

INTRODUCTION TO POPULATIONS

Definitions

- What is a population?
 - Ecological*
 - Statistical

Ecological Population

- “a group of organisms of the same species occupying a particular space at a particular time” (Krebs 2001:116)

...same species...

- Populations are composed of interbreeding individuals
- There is *genetic* proximity

...particular space...

- Populations occupy a delimited geographic area
- There is *spatial* proximity

Genetic, Geography and...

- Demographics
 - Reproductive rates
 - Survival
 - Composition (sex ratio, age structure, etc.)
- These things should be similar within populations

Hierarchical Aggregations of Populations

- According to this definition, populations can be grouped at many different levels of aggregation (Garton 2002)
 - Deme
 - Population
 - Metapopulation
 - Subspecies
 - Species

Deme

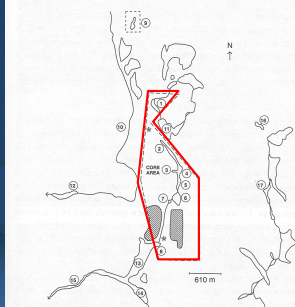
- “a group of organisms where breeding is random” (Emlen 1984:202)
- “a panmictic population” (Ehrlich and Holm 1963)

Deme

- **Genetics**
 - This smallest grouping of individuals should emphasize genetic objective of random breeding within the group
 - In reality, random breeding is constrained by the social system
- **Geography**
 - Continuous distribution of individuals in one patch of habitat
- **Demographics**
 - Smallest group where it is reasonable to estimate birth, death, immigration and emigration rates

Red-winged Blackbird Deme (Orians study area)

- A patch of emergent vegetation adjacent to or within ponds, streams or lakes

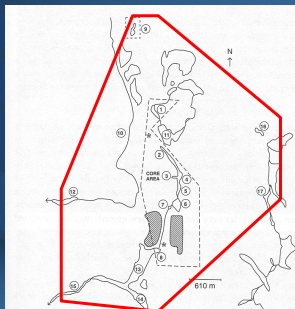


Population

- A collection of demes with strong connections between adjacent demes
- **Genetics**
 - Relatively high rates of dispersal among demes
- **Geography**
 - A collection of patches without great expanses of non-habitat intervening
- **Demographics**
 - High correlations in demographic rates between adjacent demes

Red-winged Blackbird Population

- Patches of emergent vegetation adjacent to or within ponds, streams or lakes in Columbia River National Wildlife Refuge



Metapopulation

- A collection of populations with weak connections between adjacent populations
- **Genetics**
 - Relatively low rates of dispersal among populations produces genetic differentiation
- **Geography**
 - Separated by expanses of non-habitat
- **Demographics**
 - Low correlations in demographic rates between adjacent populations

Red-winged Blackbird Metapopulation

- Populations along Columbia River and adjacent populations

Subspecies

- A collection of metapopulations in a region
- **Genetics**
 - Rare dispersals maintain genetic similarity
- **Geography**
 - Separated by expanses of non-habitat or other semi-permeable barriers to dispersal
- **Demographics**
 - Nearly complete independence
