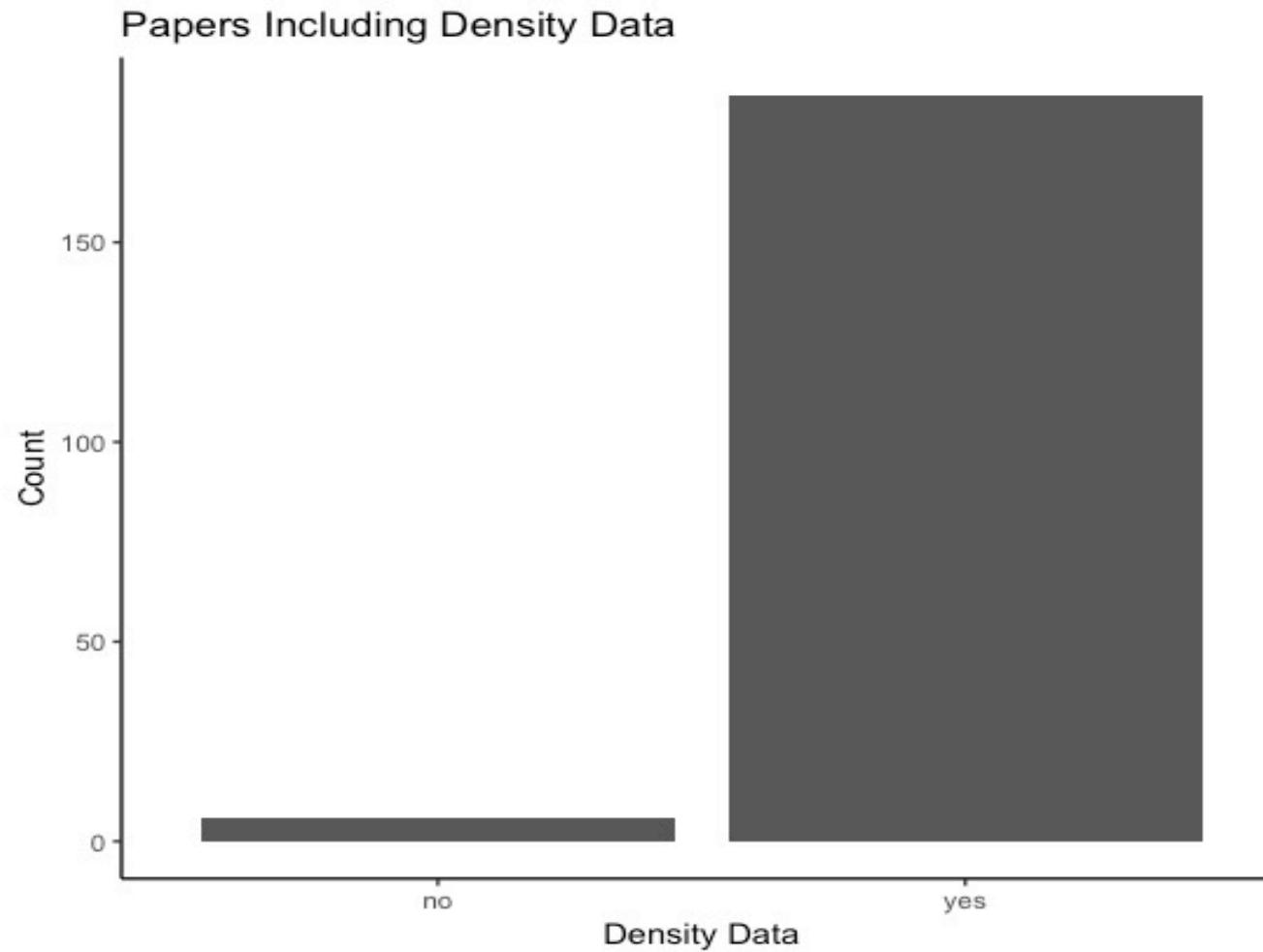


# Chapter 1:

