ESRM 350

Population Characteristics

Autumn 2016

“All adventures, especially into new territory, are scary”

- Sally Ride, American physicist and astronaut

Wildlife Populations

Groups of animals, all of the same species, that live together in a particular area and can interbreed

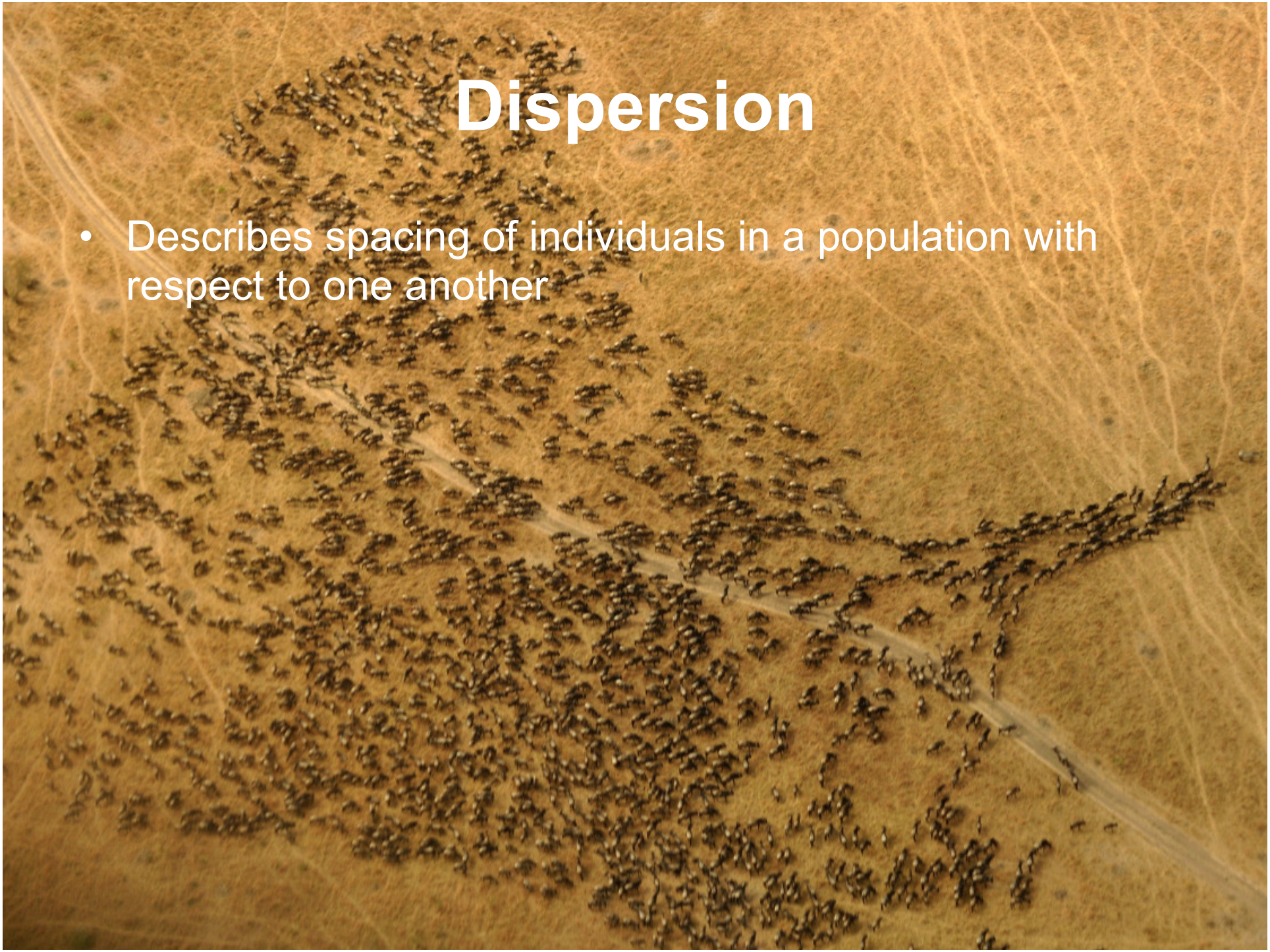
What Delineates Populations?

