Intro:

* Positive interactions and habitat structure
  + Deserts harsh
    - UV, heat, water, etc.
  + Positive interactions common in stressful ecos, like faciliation
  + Facilitation is:
    - Association between species
    - Change the environment in that and that way to give or prevent x and y
  + Facilitation that impacts much of the community is foundational
  + Shrubs, cacti, and tress most common
    - Sturdy plants provide habitat and good for lots of animals
  + Done a lot of plant-plant, but plant-animal happening too
  + Plant-animal + interactions determine ecosystems at a “mesohabitat” level
    - More detailed than macro eco-region level habitats, but more wide reaching than benefactor-level facilitation (like only under a canopy)
    - Middle ground of habitat level important! Face challenge globally!
      * Habitat connectivity
* Mutualism and birds
  + Facilitation, (though complex) most broadly only 0/+, but mutualism is +/+
  + Pollination and seed dispersal done by birds
  + Birds can:
    - cover large distances,
    - hold lots of pollen on their bodies,
    - scarify seeds to increase germination
    - and are relatively understudied in their relationship to plants compared to insects
  + Even though their relationship with plants is super variable in terms of specialists and generalists
* Migration/community structure changes
  + Birds migrate, and plant flower/fruit
    - Phenology at work
  + This overlap important
    - Temporal and geographic synchronicity
  + Monitoring this relationship as environment changes
* Hypotheses and predictions

Methods:

* Study Site
* Study species and system
* Line Transects
* Data Analysis
  + Comm structure
    - Vegan metrics lm and glm
    - PCA
  + Mutualistic interaction possibilities
    - Mesohabitats’ ANOVAs
      * Taxonomic
      * Functional
    - Behaviors ANOVAs
      * Taxonomic
      * Functional
  + Mesohabitat influence on behavior
    - Chi squared

Results:

* Community Structure
  + Vegan metrics
  + pca
* Mutualistic interaction possibilities
  + Mesohabitat
    - Taxonomic
      * Two level
      * Three level
    - Functional
      * Three level
      * Two level
  + Behaviors
    - Taxonomic
      * Species abundances
    - Functional
      * Trophic guilds
      * Migratory classes
* Mesohabitat’s influence on behavior
  + Chi-squared test
  + Two level
  + Three level

Discussion:

* Birds do change throughout season
* Where birds are changes between seasons
* What birds are doing changes throughout season
* Where a bird is influences what it’s doing
* Important to know that community structures relevant for mutualistic interactions needed throughout season
  + Nectarivores relevant in spring, frugivores in late summer
* Help managers make decisions about what plants are needed for birds communities, and vice versa
  + Birds’ migrations are changing, the environment is changing, and blooming/fruiting is changing.

Figures:

* Fig 1: vegan metrics boxplot
* Fig 2: PCA eigenvector map
* Fig 3: a) Mesohabitat and behavior species abundance bar graph, b) Mesohabitat and behavior trophic abundance bar graph, c) Mesohabitat and behavior migratory class abundance bar graph
* Fig. 4: a) Meso-beha mosaic 2 level plots, b) 3 level plots (both seasons only)

Tables**:**

* Table 1: community metrics stats
* Table 2: species list
* Table 3: trophic guild list
* Table 4: migratory class list
* Table 5: taxonomic and functional meso and beha stats: both seasons