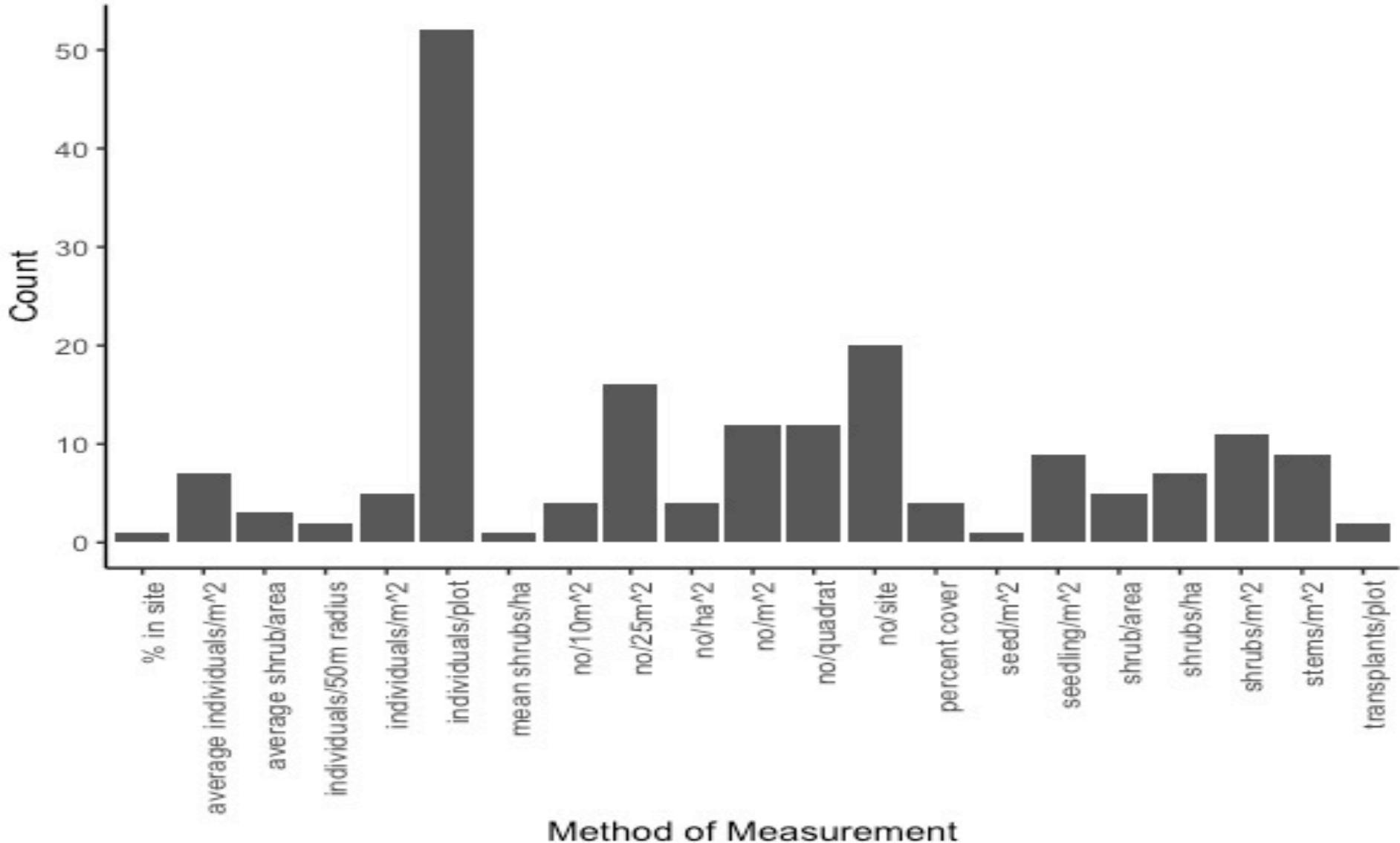
# Progress to Date:

