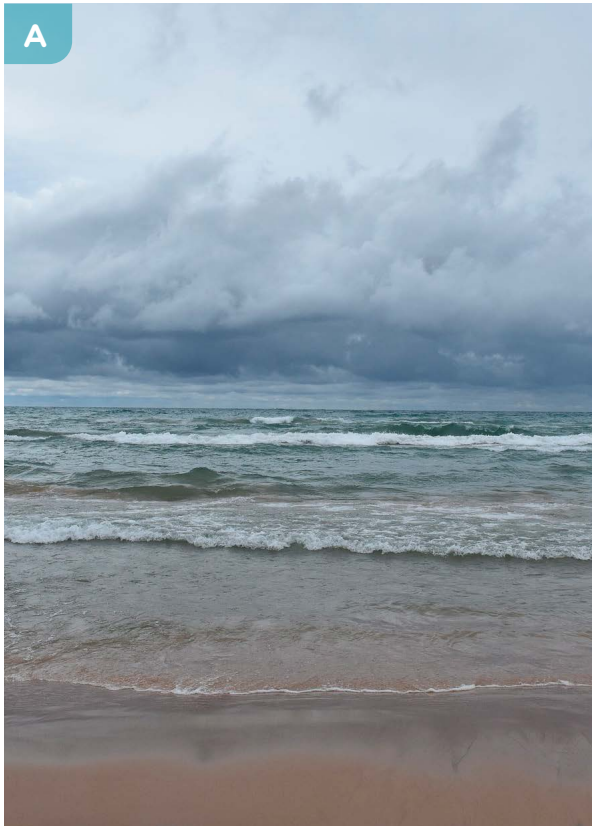
Cyfoeth Naturiol Cymru
Natural Resources Wales

Sand dune formation

Resource cards

Set A

A



A

Wind and rain break down rock into smaller grains.

A

1

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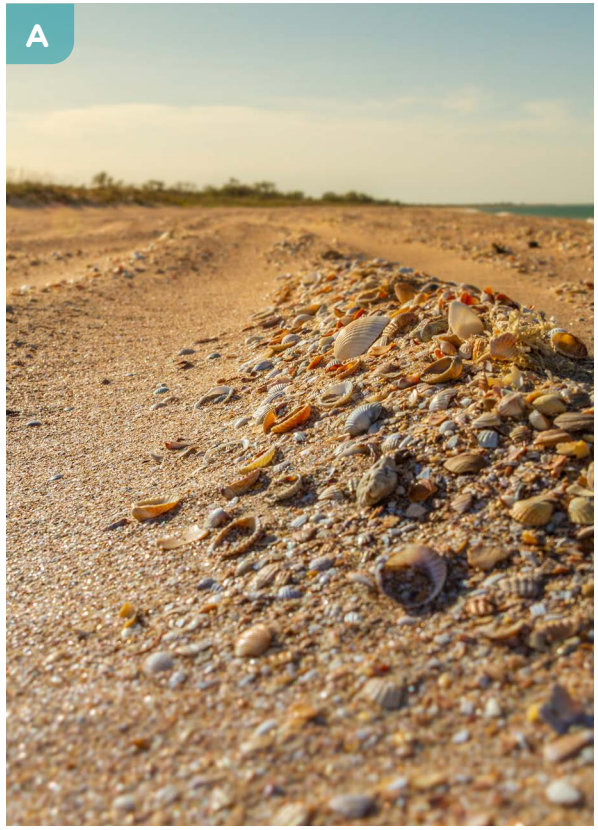

A

The grains are mixed with shells and are bashed and rolled and broken by the waves and tides, becoming smaller and smaller, until eventually they become sand and are blown onto the shore.

A

2

A

A

Embryo dunes

Small piles of bare sand begin to form, creating embryo dunes. These dunes continually form at the base of the dune system over time.

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Yellow dunes

There are areas of bare, loose sand between the hardy vegetation giving this area the name yellow dunes or foredunes.

