

## Population distribution and abundance



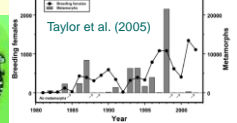
How many & where?



Salicornia on Wadies Island

## So, what's a population?

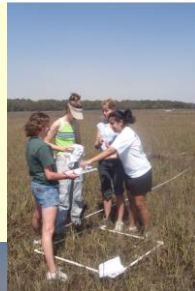
- Some characteristics:
  - Distribution
  - Abundance
  - Density
  - Birth rate
  - Death rate
  - Immigration rate
  - Emigration rate
  - Age structure



Marbled salamanders

## Lecture outline

- Distribution
  - Broad
  - Local
- Metapopulations
- Abundance
- Rarity



## Range

- Where's Kanga & Roo?

Eastern grey kangaroo  
*Macropus giganteus*



*Macropus giganteus* lives in eastern Australia, where there is little seasonal variation in precipitation or dominance by summer precipitation.

*M. fuliginosus* lives in western Australia, where winter rainfall dominates.



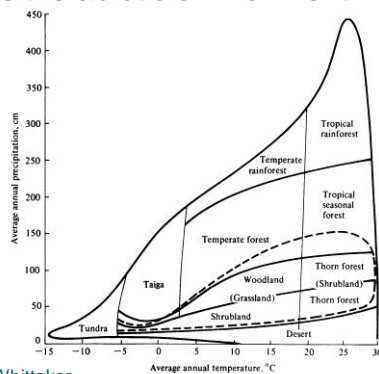
Western grey kangaroo



Red kangaroo

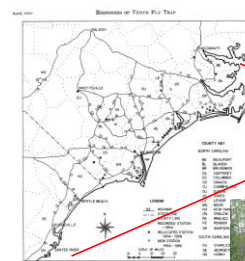
Fig. 9.2

## Does the abiotic environment matter?

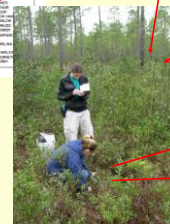


Robert Whittaker

## Distribution across scales



Roberts & Oosting (1958)



## Distribution at smaller scales

- Random
  - Uniform (regular)
  - Clumped
- Why?

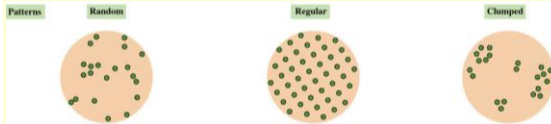


Fig. 9.10

## Distribution at smaller scales



## A (realistic) complication

- Metapopulations; R. Levin (1969)

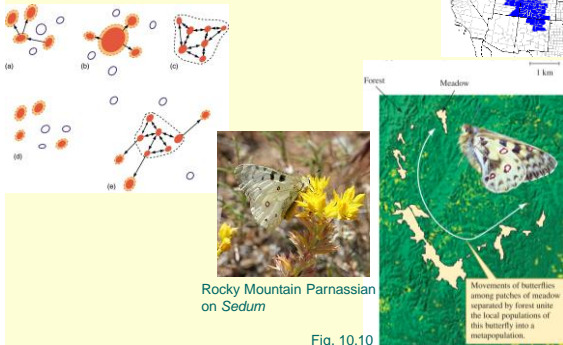
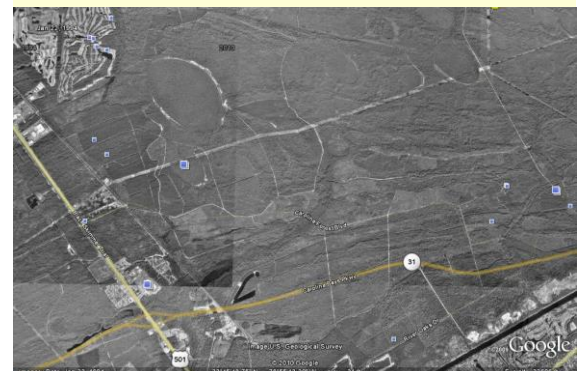


Fig. 10.10

## Local applications?

- 1994



2003



2007



## Roughly predicting densities

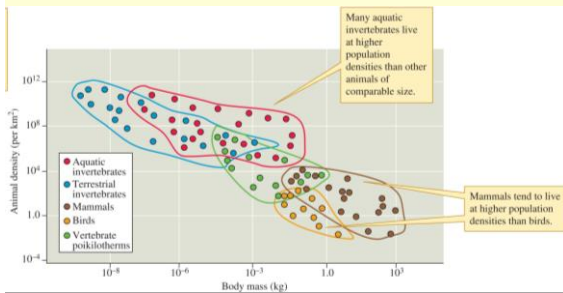


Fig. 9.20

## Synthesizing distribution and abundance data

- Rabinowitz (1981): seven forms of rarity
- Based on a combination of:
  - Geographic distribution (extensive vs. restricted)
  - Habitat specificity (broad vs. narrow)
  - Local population size (large vs. small)

## 7 forms of rarity

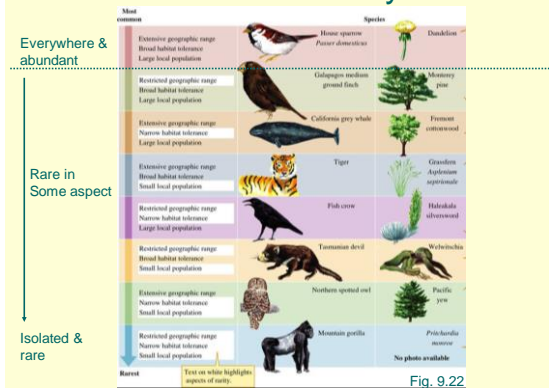


Fig. 9.22