# PRISMA

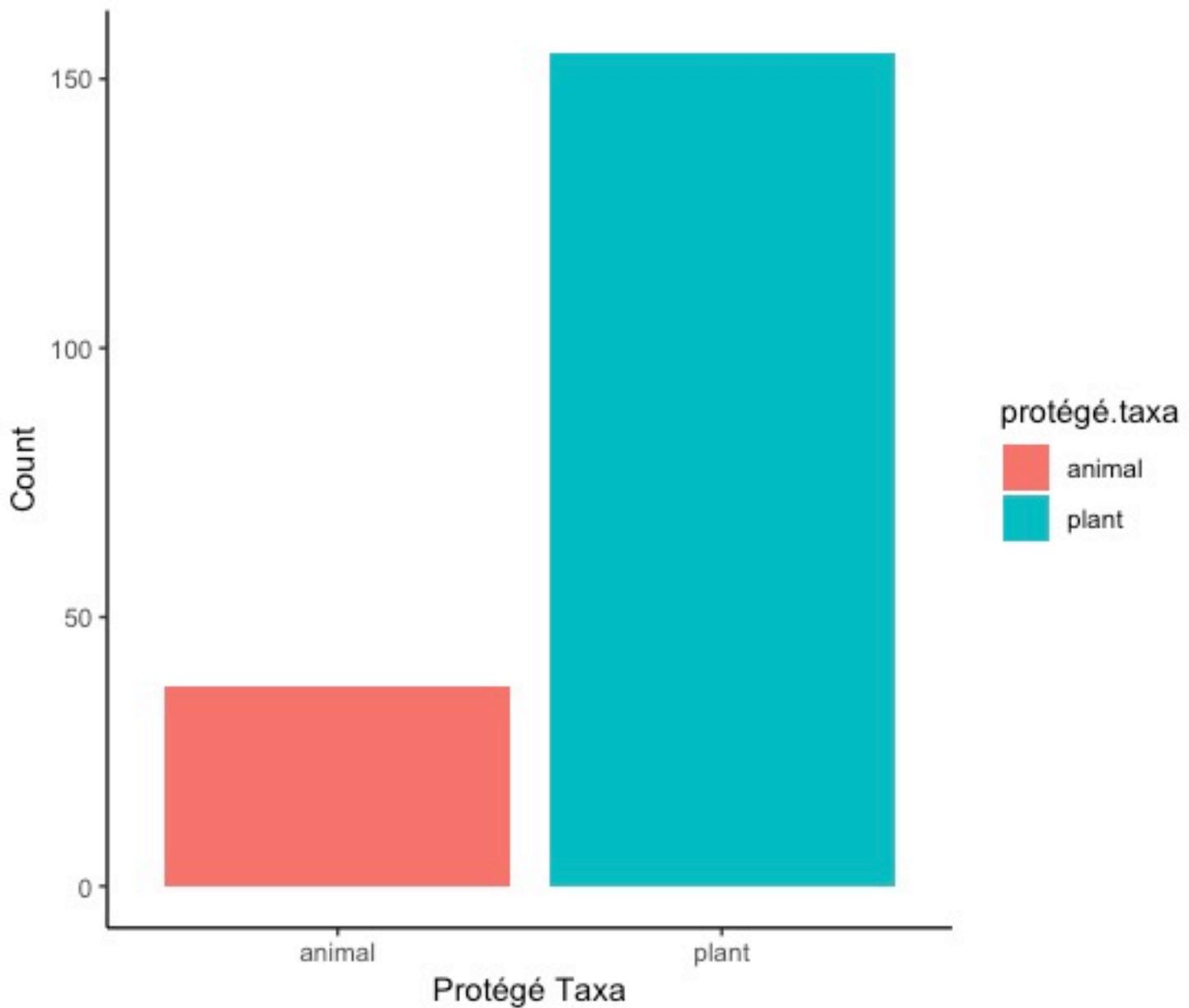
# Chapter 1 Progress so Far Cont.



