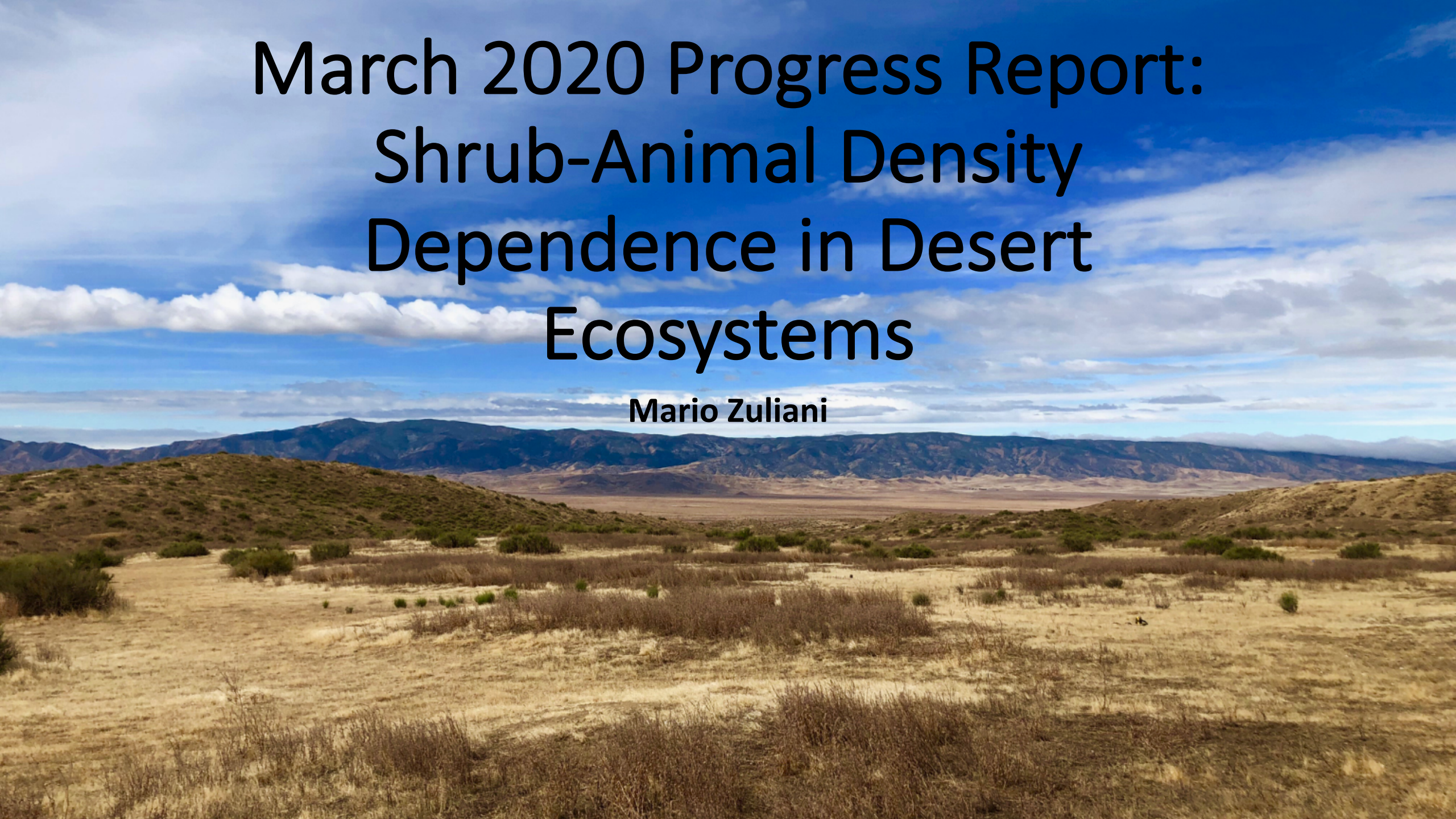


March 2020 Progress Report: Shrub-Animal Density Dependence in Desert Ecosystems

Mario Zuliani

Chapter 1: Does Density matter: A Systematic Review of Plant-Animal Interactions

Purpose:

- To examine the relationship between shrub and animal densities reported in literature

Questions:

- Are the shrub densities in desert ecosystems recorded and animal's occurrence data reported?
- What types of interactions are occurring between animal and shrub species? Are these direct or indirect interactions?
- Is facilitation measured or observed when shrub density measures are reported?