- Geographic barriers
  - e.g., mountain ranges, rivers, etc…
- Habitat borders
  - many wildlife populations inhabit areas, like reserves, that are bounded by inhospitable environments
- Biotic interactions
  - intra-specific: borders set by adjacent populations of the same species with which interbreeding does not occur
    - intra-specific boundaries can be "soft" (defined only by reproductive isolation)
    - e.g. mechanism: adjacent populations have different mating preferences
  - inter-specific: competition, parasitism, predation

Bethke et al. (1996) Ecological Applications

Key Population Characteristics

- Frequency of different genotypes (genetic structure)
  - changes constitute the process of evolution
- Age structure
  - proportion of individuals in various age classes
    - e.g., young-of-the-year, juveniles, adults
    - Influences population growth trajectory (will discuss next time)
- **Dispersion**
  - density and spacing of individuals
  - our focus today

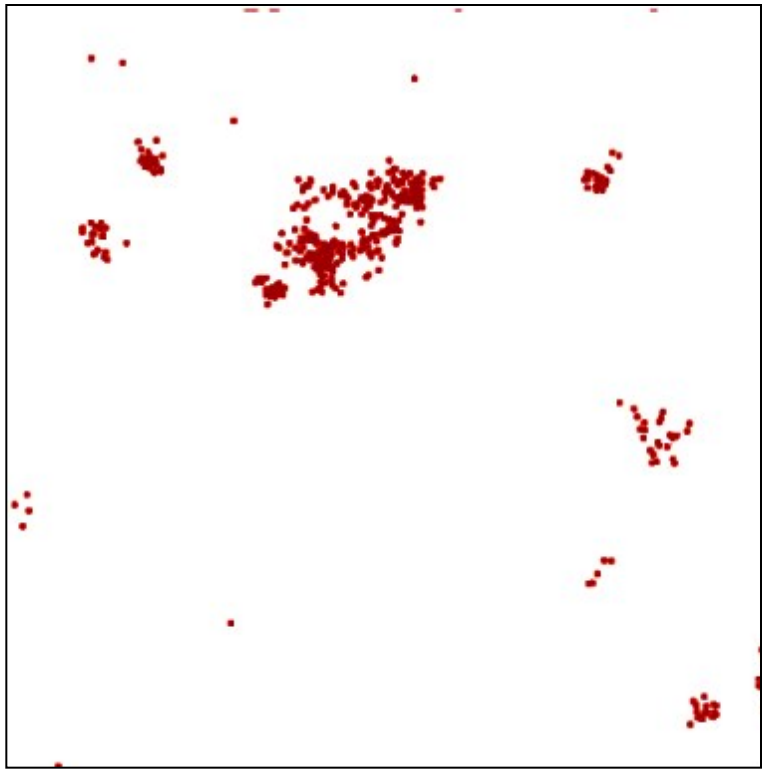


Dispersion

- Describes spacing of individuals in a population with respect to one another

Patterns of Dispersion

- **Clumped** – individuals in discrete groups (also called ‘clustered’)



Causes of Clumped Dispersion

- Clumped spacing may arise from
  - social predisposition to form groups
    - e.g., for thermoregulation, foraging, safety from predators

Killer whales (*Orcinus orca*) creating a bow wave
to wash a seal from an ice flow