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4

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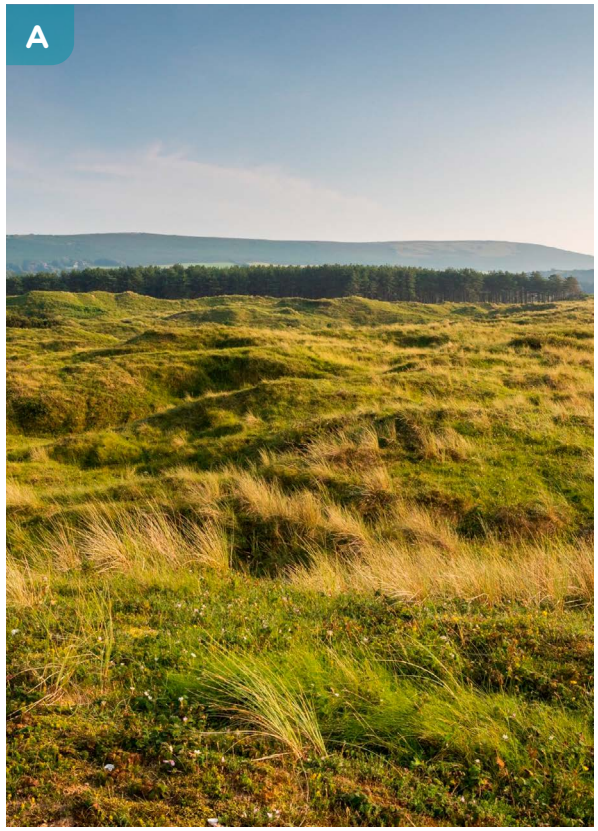


A

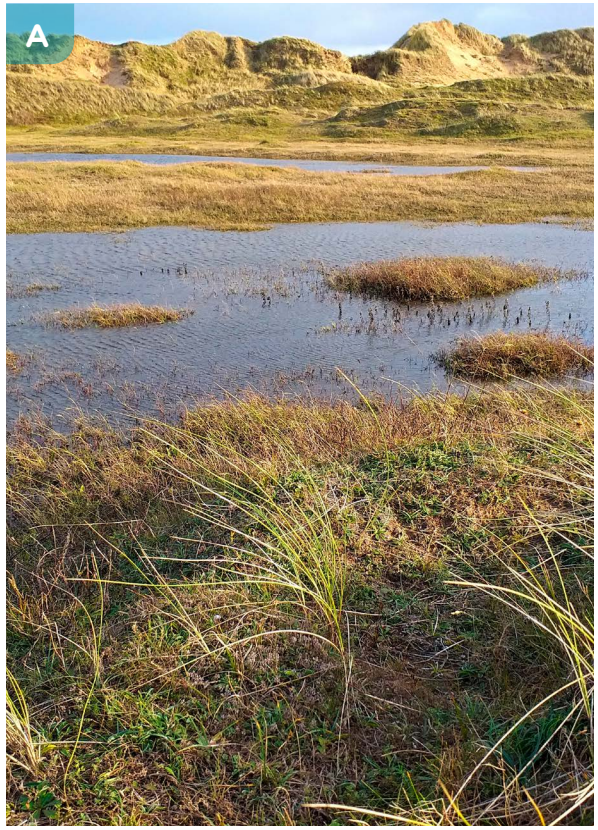
Secondary dunes

Secondary dunes or grey dunes are older and further away from the sea. There is more vegetation which stabilises the ground. There are increased nutrients from the natural decay of plants, and the developing sandy soils hold more moisture.

A

5

A



A

Dune slacks

Low-lying damp hollows between the dunes are called dune slacks. Where they reach below the water table, dune slacks have standing fresh water in winter and spring and are colonised by wetland animals and plants.