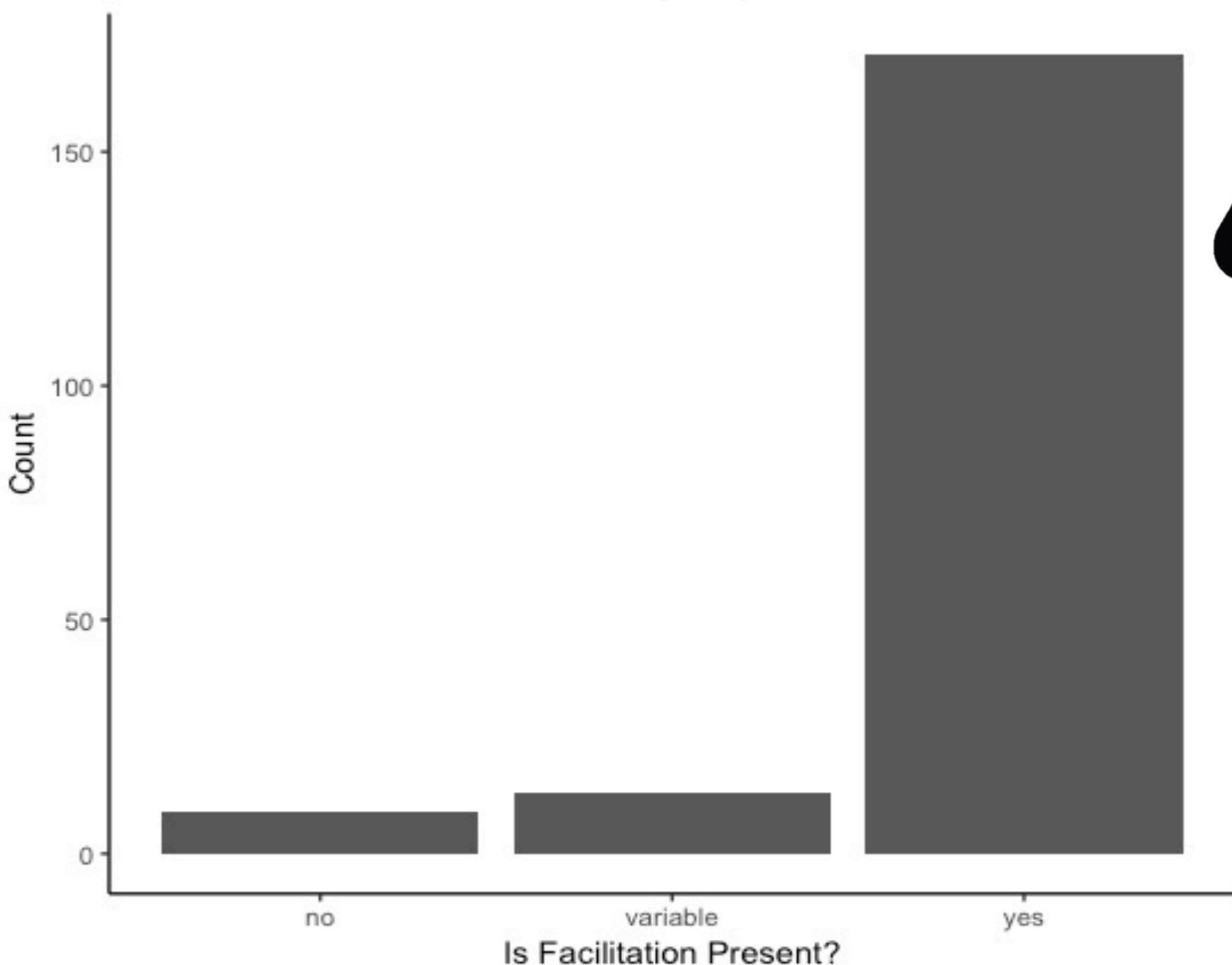
## Methods of Measuring Shrub Density



## Protégé Taxa in Included Papers



## Is Facilitation Present in Density Papers



# Chapter 1: So What Do We See so Far?

- 1) Many of the papers focusing on facilitation and shrub density report a value for shrub density.
- 2) Most papers do not have a numeric value to quantify facilitation
- 3) There is no universally agreed upon unit of measurement for shrub density, and can vary greatly depending on the study