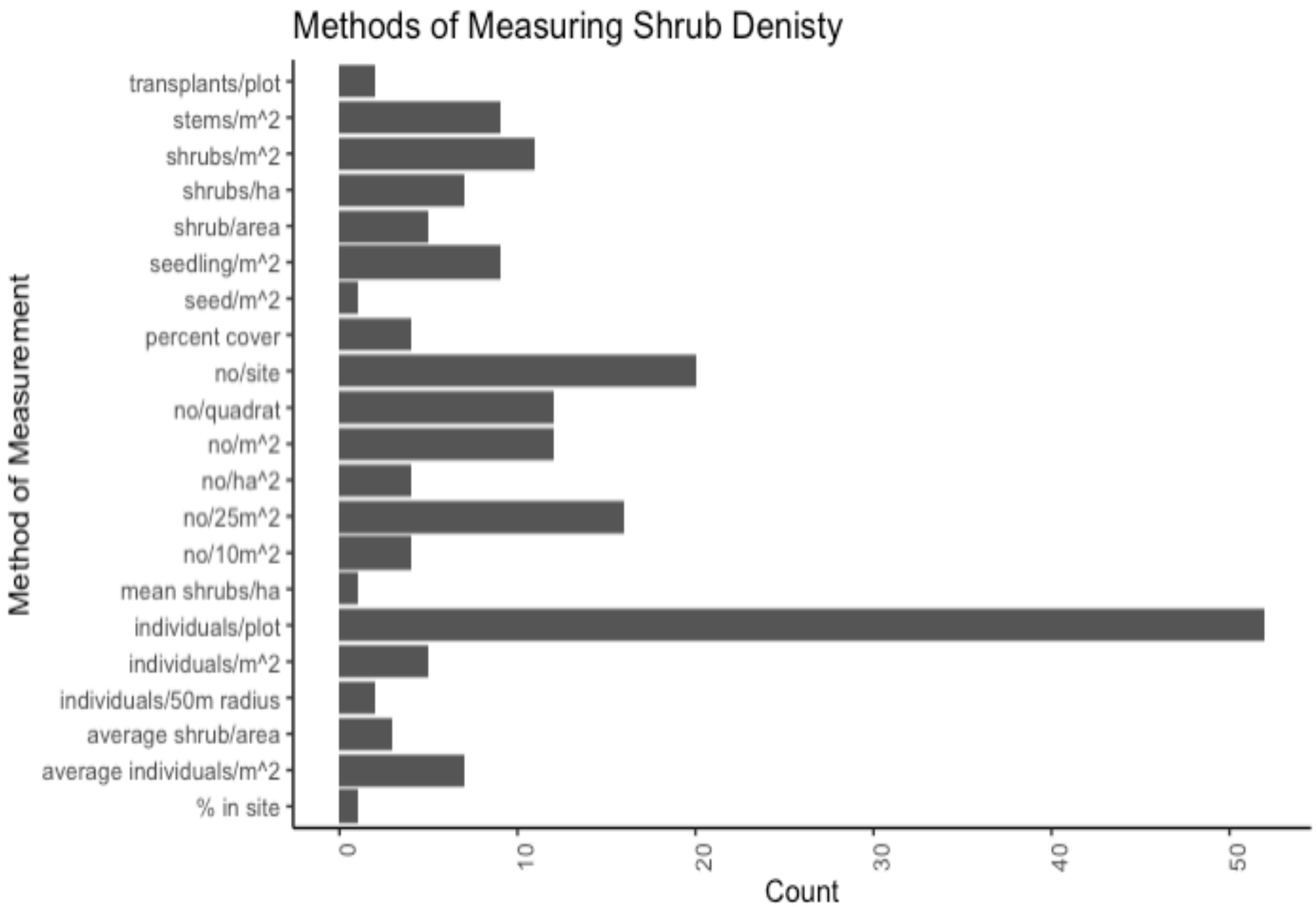
Chapter 1: Does Density matter: A Systematic Review of Plant-Animal Interactions

Predictions:

