

## 1. Overview

### a. Island

#### i. Examples:

1. Oceanic island
2. Ecologically might mountain tops work like islands?
  - a. Rocky state park, no vegetation, dominated by shrubs and herbaceous plants, at top of mountain, heath ball its called
3. Local Patches
4. Any spatially isolated community can act as an island

### b. Preston 1962

- i. Lead up to mccarson
- ii. He formalized species-area curves

## 2. Species-area relationships

- a. First thing we do is sample areas of different sizes
- b. Count the number of species in each area
- c. Plot number of species (dependent variable) vs. area (independent variable)
- d. The result is larger areas show more species
- e. Species area equation preston put together
  - i.  $S=cA^z$
  - ii.  $S$ = number of species
  - iii.  $c$ = a constant depending on group and unit of measurement
    1. Depends on taxonomic group and unit of measurement
  - iv.  $A$ = area of island
  - v.  $z$  = slope of line relating  $S$  and  $A$
  - vi. Rearrange equation
    1.  $\log S = \log cA^z$
    2.  $\log S = \log c + \log A^z$
    3.  $\log S = \log c + z \log A$
    4. Treat  $\log S$  as "y"
    5. Treat  $\log C$  as "b"
    6. Treat  $z \log A$  as "mx"
- f. Species-area relationships on mainland's
  - i. log-log plot is linear over many area sizes
  - ii. Slope is typically below 0.24
  - iii. There aren't that many new species to add as the pool increases in main land
- g. Species-area relationships on islands
  - i. log-log plot is linear
  - ii. Slope is higher than from mainlands
  - iii. Islands are species poor (depauperate)
  - iv. Barriers to dispersal make it so there are fewer species on islands
  - v. Fewer of the mainland pool gets to islands
  - vi. As we increase area, there are many more additions possible as area increases on islands

## 3. Equilibrium model

- a. MacArthur and Wilson 1967 (same MacArthur as all other things)
  - i. *The Theory of Island Biogeography*

- b. This book marked the start of modern community ecology
- c. Sought to explain why island diversities differ
- d. Think of birth and death rate model when thinking of this model
- e. Predicts turnover of island species membership
- f. (habitat hypothesis does not predict turnover)