Duver means.... Dunes!

Welcome to St Helens Duver!

The word 'Duver' (pronounced to rhyme with 'cover') is a local, Isle of Wight term for an area of sand dunes. During your visit to St Helens Duver, you are going to learn about…

- ✓ Sand dunes as an example of a **coastal ecosystem**; their development and their key characteristics
- ✓ The **human geography** of St Helens Duver – the human activities that are taking place here, and how they threaten the sand dune ecosystem
- ✓ The **management** of The Duver/Bembridge harbour- now and in the future.

What are sand dunes?

St Helens Duver is a type of coastal ecosystem called a sand dune. Basically, they are accumulations of sand which have been shaped into a series of ridges and has developed on a 37-acre sand and shingle spit which has developed across the estuary of the Eastern River Yar. The development of the dune has been dependent on input of sediment from the river, along with sediment brought inland by onshore currents / wind.

Dune development

Onshore winds blow dry sand inland by a process known as **saltation** (where sand particles are bounded along). If there is an obstruction towards the top of the beach (storm beach) such as a piece of driftwood or seaweed, the wind is interrupted, loses energy, and deposits some sand so that it accumulates around the obstacle.

These first dunes are called embryo dunes, and are an inhospitable environment for vegetation with high PH values (over 8, so alkaline), high salinity, dry and exposed conditions. Only hardy salt tolerant (halophytic) species will grow, and these **pioneer species** or **colonisers** have specific adaptations which allow them to grow here:

1. Marram grass is a robust plant with underground shoots (rhizomes) which spread quickly and bind the sand, trapping even more sand so the embryo dunes can grow bigger. New shoots grow from the long roots and a 'mat' of marram grass develops. The long 'tap' roots access moisture from the water table.

Embryo dunes at St Helens Duver

2. Prickly saltwort has thorny leaves which reduce transpiration and thus conserve water, and the succulent leaves of sea couch store water – both adaptations help to overcome the drought conditions.
3. At the Duver you will also find quite a lot of frosted Orache, a sturdy plant tolerant of the high salinity and which grow prostate (low-lying) to avoid damage by the wind.

With the stabilising effects of the colonising plants, low, hummocky dunes develop which gradually grow in height out of the reach of all but the highest storm tides. These **foredunes** lie just behind the embryo dunes and contain plants like sea rocket and saltwort.

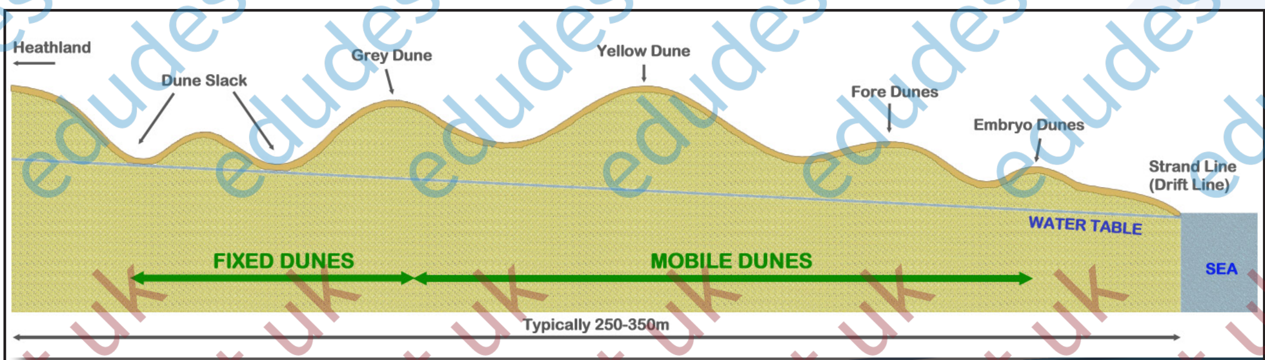
As the plants die, they decompose and add nutrients/organic matter. These established and stable dunes are called **yellow dunes** and, due to the improved conditions, the **biodiversity** increases and you may now find plants like mosses, lichens, sea spurge, and sea holly. These species gradually overtake the original, colonising species, and this change in the vegetation is known as **succession.** Up to this point in the profile, the dunes are known as **'mobile'** as they are continually being modified by the wind and/or sediment accumulation or removal.