A

6

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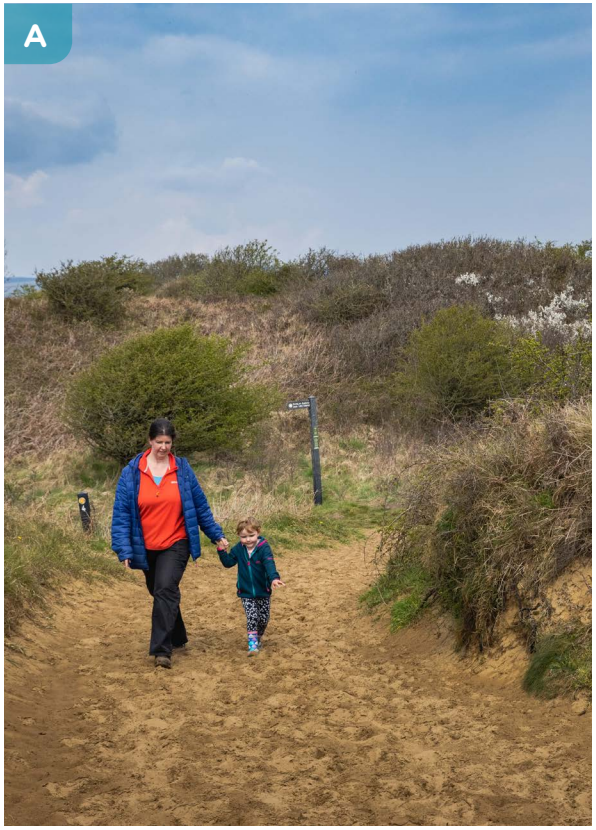


A

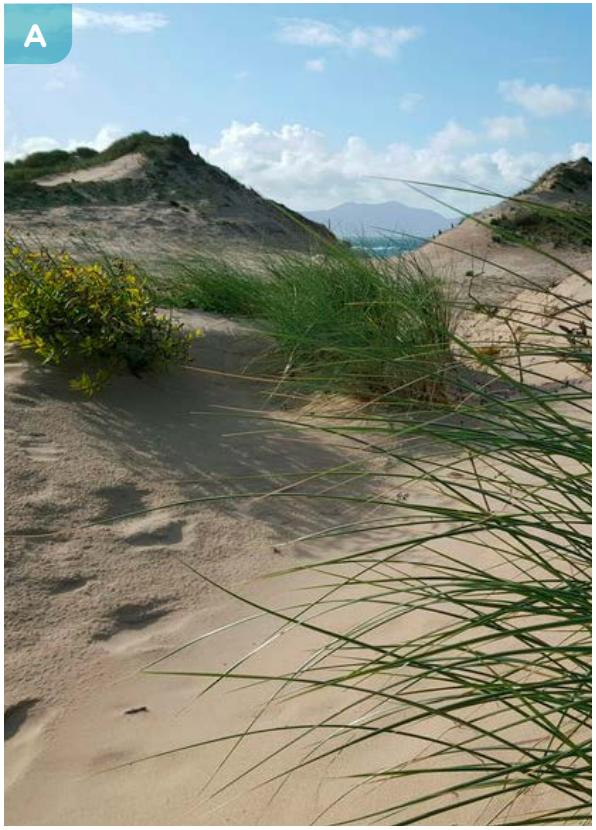
Mature dunes

Mature dune are the oldest dunes in the system. Having begun life as embryo dunes, these are now some distance inland.

A

7

A



A

Meanwhile on the foreshore, embryo dunes continue to form.

