



Twyni Pen-bre | Pembrey Burrows

Background Information

Sands of LIFE is a major conservation project revitalising sand dunes across Wales. Working with landowners and site managers, the project is recreating natural movement in the dunes and rejuvenating habitats which are home to some of our rarest wildlife.

The project covers over 2,400 hectares of sand dunes on 10 sites, across four Special Areas of Conservation. It is led by Natural Resources Wales and funded by the EU LIFE programme and the Welsh Government.

Healthy dunes have plenty of bare sand which can move with the wind, forming new dune ridges and hollows. Rare and specialised communities of plants and invertebrates are constantly re-colonising the open spaces. These unique habitats are reservoirs of biodiversity and are of European importance for wildlife.

The sand dunes also help safeguard our wider environment by providing a natural solution to flood defence and coastal erosion as well as maintaining water flows and supporting vital pollinators for our crops, such as bees and butterflies. They are also great places to get exercise and enjoy the outdoors.

Location & History



Pembrey Burrows is part of a large dune system around 13km in length, on the Carmarthen Bay coastline, between the towns of Bury Port and Kidwelly in the county of Carmarthenshire, South West Wales.

Pembrey Burrows is at the southern end of the dune system, in an area which is actively growing, thus the area of the dunes is getting bigger. Since the 1940s, when the area was under water, around 130 hectares of new land has been created.

The dunes are being formed in linear ridges and furrows. At the high-tide mark you can see embryo dunes developing; behind these are the larger yellow dunes bound together by marram grass. Further inland are the older grey dunes which support flower-rich dune grassland. Look out for dune pansy, kidney vetch and seaside century, bloody cranesbill and fragrant evening primrose.

The insect life is also unique, and you can find the small blue and marbled white butterfly, alongside solitary wasps and bees such as the rare, brown-banded carder bee.

Pembrey Burrows is part of Carmarthen Bay Dunes Special Area of Conservation because of its international importance for nature, as well as being a Site of Special Scientific Interest.

The surrounding area has a fascinating history. Nearby, Nobel's Dynamite Works was established in 1881, before becoming an ammunition factory during the First and Second World Wars, employing over 2,000 staff at its peak. After the factory closed in 1965 the site was transformed into Pembrey Country Park, which remains popular with locals and tourists alike. The Park consists of just over 200 hectares of Green Flag awarded woodlands, and a Blue Flag beach which is almost 13 kms long. It is one of the top tourist attractions in South Wales.

Away from the bustle, Pembrey Burrows developed naturally as a haven for wildlife. It was designated a Local Nature Reserve and Carmarthenshire County Council continues to care for this special place.



Why do we need to manage the dunes?



Naturally, dunes have plenty of mobile, bare sand alongside a mosaic of different dune habitats. However, in Wales, over the last 80 years, nearly 90% of the open sand on our dunes has disappeared, being replaced by dense grass and scrub. The root of the vegetation has ‘fixed’ the once moving dunes and resulted in a loss of pioneer habitat crucial for rare dune wildlife.

The cause of the loss of sand is the combined impact of air pollution, invasive alien species, climate change and lower levels of grazing by livestock and rabbits. This means we need to intervene with active conservation management, to protect the quality of our dunes and the populations of rare plants and animals which depend on them.

Key management at Pembrey Burrows

- Re-profiling (changing the shape of a dune and moving sediment from place to place) dunes to create bare sand and encourage sand movement.
- Restoring ponds and wet hollows on the dunes.
- Controlling invasive alien species, especially sea buckthorn.
- Promoting grazing by livestock and rabbits.

[Some of the Sands of LIFE project’s crucial work at Pembrey Burrows - YouTube](#)

Conservation action at Pembrey Burrows carried out by the Sands of LIFE project

Notches in the foredunes

The Sands of LIFE project has created notches (or gaps) in the dune ridge by the beach. The aim is to work with natural processes to increase the amount of sand movement in the dunes and help tackle the problem of over-stabilisation.

The notches funnel the wind and sand further inland, creating fresh areas of bare sand habitat as well as increasing the amount of ‘sand rain’ received by nearby vegetation. This is when winds lift large amounts of sand and dust from bare, dry soils.

The calcium-rich sand rain helps keep the pH of the soil high (alkaline) which is beneficial for dune flora. The project has excavated three notches in areas which were already partially open due to the action of wind and walkers.



Notch location: Before



Notch location: After



The project is monitoring the amount of sand rain using a sampling system. ‘Sand rain collectors’ have been made from a bucket with a sample bag in it, covered by a garden sieve filled with marbles to stop debris entering. It is then covered in a wire mesh and in some places a box is constructed to protect it from livestock. The collectors are placed along a transect line behind the notch at 50m, 100m and 200m. There are also collectors in place along a ‘control’ transect line which is not located behind a notch, to allow the team to compare the difference in sand movement.



