

FACTORS AFFECTING POPULATION CHANGE

Density-Dependent Factors

- Any influence that increases as the population density increases or decreases.
- As a population grows there is a struggle for available resources.
- Intraspecific competition occurs when organisms of the same species compete for resources (food, space, mates) in their habitat.
- As populations grow the amount of available food decreases per individual, which could result in a decrease in the growth and reproductive success of the population.

- Predation is when a predator catches, kills and consumes a prey.
- In a predator-prey relationship, the population of the predator depends on the population of the prey.
- If the prey population decreases the predator population will also decrease, as the amount of food has been reduced.
- When the predator's population decreases the amount of prey will increase as there is less predators around to consume them.
- Disease can greatly affect the populations that are dense or overcrowded, since it is easier to be passed from one individual to another.
- Ex/ foot-and-mouth disease in cattle on farms

- Low population density can also influence population growth rates
- The Allee effect occurs when population density is so low that the organisms fail to reproduce enough to offset the mortality rate.
- This occurs in populations so small or spread out that it is difficult to find mates (ex/ the decline of the passenger pigeon which only breeds in large colonies)
- Small populations can also lead to inbreeding and loss of genetic variation.
- The minimum viable population size is the number of organisms that are needed for a population to exist for a period of time.
- This population size would contain enough diversity that the organisms would be able to cope with environmental changes and disasters.
- It varies among species (ex/ whooping cranes did not become extinct, even though at one point there were only 23 left)

Density-Independent Factors

- Any influence that does not depend on population size, such as human intervention, or extreme weather changes in environmental conditions.
- Ex/ Some organisms do not breed in extreme temperatures.
- The use of insecticides can affect the population in a entire food chain (recall the effect of DDT on biomagnification)
- A limiting factor is the resource in the shortest supply; such as light, space, water or nutrients.
- They help determine the carrying capacity of the population.