

The Dune Lifecycle

It's easy to look at a sand dune and just see a pile of sand, but lots of different factors and processes are involved in making a coastal sand dune system. In fact, sand dunes can go through a lifecycle, generally with young dunes forming at the beach and more mature dunes further from the sea, and several other stages in between

Nature's process of building a sand dune is called succession. Waves push sand up onto the beach, then sand moves around the coast and forms dunes when it's picked up or pushed around by the wind. If there are any obstacles on the coast, the larger sand grains will be dropped in front of it and pushed up it while smaller grains of sand are often deposited behind it. As this process continues, ridges of sand build up and can start to form a sand dune. The stronger the wind, the higher the dunes!

The wind-facing side of the dune often has a gentle slope, while the sheltered side is much steeper. As the wind is always changing, dunes are also always changing, growing and shifting...

Embryo dunes

Embryo dunes are the youngest sand dunes. They are the earliest stage in a dune's life. These dunes face the beach, are made up of mostly exposed sand, and are also the smallest dune stage – reaching just up to a few metres tall. Here pioneer species like couch or lime grass are the first to colonise the sand and begin to stabilise it with their long roots. These embryo dunes are often only present in the summer and can be washed away by high tides or winter storms, but will form again each year.

Fore Dune

Behind the embryo dune, the fore dune often stands a few metres taller, with marram grass stabilising it a little more than the younger dunes, and more vegetation cover compared to completely bare sand. As more plants grow in the sand, this type of dune is more resilient to storms, so it can stay in the same position for a number of years.

Semi-fixed Dune

With plant roots now reaching deep into the dune, semi-fixed dunes are pretty stable, but you can still see exposed sand on their surface which is able to move. These dunes will continue to accrete sand from the beach and, the sand on these dunes can be blown over the ridge and inland to grow the dunes behind them. These are also known as yellow dunes because of the colour of the sand.

Dune Slack

Sand dunes are separated by dips, called dune slacks. Slacks are formed in two ways – either when a new dune ridge forms in front of a low-lying area which cuts it off from the sea, or when a dune blowout forms in an area that's got lots of vegetation, exposing a dip of bare sand. Where these low areas are low enough to

meet the dune water table, freshwater pools can form. These slacks are fantastic habitats for dune wildlife such as natterjack toads, which use the pools for breeding.

Dune Blowouts

Areas of sand dunes which have exposed sand can become dune blowouts. These areas allow dune migration and dynamism, as the bare sand can be picked up by the wind and blown elsewhere in the dune system.

Fixed Dune

As you move further away from the beach, the dunes become less yellow in colour and begin to turn grey. This is because these dunes are starting to build up more humus (the broken-down organic plant matter which is found in soil) from the diverse plant life and bacteria which now lives in these stable dunes. These dunes are also better at holding in water, making them able to support larger shrubs. These are also known as grey dunes and can still have sand blowing through them from blowouts, the semi-fixed dunes or even from the beach on a really windy day!

Mature Dune

Mature dunes are the furthest away from the beach, are the oldest dunes in sand dune system and often have very little exposed sand. Lots of broken down organic plant and animal matter in the very stable sand make these inland dunes accessible to some larger plants and even trees.

Dune Heath

Dune heaths are found on the more acidic sandy areas where rain has leached out the lime from the sand. These are very rare habitats as they've often been lost to plantations or development, but a few locations still have extensive areas - including Studland in Dorset. Here you can find many species of heather, lichens and fine grasses, often with a thin layer of peaty soil.