- 4) Many papers looking at density and facilitation conclude that facilitation is present in their system

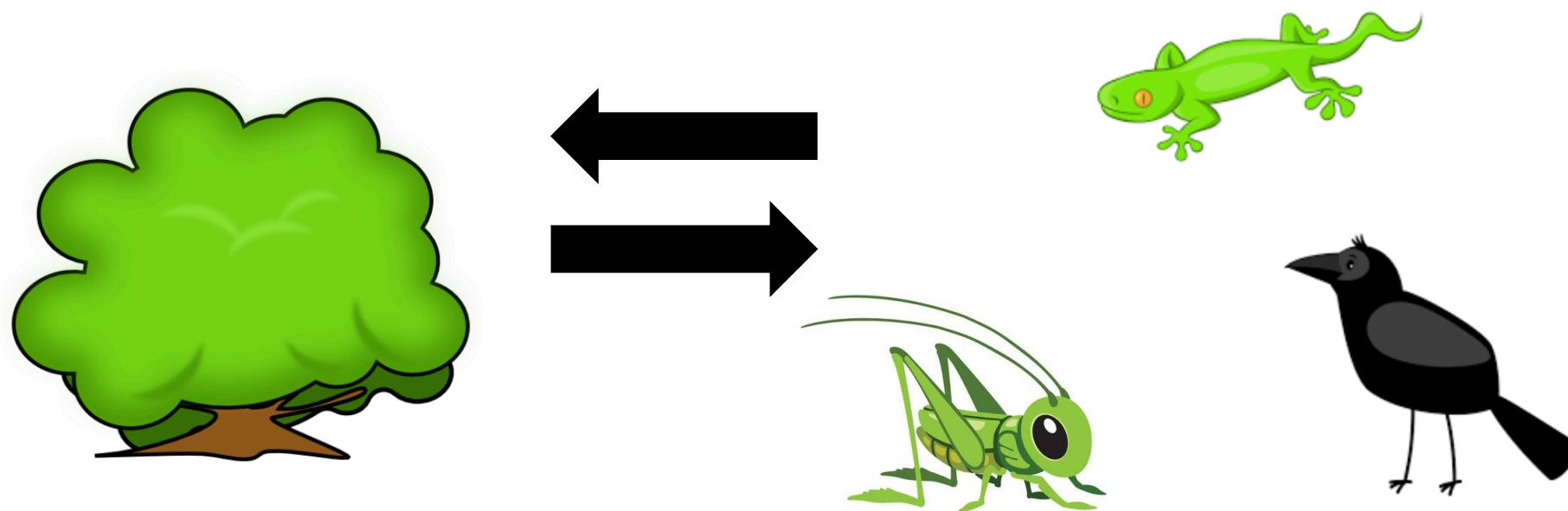
# Chapter 2: Shrub-animal density dependence in desert ecosystems



# Chapter 2: Shrub-animal density dependence in desert ecosystems

## Purpose:

- The purpose of the experiment is to examine the importance of density of shrub and animal species in a desert ecosystem, including measures of local stress.