Sand rain collector monitoring

Sand scrapes

Sand scraping involves removing the turf and soil to expose clean sand. The bare sand is a pioneer habitat, which is quickly colonised by specialist species which depend on these open conditions to thrive. For example, dune pansy and mining bees.

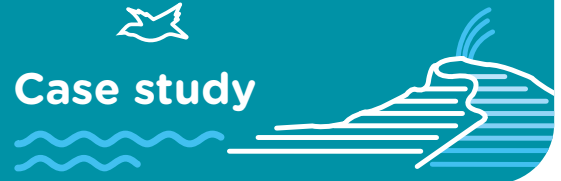
Sands of LIFE have created a mosaic of 14 scrapes totaling 1 hectare, where ecological succession is re-set to the earliest stages, and small-scale sand movement and sand rain can take place. The work increases habitat diversity across the dunes as a whole.



Sand scrapes: Before



Sand scrapes: After



Dune slack scrapes

Dune slacks are natural hollows in the dunes which are damp all year around but flood in winter. Wetland plants thrive in these ecological conditions, such as marsh orchids, marsh pennywort, common centuary and creeping willow.

Sands of LIFE restored 5 dune slacks across Pembrey Burrows by scraping away the turf and organic matter and excavating the sand towards the water table.

Some of these scrapes also serve as ponds which provide water for livestock throughout the year.



Overgrown dune slack: Before



Dune slack: After

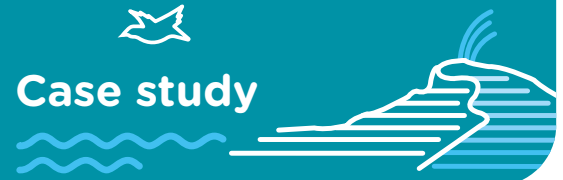
Sea buckthorn removal



Sea buckthorn

In the past, tough non-native species, such as sea buckthorn, were commonly planted on Welsh dunes to stabilise the sand but they have since become invasive, taking-over large areas. Although native on the east coast of England, sea buckthorn is not native in Wales and grows into impenetrable thorny thickets, threatening the health of the dunes. It smothers low growing plants, binds the sand and fixes nitrogen in the soil destroying the flower-rich dune grassland.

Following initial clearance by Carmarthenshire County Council, Sands of LIFE are working to remove scattered sea buckthorn across the whole of the dunes. Plants are pulled out by their roots using an excavator or sprayed with approved herbicide. Some areas have then been scraped to remove enriched soil and create a further 1 hectare of bare sand.



Sea buckthorn: Before



Sea buckthorn area: After clearance and scraping

Fencing to allow sustainable grazing

Healthy dune habitats are dependent on low-intensity grazing by cattle or ponies. Where traditional livestock grazing has been abandoned, sand dune habitats become overgrown and dominated by coarse grasses and scrub, which also increases the stabilisation of the dunes. Habitat diversity is reduced, coupled with a loss of species; typically those of pioneer and early successional sand dune stages.

Restoration of grazing creates a patchwork of tall and short vegetation, and bare ground suitable for scarce sand dune invertebrates and plants.

Sands of LIFE have installed just over 4km of sustainable chestnut stock-proof fencing, which included replacing old fencing, installing livestock handling pens and erecting a new fence to bring 12 hectares area back into grazing. Kissing gates were fitted to facilitate access by the public.



Stock-proof fencing



Kissing gate



Visiting Pembrey Burrows

Pembrey Burrows can be accessed via Pembrey Country Park. It is a short walk from the car park and a visit allows learners to see the different habitats and management works.

[Natural Resources Wales / Plan an event, activity or project on our land](#)

Other resources

- [Life in the Dunes; Discovering South Wales, by Grace Hunt - YouTube](#)
- [Natural Resources Wales / Sand dunes](#)
- [Information note - Coastal sand dunes in Wales](#)
- [Natural Resources Wales / Wales Coast Path](#)
- [Natural Resources Wales / Crucial winter sand dune work completed at Pembrey Burrows](#)
- [Natural Resources Wales / Fen Orchid rediscovered at Laugharne - Pendine Burrows](#)
- [The military history of Pembrey Dunes, South Wales, with Alice Pyper - YouTube](#)

Learning in, learning about, and learning for the natural environment.

Looking for more learning resources, information and data?

Please contact: education@naturalresourceswales.gov.uk or go to <https://naturalresources.wales/learning>

Alternative format; large print or another language, please contact: enquiries@naturalresourceswales.gov.uk
0300 065 3000