http://www.youtube.com/watch?v=hPge_0lea3o

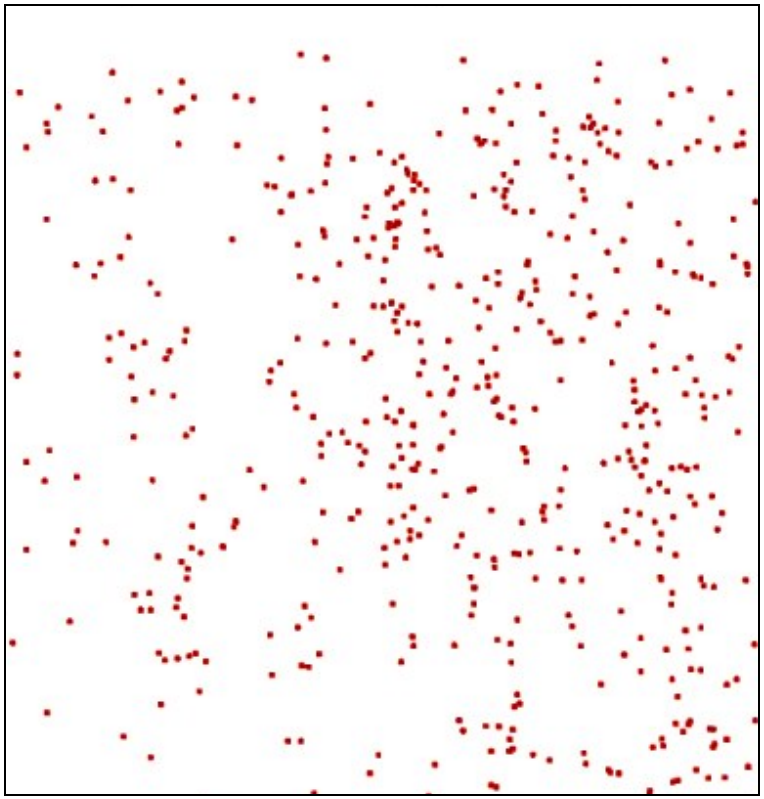
Causes of Clumped Dispersion

- Clumped distribution of resources
- Tendency of progeny to remain near parents

Cheetah (*Acinonyx jubatus*) mother with cubs

Patterns of Dispersion

- **Uniform** – individuals maintain a minimum distance from other individuals (also called ‘evenly spaced’)



Causes of Uniform Dispersion

- **Uniform** spacing arises from interactions among individuals
  - maintenance of minimum distance to avoid agonistic interaction
    - e.g., to avoid fights over food, or interference while foraging
  - Territoriality: defense of a *fixed* area against other individuals (same or different species)
    - typically to protect resources or reproductive opportunities

Territoriality

- Only viable if resources, reproductive opportunities can be defended
  - otherwise, the energetic costs of defense are too high

The swallow-tailed hummingbird (*Eupetomena macroura*) of South America defends territories to protect resources (nectar)

Southern elephant seal (*Mirounga leonina*) bulls defend mating territories (reproductive opportunities); starve while doing so

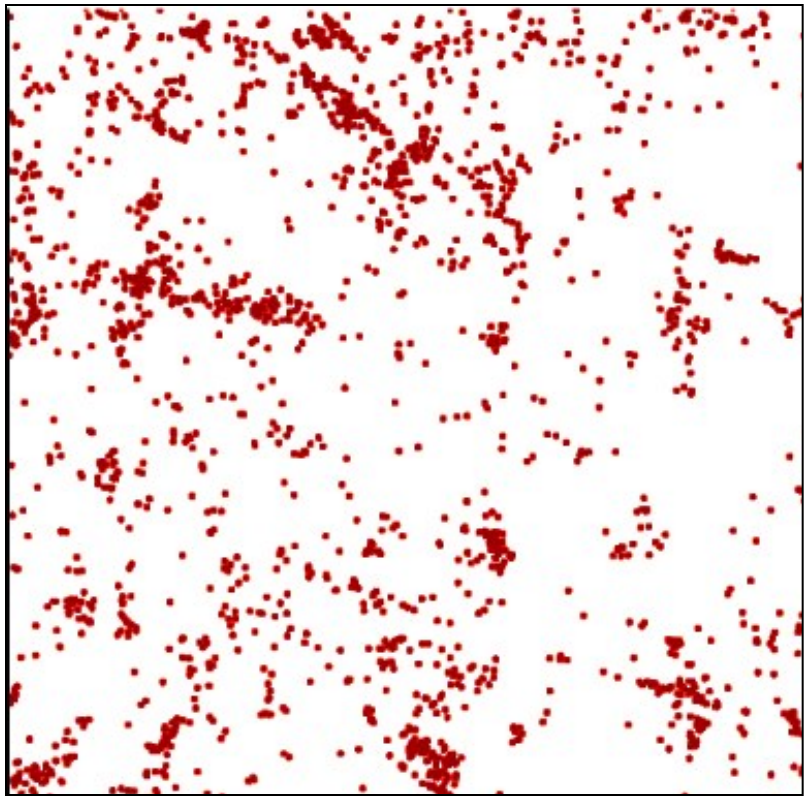
Territoriality

- Costs of territoriality sometimes reduced if neighbors are familiar
  - the “dear enemy” effect
  - territorial boundaries well established

The tawny dragon (*Ctenophorus decresii*) reduces aggression levels in repeat interactions with familiar territorial rivals

Patterns of Dispersion

- **Random** – individuals spaced independently of one another



Causes of Random Dispersion

- Random dispersion seen in wildlife populations characterized by
  - overlapping home ranges (i.e., no territoriality)
  - randomly distributed resources

Individual gray kangaroos (*Macropus fuliginosus*) are spaced randomly in populations where cover is widespread

Caughley (1963) *Austr. J. Zoology*

Five Minute Paper

Questions & Insights