Hypotheses

Chapter 1: The evolutionary basis of commonness and rarity.

- **Are occupancy within a geographic range (range porosity, holes within the range) phylogenetically heritable?** (Extent of occupancy (sum of occupied areas) is heritable.)
  - Is the percent of occupancy heritable?
  - H_0: Percent occupancy is random with respect to phylogenetic distance.
  - H_1: More closely related species have more similar occupancy.
  - H_2: More distantly related species have more similar occupancy.
    - Birds, mammals, butterflies, FIA
    - Randomization test between phylogenetic distances and occupancy (Waldron 2007).

- **What is the species longevity for common vs. rare species?**
  - Do common species have older divergence dates than rare species?
  - H_0: Common species and rare species do not have significantly different divergence dates.
  - H_1: Common species have older divergence dates than rare species.
  - H_2: Rare species have older divergence dates than common species.
    - Anything with a good molecular clock phylogeny- mammals, birds, possibly reptiles, fish, amphibians, FIA
    - Randomization test between divergence date and commonness/rarity metric.

Chapter 2: Understanding commonness and rarity through life history traits.

- **Can regional occupancy and abundance be explained by life history traits?**
  - What amount of the variation in occupancy and abundance can be explained by life history traits?
  - H_0: No relationship between life history traits and occupancy or abundance.
  - H_1: Life history traits explain variation in occupancy or abundance.
    - Birds, mammals, reptiles
    - Variance partitioning with life history traits, and phylogenetic distance

Chapter 3: Comparing natural patterns of commonness and rarity to anthropogenically influenced patterns

- **What do regional patterns of occupancy and abundance look like for invasive species?**
  - Invasive species will have higher abundances at a site and lower percent occupancy than native common species.
  - Invasive species will have distributions that are positively correlated with human disturbance, native common species will have distributions that are negatively correlated or have no relationship to human disturbance.
  - Invasive species will have more peaks of abundance than native common species.
    - Birds, maybe plants (FIA or something else)?
- **What do regional patterns of occupancy and abundance look like for rare species of conservation concern?**
  - Conservation rare species will have lower abundances overall and lower percent occupancy than native rare species.
  - Conservation rare species will have distributions that are negatively correlated with human disturbance, native rare species will have distributions that are negatively correlated or have not relationship to human disturbance.
  - Conservation rare species will have even abundance throughout the range, native rare species will have a peak or peaks of higher abundance.
    - Birds, maybe mammals, plants, reptiles, butterflies?