A

8

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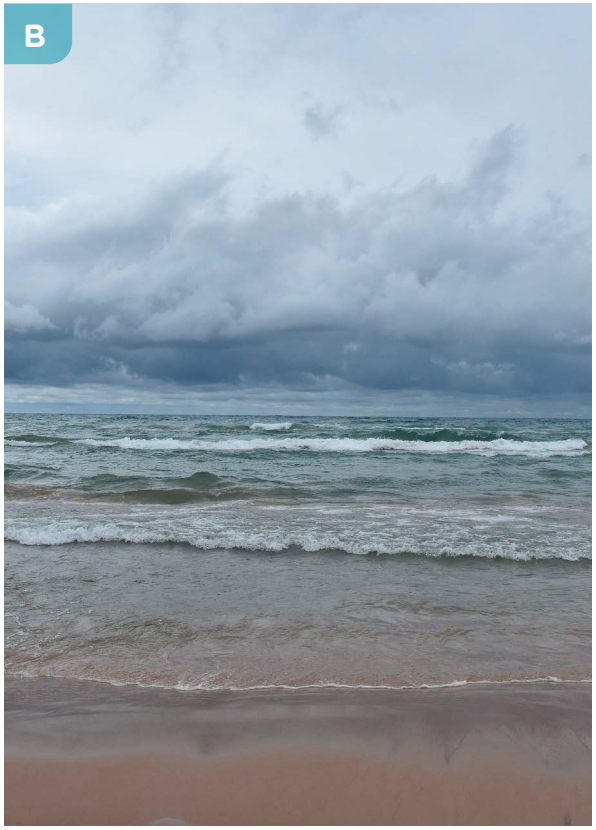
Set B

B



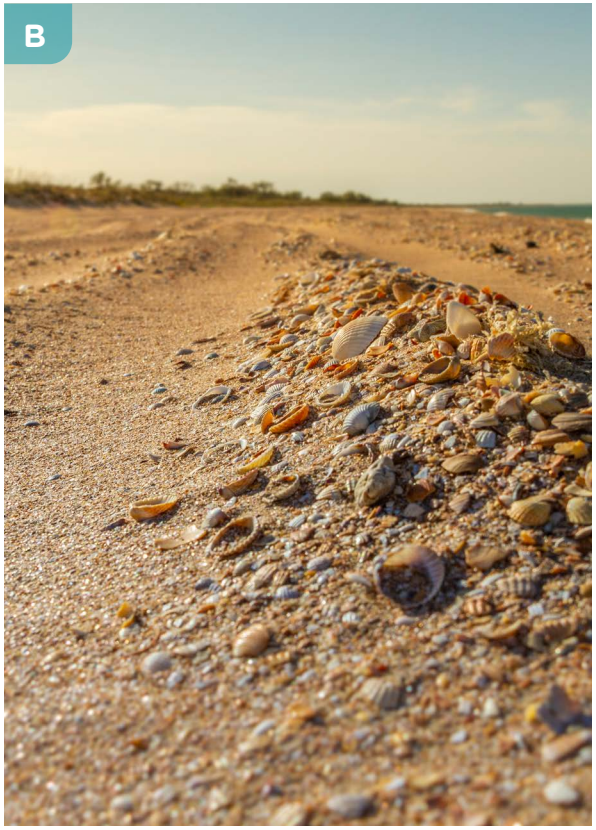
B

Weathering processes such as wind, rain and freeze/ thaw cycles break down rock into smaller grains which are washed into the sea.

B

1

B



B

The grains are mixed with shells and are bashed and rolled and broken by the waves and tides, becoming smaller and smaller, until eventually they become sand.

B

2

B

B

Winds blow across the seas creating waves. Waves and tidal currents transport the sand around the coast. Under the right conditions (typically smaller waves), sand is deposited on the beach. Beaches of bare sand with no vegetation are created.

B

3

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B

Embryo dunes

The wind blows dry sand inland through the process of aeolian transportation and obstacles on the beach trap the sand. Small piles of bare sand begin to form, creating embryo dunes.

B

4

B

B

Embryo dunes

Embryo dunes continually form at the base of the dunes as seeds from pioneer plant species are carried by the wind, germinate, and grow. This scattered vegetation traps and binds the sand blown from the beach, causing the embryo dunes to grow into higher foredune ridges.

