



Population

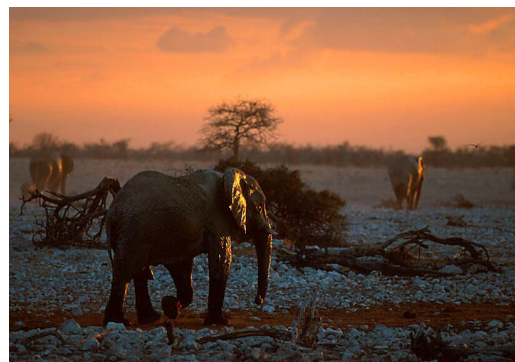
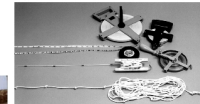
- Group of organisms belonging to the same species that live in a given area.
- Why study populations?

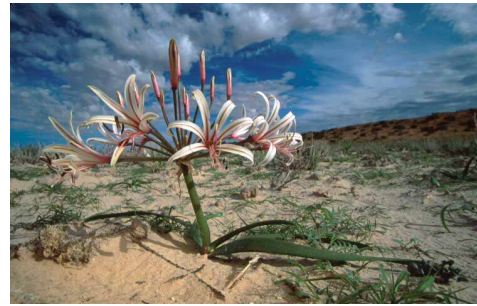
Characteristics of populations

- Density - individuals per area
- Dispersion - pattern of spacing

Density and Dispersion

- Measuring Density:
– Transects





- Mark-recapture method for estimating density



Figure 35.2A

- The dispersion pattern of a population refers to the way individuals are spaced within their area
 - Clumped
 - Uniform
 - Random

- Clumped dispersion - individuals are aggregated in patches

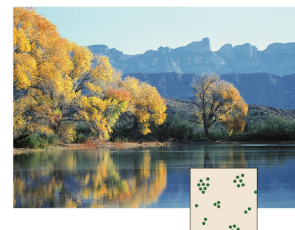


Figure 35.2B

- A uniform pattern - often results from interactions among individuals of a population

- Territorial behavior and competition for water are examples of such interactions

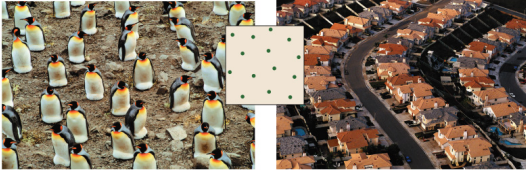


Figure 35.2C

- Random dispersion - individuals in a population spaced in a patternless, unpredictable way

- Example: clams living in a mudflat
- Environmental conditions and social interactions make random dispersion rare

Population Growth

- Exponential growth is the accelerating increase that occurs during a time when growth is unregulated

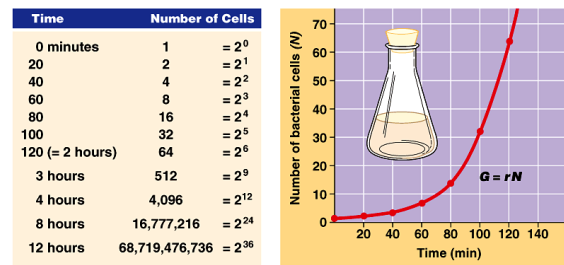


Figure 35.3A

- Logistic growth is slowed by population-limiting factors

- It tends to level off at carrying capacity
- Carrying capacity is the maximum population size that an environment can support at a particular time with no degradation to the habitat

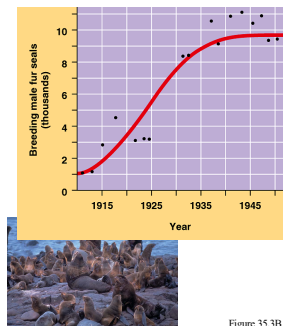


Figure 35.3B

- Logistic growth equation

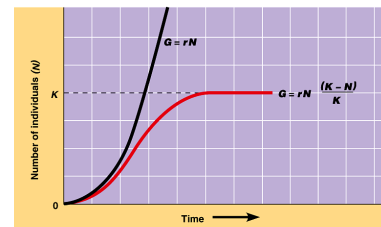


Figure 35.3C

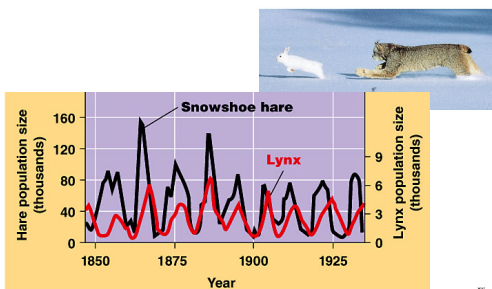
Factors limiting growth:

- Density dependent:
 - competition
 - predation
 - parasitism
 - crowding



- Some populations go through boom-and-bust cycles of growth and decline
- Example: the population cycles of the lynx and the snowshoe hare
 - The lynx is one of the main predators of the snowshoe hare in the far northern forests of Canada and Alaska

- About every 10 years, both hare and lynx populations have a rapid increase (a "boom") followed by a sharp decline (a "bust")



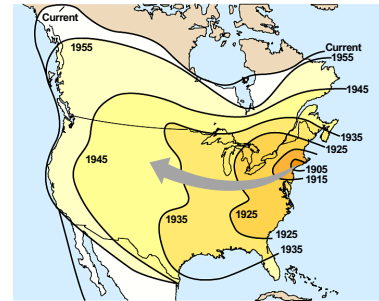
- Recent studies suggest that the 10-year cycles of the snowshoe hare are largely driven by excessive predation
 - But they are also influenced by fluctuations in the hare's food supply
- Population cycles may also result from a time lag in the response of predators to rising prey numbers

The Spread of Shakespeare's Starlings

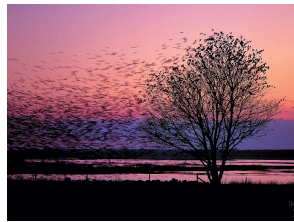
- In the 1800s and early 1900s, introducing foreign species of animals and plants to North America was a popular, unregulated activity
- In 1890, a group of Shakespeare enthusiasts released about 120 starlings in New York's Central Park
 - It was part of a project to bring to America every bird species mentioned in Shakespeare's works



- Today, the starling range extends from Mexico to Alaska
- Their population is estimated at well over 100 million



- Over 5 million starlings have been counted in a single roost
- Starlings are omnivorous, aggressive, and tenacious
- They cause destruction and often replace native bird species
- Attempts to eradicate starlings have been unsuccessful



- The starling population in North America has some features in common with the global human population
 - Both are expanding and are virtually uncontrolled
 - Both are harming other species
- Population ecology is concerned with changes in population size and the factors that regulate populations over time

Figure 52.21 Human population growth

