Describing Populations

Populations, communities & ecosystems

How are **populations** and ecosystems linked?

individuals of the same species in a given area → **population**

population + populations of other species → **community**

community + abiotic environment → **ecosystem**

The size and health of a population acts as an indicator of its ecosystem's condition. A decline in a population is likely to be caused by a change in its ecosystem.

Quantifying a population

The size of a population is influenced by both abiotic and biotic factors. Thus populations are **dynamic**, responding to variations in their environment.

Populations can be measured in a number of ways.

size	The number of individuals in a population.
density	The number of individuals per unit area.
growth rate	The change in the number of individuals per unit time.

The population's size and distribution in both space and time is only apparent when each of these measures is known.

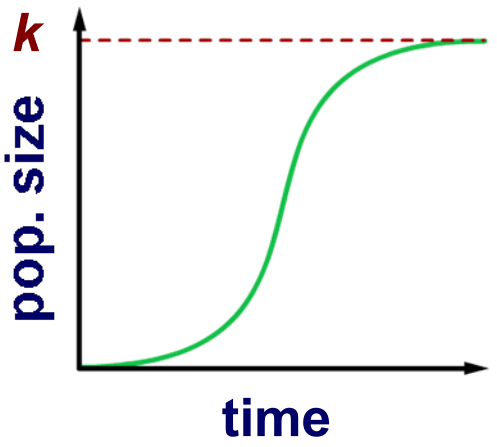
A simple population model

Describing populations over time

Density dependence

The availability of resources such as food and mates depends on population size. Similarly, disease spreads more effectively through a dense population.

Factors whose effect upon a population depends on the population's size are **density dependent**. They often cause **intraspecific competition** and are generally important for determining a population's carrying capacity (***k***).

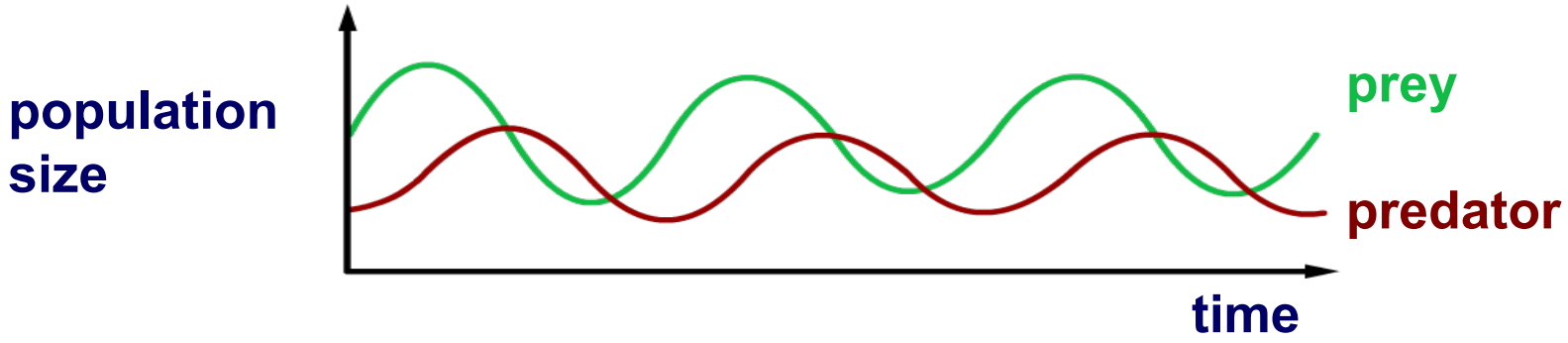


Other resources, such as temperature, rainfall and salinity, remain constant regardless of population size. These are called **density independent factors**.

Predator-prey interactions

Interspecies interactions can limit a population's size. Predator-prey interactions are an obvious example.

- The prey population size depends upon food availability.
- A high predator population can cause prey numbers to drop.
- A low prey population can suppress predator numbers.



These cycles are rare since most predators have multiple prey species. They generally feed on the most common species, preventing severe declines in predator and prey numbers.

Competing populations

Growth curves summary