B

5

B

B

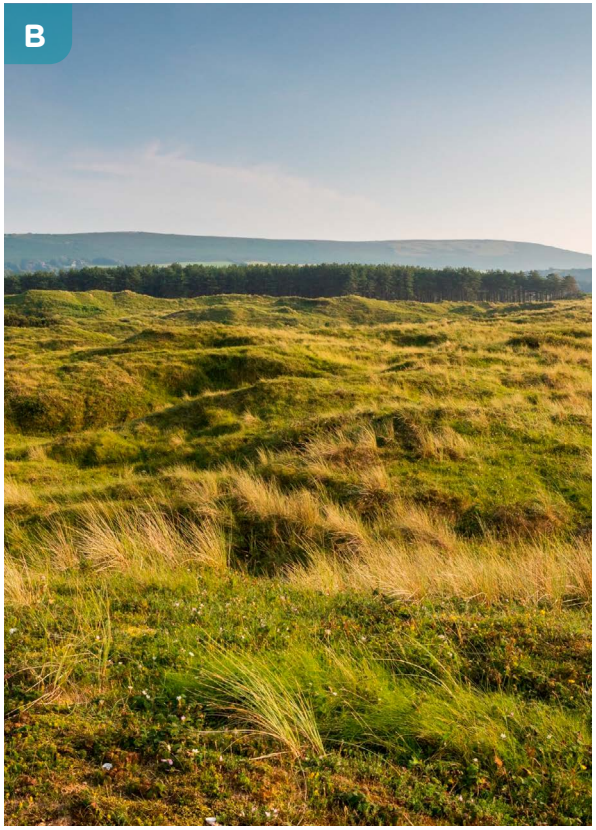
Yellow dunes

Wind is deflected over the dune ridges, and blown sand is deposited as the wind speed drops on the sheltered, leeward side. This allows the dune to grow both in terms of height and width, increasing it's chances of surviving winter storms. Marram grass grows, and its long, strong roots dig deep, stabilising the ground. There are areas of bare, loose sand between the hardy vegetation giving this area the name yellow dune or foredune.

B

6

B



B

Secondary dunes

Secondary dunes or grey dunes develop and migrate inland, and new dunes form in front. These dunes can be the largest within the dune system and often reach heights of 10 to 20 metres. There is more vegetation which stabilises the ground, and less bare sand. Increased nutrients from the natural decay of plants are present in the developing sandy soils, which also hold more moisture. Many different types of plants can be found growing, alongside burrowing mammals.

B

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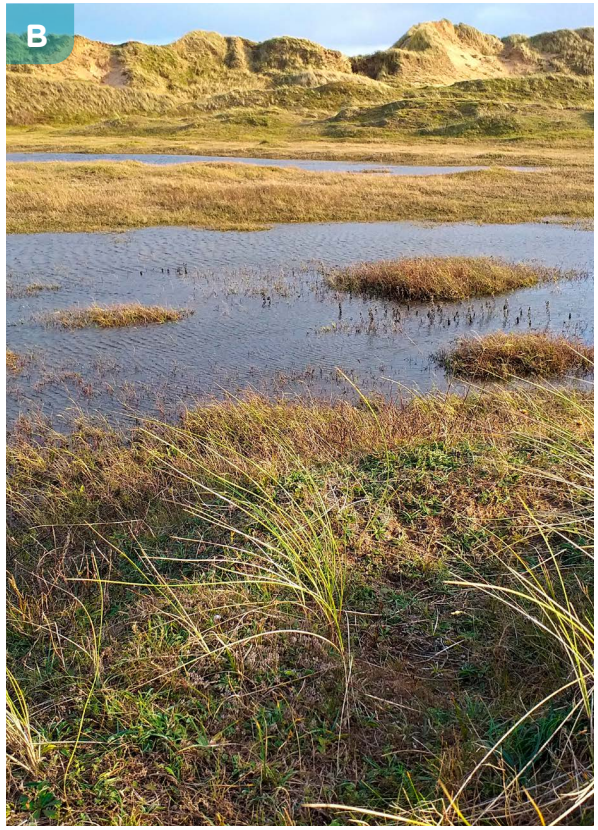