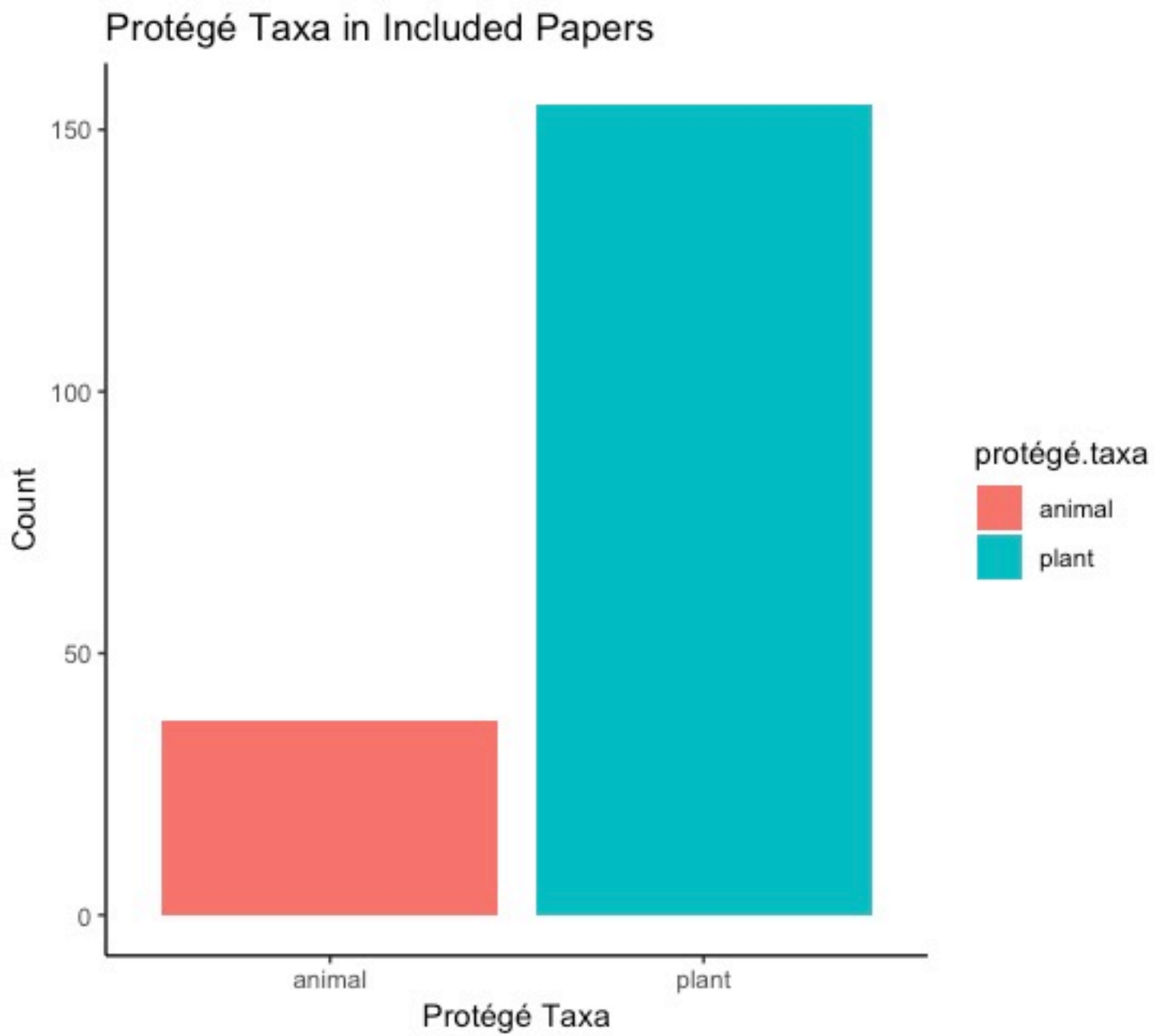
1. Many studies are going to focus solely on benefactor interaction
2. Shrub densities will not be reported on or included in studies

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


Methods of Measuring Shrub Denisty
Method of Measurement
transplants/plot
stems/m^2
shrubs/m^2
shrubs/ha
shrub/area
seedling/m^2
seed/m^2
percent cover
no/site
no/quadrat
no/m^2
no/ha^2
no/25m^2
no/10m^2
mean shrubs/ha
individuals/plot
individuals/m^2
individuals/50m radius
average shrub/area
average individuals/m^2
% in site
0
10
20
30
40
50
Count


WORK IN PROGRESS


Protégé Taxa in Included Papers
150
100
50
0
Count
animal
plant
Protégé Taxa
protégé.taxa
animal
plant


WORK IN PROGRESS

Chapter 1: What do we see so far?

- The 37 papers that look at facilitation with shrubs have some sort of measure recorded for density
- No papers have a measure for facilitation
- There is no universally agreed upon unit of measurement for shrub density
- Many papers that look at density and facilitation conclude that this interaction is present in their system

Chapter 1: Next steps and Questions

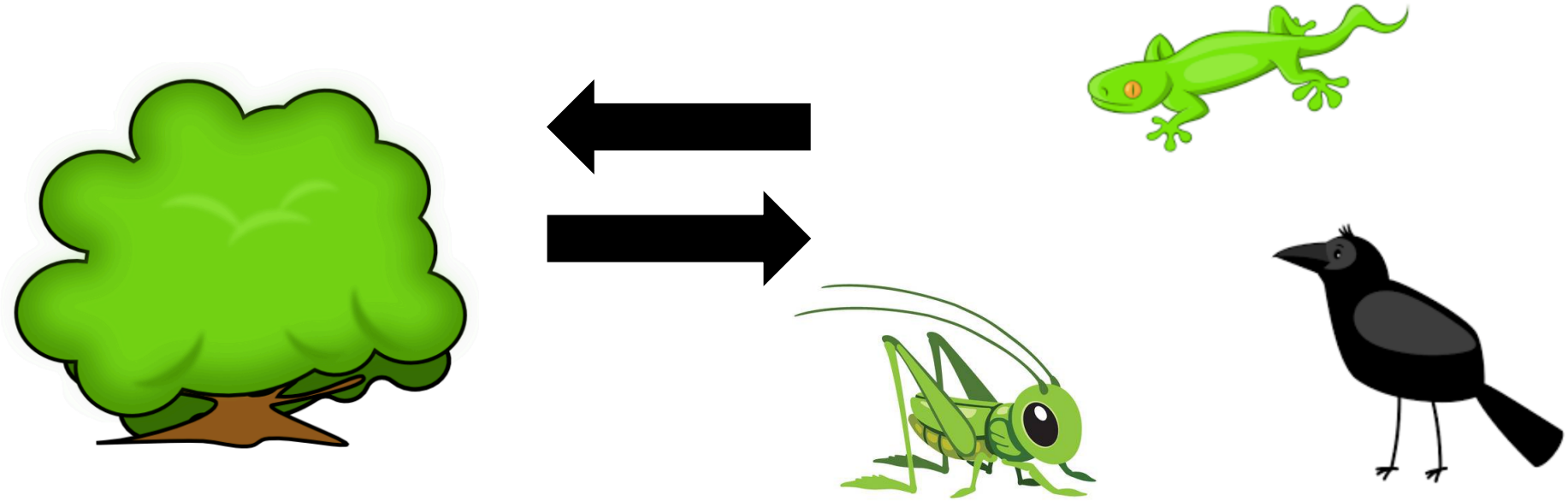
1) Convert all density measures into one common unit. Advice?
2) Generation of a map of study locations.
3) Use as a a Chapter or as an introduction to main thesis?