# Chapter 2: Shrub-animal density dependence in desert ecosystems

## **Question:**

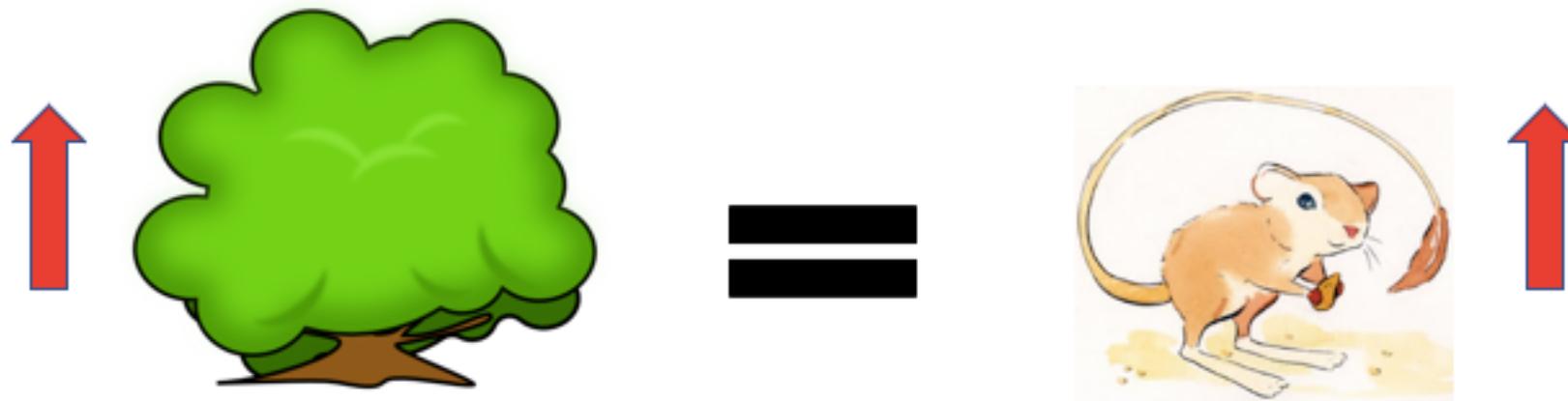
- Is there a relationship between the shrub density and animal density in the Carrizo Plain?
- Do animal populations respond to shrub density
- How are the varying species interacting with the shrubs?



# Chapter 2: Shrub-animal density dependence in desert ecosystems

## Hypothesis:

- The frequency of frequency will increase with increasing densities of benefactor shrubs and/or interacting animals but resource limitations are an important cofactor



# Chapter 2: Shrub-animal density dependence in desert ecosystems

## Predictions:

1. Higher Shrub density will correlate with a higher animal species density.
2. Shrub and animal densities positively covary
3. High shrub densities also increase animal species richness
4. Larger shrub size will have a positive impact on animal density



# Chapter 2: Shrub-animal density dependence in desert ecosystems



2 Sites x 4 density gradient  
(None, Low, Medium, High) X 2  
(Both looking inward at  
different sides) x 10 Reps = 160  
Sets of data