B

Dune slacks

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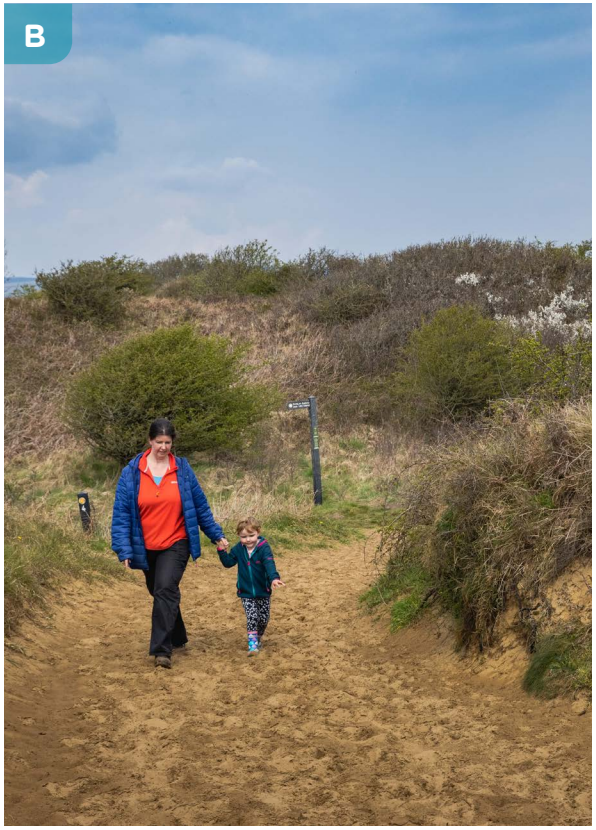

B

Mature dunes

Mature dune or hind dunes are formed as the outcome of uninterrupted succession and are the oldest dunes in the dune system. Having begun life as embryo dunes, these are now some distance inland. They are sheltered by the dunes nearer the sea, and scrub and trees can develop. The stable conditions of these fixed dunes with limited bare sand allows vegetation to reach its climax stage - woodland.

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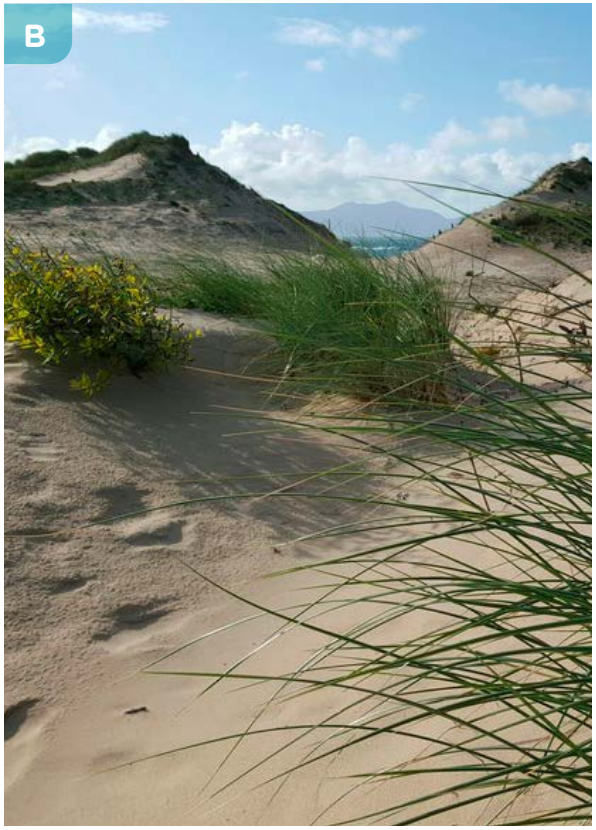
B



B

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B

10

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