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 a relationship between shrub and animal densities present in arid ecosystems?
- Does the local context influence the importance of density, i.e. environmental stress measures?
- Does Residual Dry matter as an indirect measure of vegetation on the soil surface influence animal occurrences?

Chapter 2: Shrub-animal density dependence in desert ecosystems

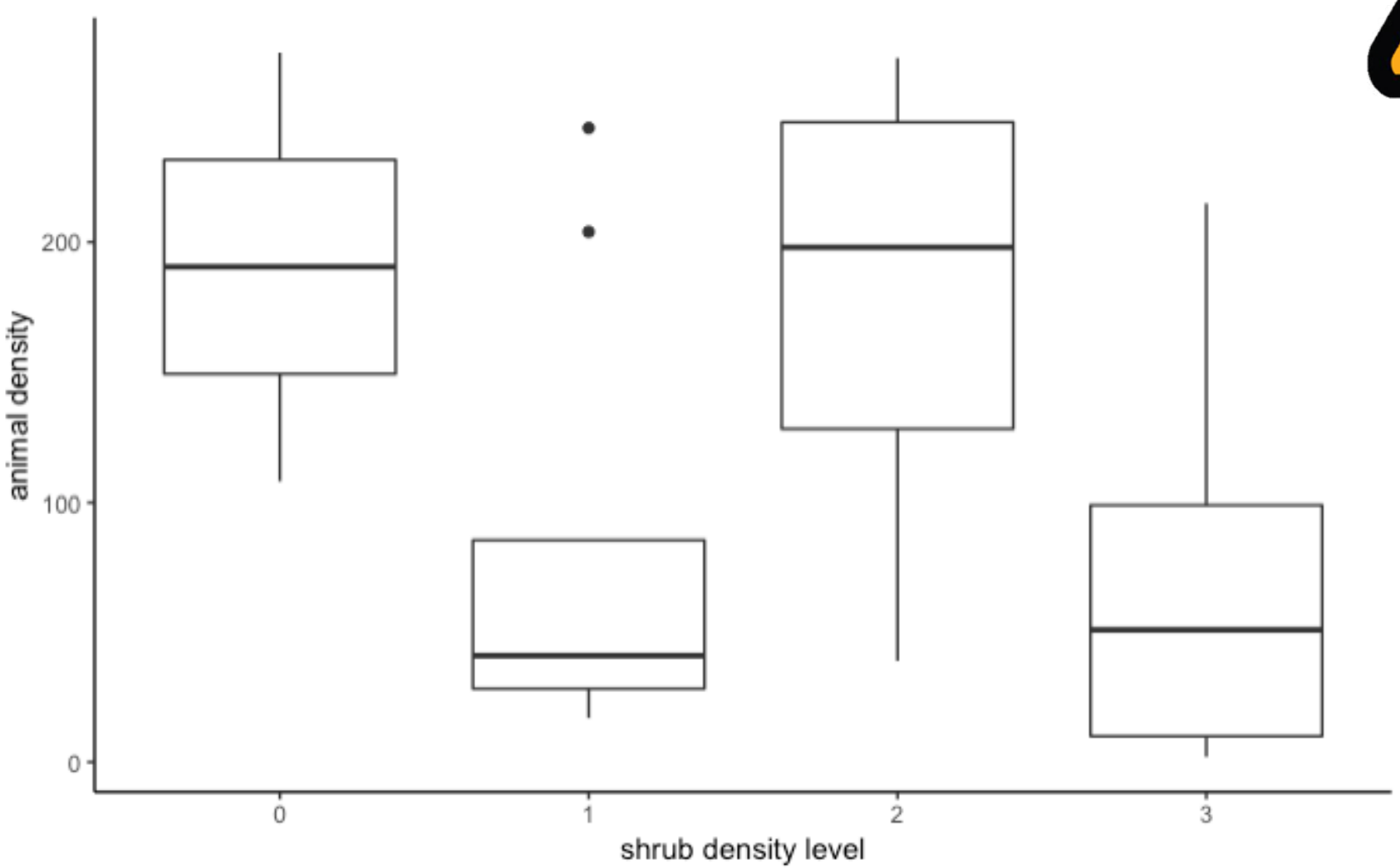
Predictions:

- Higher Shrub density will correlate with a higher animal species density.
- Shrub and animal densities within a site are positively density dependent
- High shrub densities also increase animal species richness

Chapter 2: Shrub-animal density dependence in desert ecosystems

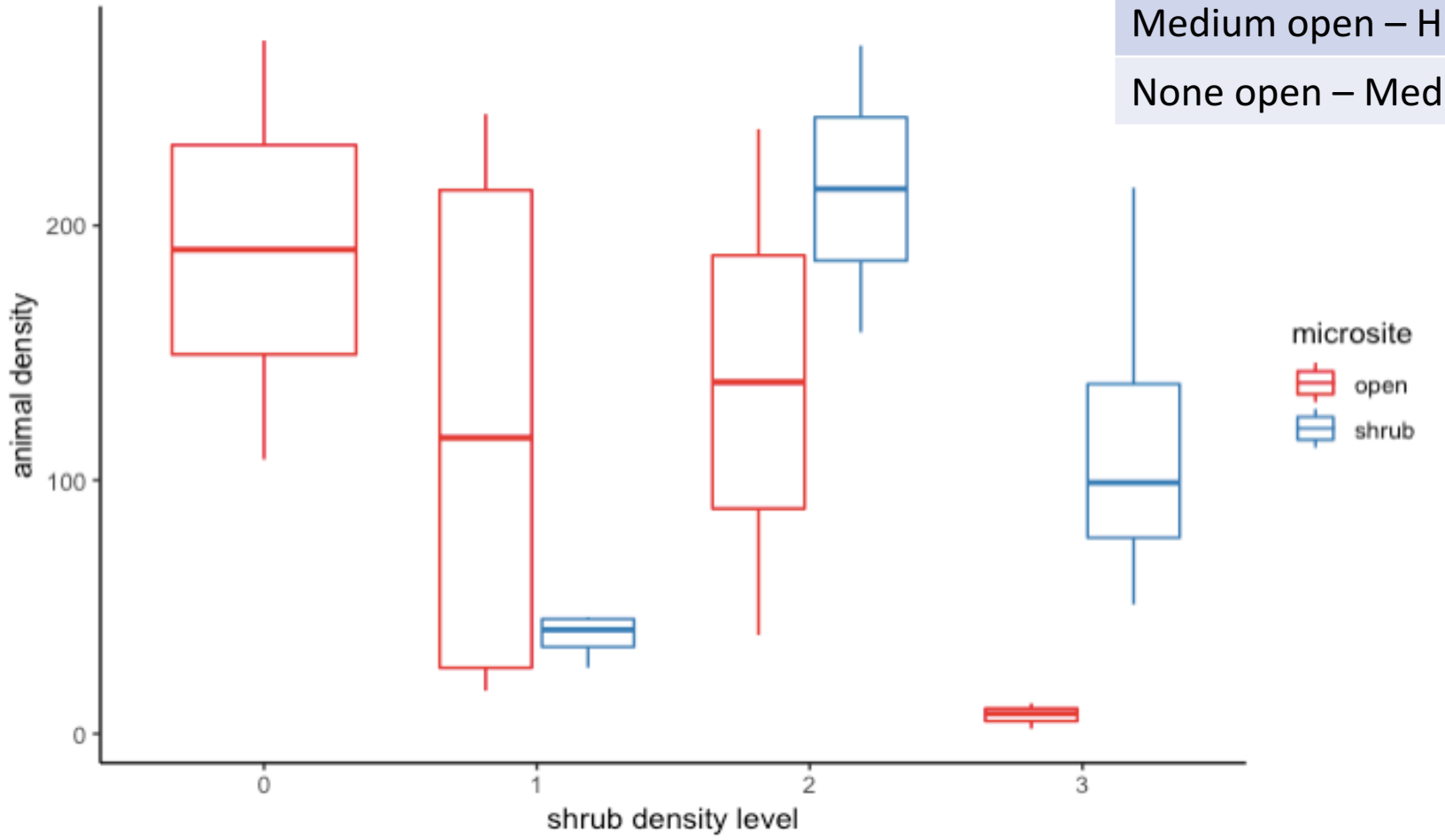
Chapter 2: Shrub-animal density dependence in desert ecosystems

