

# Biodiversity

## What is Biodiversity?

Biological diversity, or simply 'biodiversity', describes the variety of life on earth. When we think of this variety, we might imagine a vast number of different species - animals, plants, fungi, bacteria - but biodiversity can in fact be described on many different levels:



### Species

Often species are considered to be the fundamental units of biodiversity, an area with many species (high species richness) is thought to be highly biodiverse. Species are regarded in this way because they are discrete units which are comparatively easy to identify and count.



### Habitat

Rather than considering species individually, looking at the number of habitats in a region is an alternative way to think about biodiversity. A variety of habitats does not necessarily reflect a high number of species but does represent a different aspect of diversity.



### Genetic

Not all members of a species are genetically identical even though they may look similar on the outside. Every individual will have its own particular complement of genes and different populations of a specific species may contain different subsets of genes.

## Definitions

### Species

"A group of either actually or potentially interbreeding organisms that can produce fertile offspring".

### Habitat

"The geographic location in which an organism lives, including both the physical and biotic environment".

## How much biodiversity is there?

It might sound like a simple task to quantify the biodiversity in the world - just count what there is - but it isn't as easy as it seems. No-one really knows how many species there are but estimates range from around 3 million to over 100 million. Currently approximately 1.8 million species have been described with around 16,000 new species identified each year. Some species groups, such as mammals, plants and butterflies, draw the interest of many researchers and are therefore extremely well studied; estimates of total numbers indicate that it is unlikely that many more species will be identified in these groups. Other organisms, such as bacteria, algae and fungi draw less interest and millions of species in these groups may yet be discovered.



## Measuring Biodiversity

The best way to find out what species exist in a region is to go there and look. There are several methods of assessing biodiversity depending on what taxonomic group you are interested in. Plants and other immobile organisms can be most easily counted using transects and quadrats; butterflies can be caught in hand-held nets, called sweep nets; camera traps, which use motion sensors to trigger digital cameras, are often used to record wary and elusive creatures such as nocturnal mammals; birds and bats can be caught in very fine nets but must be removed carefully to avoid harming them; small mammals can be caught in baited traps so that they can be studied before they are released; the list goes on and on.



## Global Distribution of Biodiversity

Living organisms are not evenly distributed across the globe - there aren't as many species found in the polar regions as there are in the tropics - but there is not an even gradient of increase from the poles to the equator. Species tend to be concentrated in specific regions, including the Amazon rainforest of Brazil, the evolutionarily isolated island of Madagascar and the species-rich Cape region of South Africa. Several of these so-called 'hotspots' of biodiversity have been identified (such as those shown below). They are defined by levels of endemism (species found nowhere else) and also by the degree of threat to the biodiversity from human pressures (such as deforestation, pollution and climate change).



## Biodiversity Under Threat

Extinctions have occurred throughout history but the rate at which they happen is not constant. Generally the rate is low and relatively constant (the 'background' rate) but this has been punctuated by five 'mass extinction' events during which huge numbers of species were wiped out (such as the one which saw the demise of the dinosaurs). The background rate has been calculated at between 2-6 species per year but, with over 17,000 species currently considered to be in danger of extinction, experts now believe that we are in the midst of the sixth great extinction crisis. Human activity is a major cause of this crisis, with habitat fragmentation and loss, pollution, invasive alien species and climate change driving many species to the brink.