Further inland still, you find the **grey dunes** (so called due to the increased humus in the surface layer, giving a greyer a[illegible] known as the **fixed dunes** [illegible] well established with much improved soils, you will find red fescue, sand sedge and sea spurge as well as small shrubs such as gorse and bramble. Dune slacks occur in the 'troughs' in the dune close to the water table, and there may be waterlogging during some or even all of the year. Rushes and sedges thrive in the damper conditions here (see picture).

Ash or birch trees may grow in the most **mature dunes** at the back of the sand dunes, furthest away from the sea to form the **climax community**. This is the final stage in the Psammosere (succession that develops in a sand dune)

Walking back through a sand dune is like walking back in time; the older mature dunes at the back were once the embryo dunes. As the fixed dunes mature, embryo dunes are continually forming at their base, and over time the dune advances seaward.

Transect: Conduct a transect through the dune.
Your teacher may also want you to do some fieldwork, by taking samples/making observations as you go.



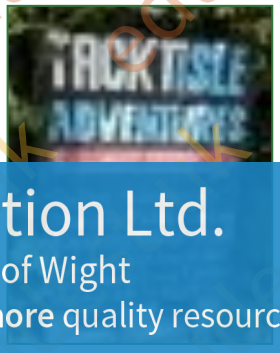
The importance of the Duver...

The dunes at St Helens Duver have stabilised due to the building of the sea wall, which has limited the development of embryo dunes to the edge of the harbour. Over time, stable acid grassland and scrub have developed and this supports a rich and diverse flora and fauna.

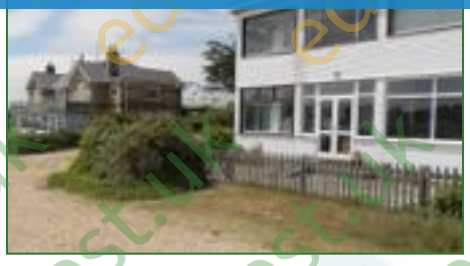
It has been identified as 'The most species-rich coastal dune acid grassland in England', with 11 nationally scarce plant species, 28 nationally scarce invertebrate species, 11 'Red Data Book' (RDB) invertebrates (e.g. the Bee wolf), and 2 RDB moth species. The Duver is an important shelter for migrating birds, such as Brent Geese, Wigeon and Redshank. In 1951 it was designated an SSSI (Site of Special Scientific Interest).

Adding the humans...

The natural beauty of this area, and its proximity to Bembridge harbour and the open sea of the Solent have made this an attractive place for people to visit. Large car parks are provided, along with a range of amenities for visitors. Some people live here, and others come to take part in a variety of recreational activities e.g. at 'Tacktisle Adventures'.



The following photos provide some clues as to what types of human activities you might expect to find...



*Work with a partner to discuss what the **positive impacts** of this human activity might be.*

The downside...

Sand dunes are fragile ecosystems and are vulnerable to human disturbance.

Trampling of the dunes is a big problem in places and, in some parts, erosion has got so bad that it has led to the development of **blow-outs**; repeated trampling soon disturbs that fragile vegetation and top layer to expose the sand below to attack by wind and rain.

The sand can be washed and / or blown away to leave a large depression, called a blow-out (pictured, left).

*Work with a partner to discuss what the **negative impacts** of human activity on the dunes could be.*

Coastal management

Study the Shoreline Management Plan & map, via the link at the base of this page and answer the following questions...

1. What is the current SMP policy for the Duver?

2. What evidence can you find of this policy as you walk around the Duver?

3. How does the SMP state that the policy will change in the next 100 years?

4. Why do you think the policy will be changing?

5. How can sand dunes provide a natural form of coastal defence?

Further research:

More information on the SMP for this area can be found at:
http://www.coastalwight.gov.uk/smp/FINAL_SMP_for_web/pdf_MainDoc/Chapter4/Chapter4_PDZ3_Dec10_Final.pdf
and
http://www.coastalwight.gov.uk/smp/DRAFT%20SMP%20FOR%20WEB/Display%20Boards/Area%20boards/SMP2_PDZ3_E.Yar.pdf