Chapter 2: Progress so Far



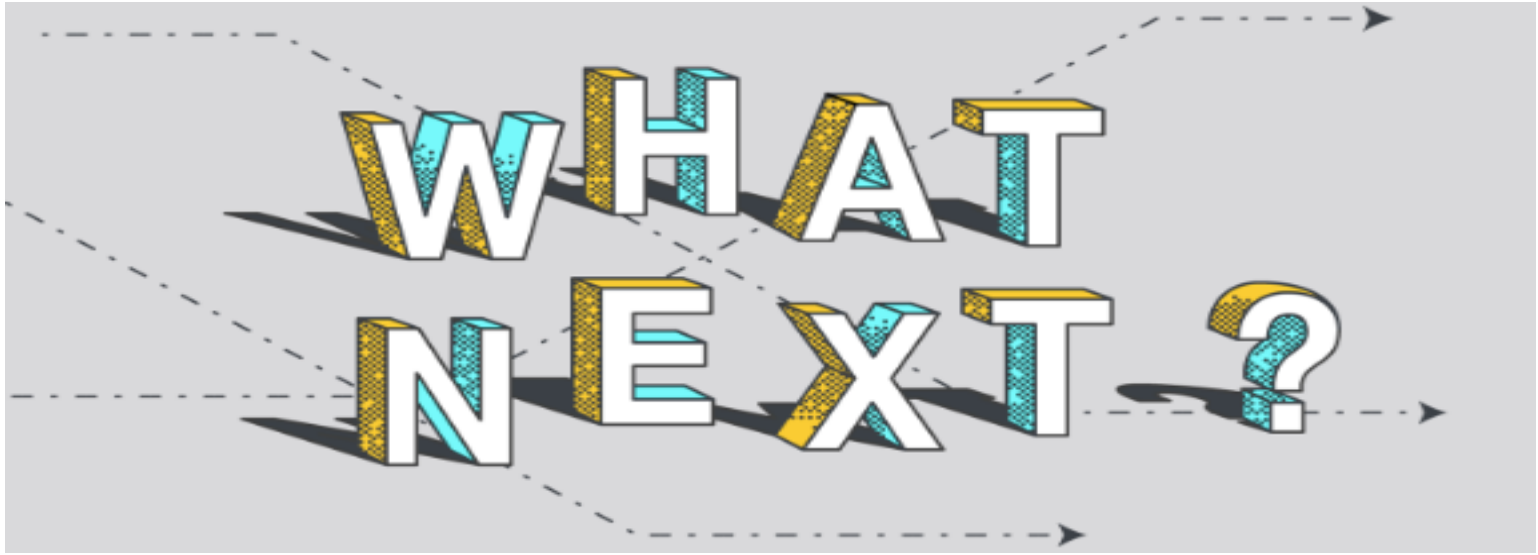
Chapter 2: Progress so Far

Contrast	SE	P-Value
Low open – Medium open	0.0751	0.7930
Low open – High shrub	0.0627	0.9787
Medium open – High shrub	0.0751	0.2745
None open – Medium shrub	0.0704	0.6968



Chapter 2: Next steps

1) RDM Data Analysis
2) Temperature Data Analysis
3) Another field season?
4) Draft write up
5) Format Thesis and Compile all Writing Evidence