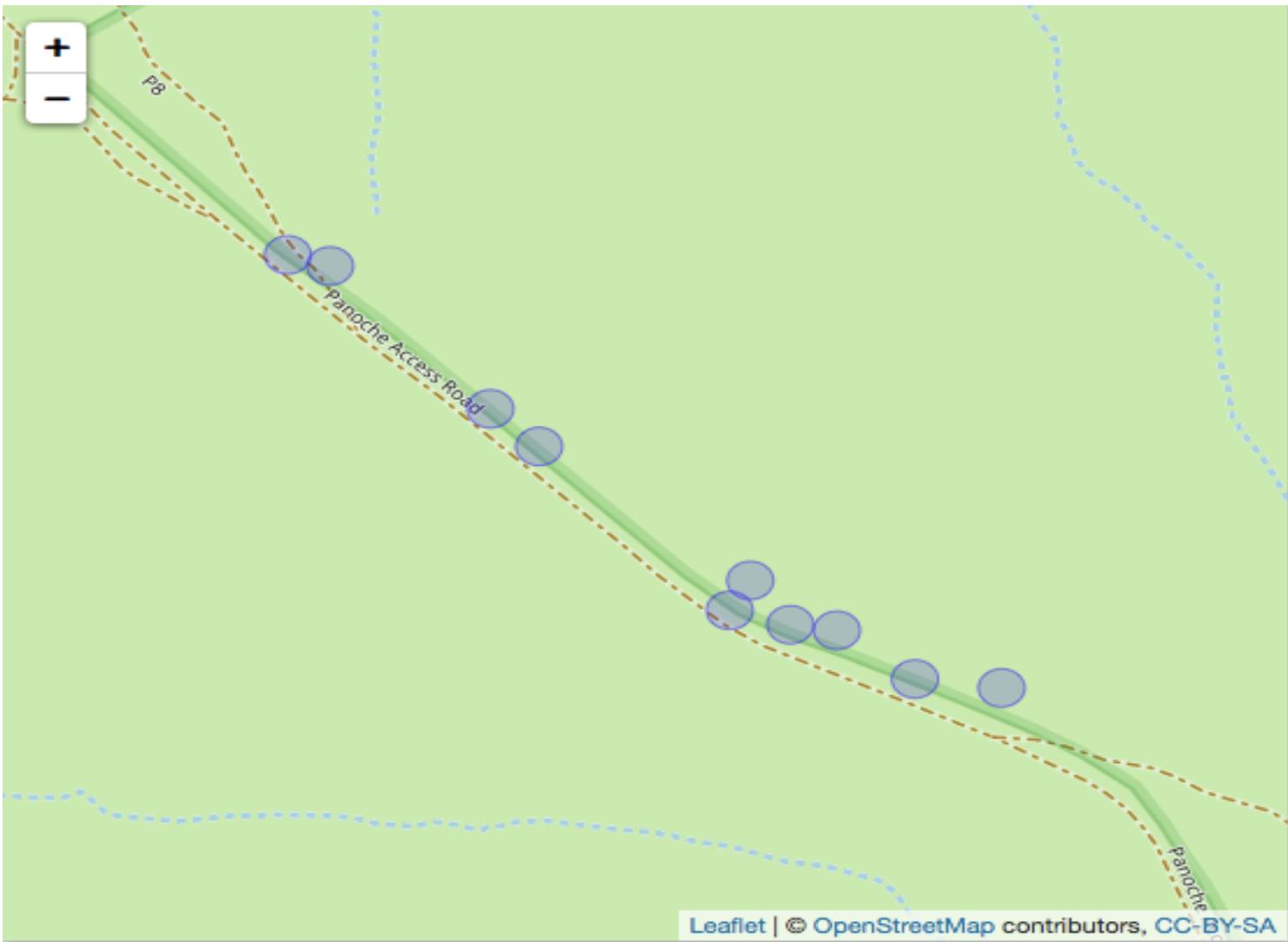
# Chapter 2: Progress so Far



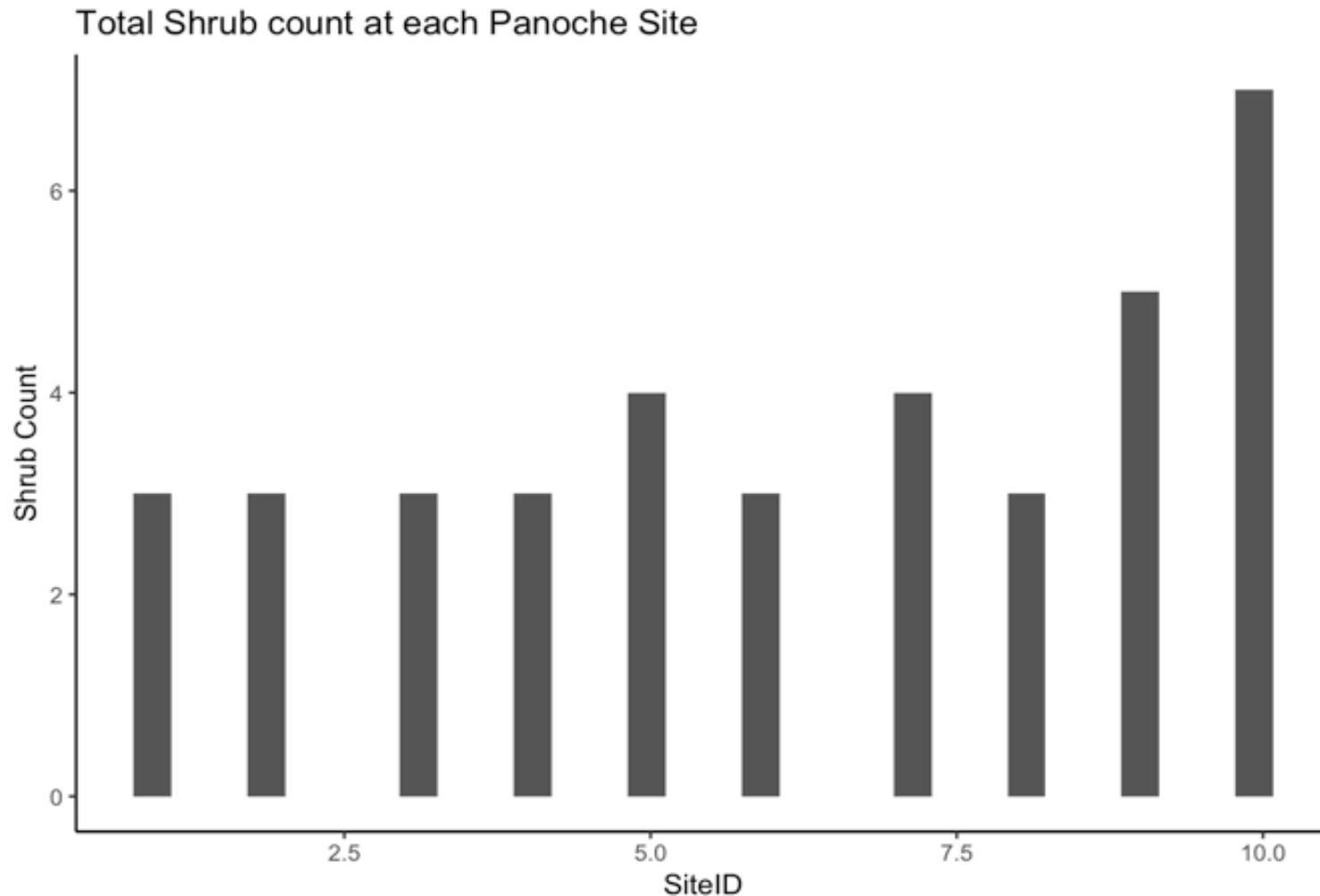
# Methodology

- 1) Randomly selects 10 sample microsites in close proximity to main path
- 2) Establish center of microsite and measure 20m outward. Take GPS location of center of Microsite
- 3) Establish radius of microsite
- 4) Measure all Ephedra shrub species in microsite including; x = longest length, y = 90 degree adjacent to x measure, and z =height
- 5) Take GPS location of shrub

# Chapter 2: Progress so Far



# Chapter 2: Progress so Far



# In-depth Timeline

Timeline	Goals
February 2019	Work with data collected from January Trip
March 2019	Continue working with data collected from January trip, work on Chapter 1
April 2019	Continue working with data collected from January trip, work on Chapter 1
May 2019	Travel to Carrizo site, acquire camera traps and SD cards. Deploy cameras at sites (Chosen in February). Conduct focal observations and transects
June 2019	Return from field site. Begin analyzing data from camera traps, transects and focal observations. Continue work on Chapter 1.
July 2019	Continue working with dataset from May field month. Continue work on Chapter 1.



Thank You! 😊