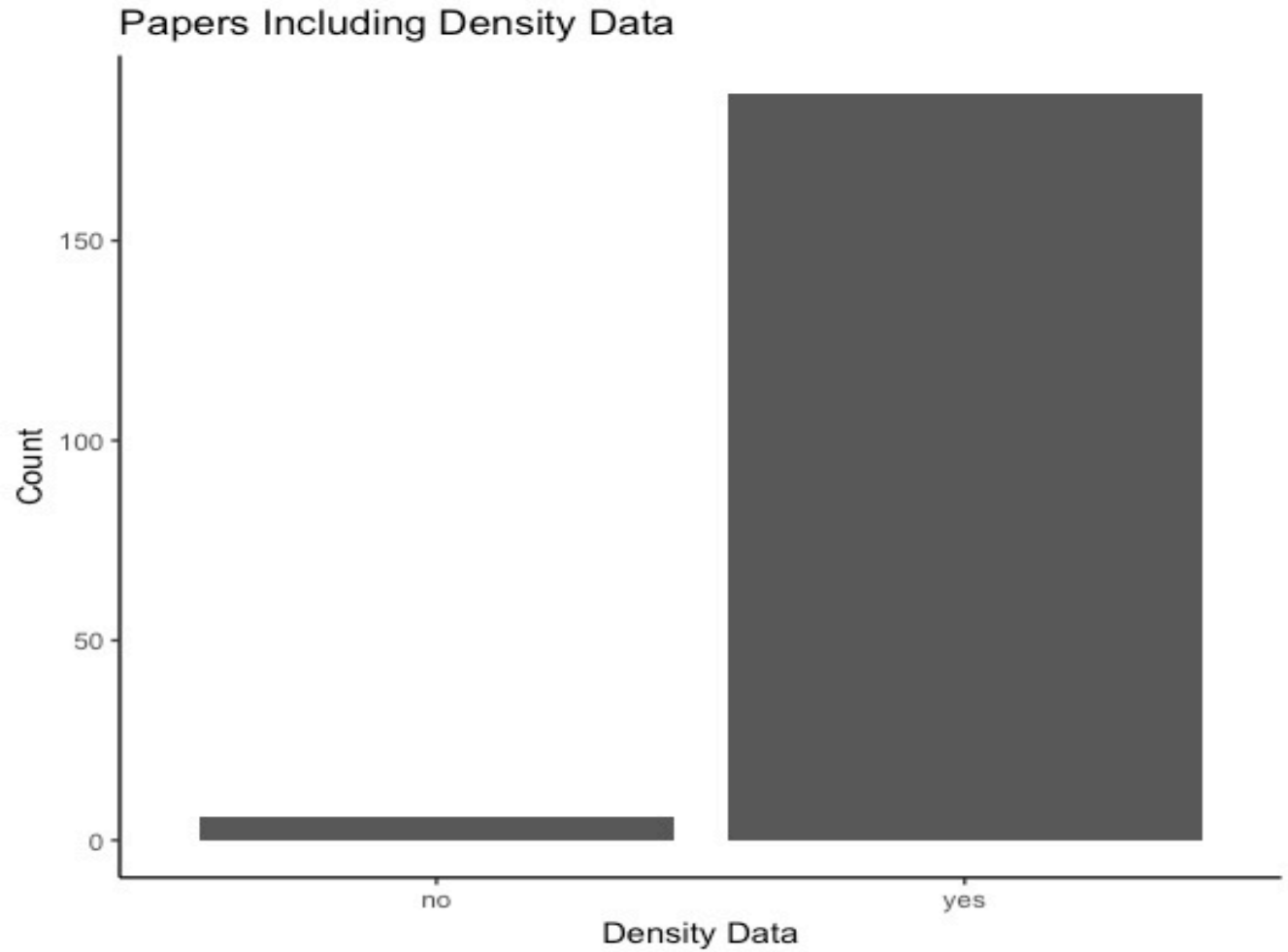


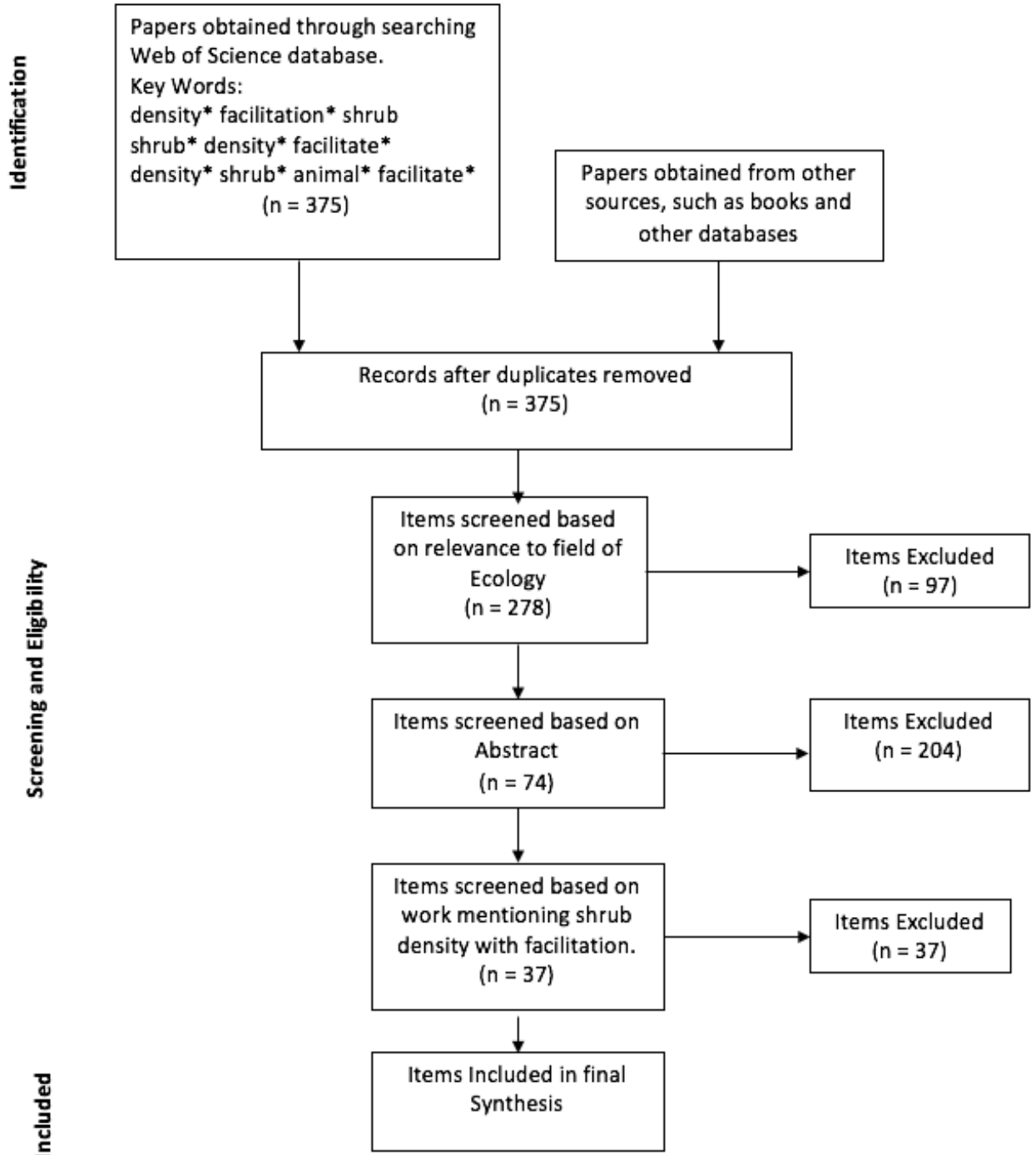
Thesis Timeline

Timeline	Goals
March 2020	Complete first draft of Chapter 2 – Done
April 2020	Analyze RDM and Temperature data. Complete statistical analysis for remaining data. Collect any additional data that committee recommends for Chapter 2
May 2020	Complete second draft of Chapter 2
June-August 2020	Format thesis and compile all writing and evidence.


Thank you! ☺
Lets Talk!

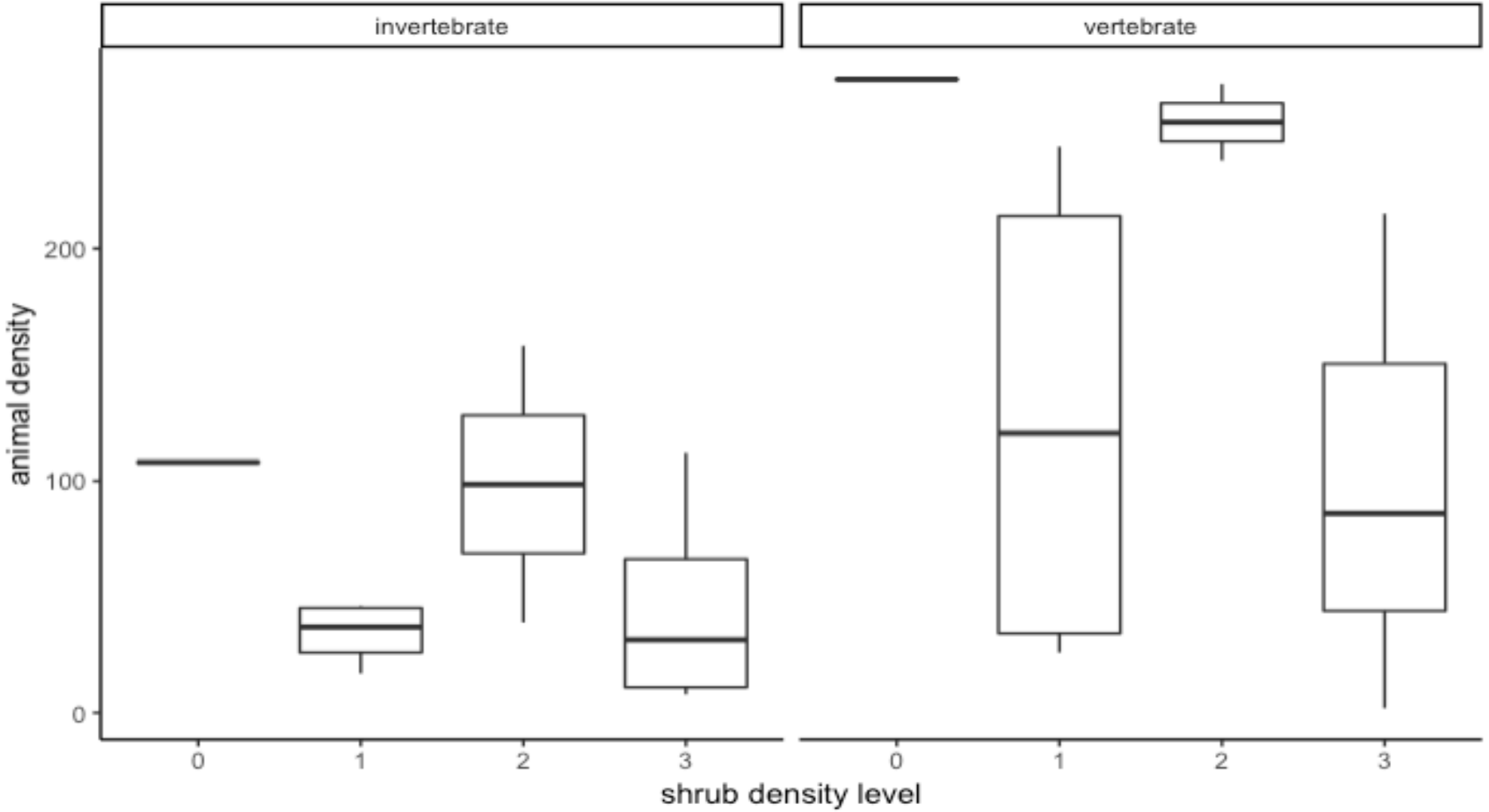
Supplementary Figures Chapter 1





Supplementary Figures Chapter 1

Supplementary Figures Chapter 2:



Contrast	SE	P-Value
None invert – Medium invert	0.1197	0.9946
None invert – Low Vertebrate	0.1059	0.7591
None invert – High Vertebrate	0.1121	0.9989
Low invert – High invert	0.1130	0.1698
Medium invert – High Vertebrate	0.0915	1.000
None Vertebrate – Medium Vertebrate	0.0750	0.9826