

What are Maritime Cliffs?

Maritime cliffs are formed at the junction between the land and the sea where a break in slope is formed by slippage and/or erosion by the sea. Where the underlying geology of the cliffs is predominately soft rocks, such as clays and sandstones, it is classified as a soft cliff system. Such cliffs, which are seen around the Solent, are often characterised by slips; this is an area of slumped cliff face that gradually becomes vegetated.

Soft cliffs are generally low in height and, where unprotected, there is a rapid rate of cliff retreat. This is due to the unconsolidated nature of the cliff material being constantly eroded by the sea, and as a result of the effects of ground water movement and seepage from the land. The material produced by erosion provides an important source of sediment that contributes to the maintenance of other coastal habitats and beaches. It also slows erosion further along the coast.

Undefended maritime cliffs are of international and national nature conservation importance as a result of the unique combination of environmental factors that influence the habitats and vegetation which form on them. These factors include the influence of the sea, geology, the sloping or slumped profile creating a wide range of soil bedrock, moisture, slope, aspect and slope exposure conditions and the presence or absence of grazing.

The soft cliff ecosystem depends on erosion, which is vital for constantly renewing geological exposures and recycling the botanical succession. Pioneer vegetation colonises relatively rapidly, followed by grassland communities and in more sheltered areas with lower rates of erosion and slumping scrub and woodland can develop. A second important and characteristic element of soft cliff systems is the streams, flushes and seepages draining from the adjoining land. These features enhance diversity considerably, with swamp, standing water, reedbed and areas rich in marsh orchids. The invertebrate fauna of soft-rock cliffs is often rich and important, and includes a number of species found in no other habitat in Britain.

Species Supported

The geological and maritime conditions of the Solent's cliffs give rise to a characteristic complex of habitats, with their associated plant and animal communities. Erosion of the soft cliffs produces crumbling surfaces and landslips that provide suitable conditions for invertebrates (particularly burrowing bees and wasps and the Glanville fritillary butterfly) and ephemeral maritime plants. The Isle of Wight supports the only native British population of this butterfly. Freshly eroded surfaces are colonised by pioneer cliff plants, while more stable areas support longer established grassland, herb, heath and scrub communities. Runnels and pools on the slopes of the cliffs are partly colonised by plants and a range of invertebrates (particularly beetles). Thin turfs on the cliff tops include a range of bryophytes, lichens and higher plants, characteristic of a southern maritime location. Their south facing aspect produces a particularly warm microclimate in summer, enabling a southern flora and fauna to become established, including species at the edge of their range.

The Value of Maritime Cliffs in the Solent

Eroding maritime cliffs are an important source of sediment for the coastal system. They help to protect coastal features and land down drift. If they are defenced and not allowed to erode this can cause erosion and flooding problems at sites which depend on this sediment supply.

Much of the Solent's maritime cliffs are an important geological resource and they have a high educational value. The fossils that they produce provide a fascinating insight into the plants and animals that once lived on the Solent's shores. Fossil hunting is also a popular recreational pastime.

Both the cliffs themselves and the views that they offer are an important recreational asset and help to support tourist infrastructure. This can be seen at the holiday parks located along the Barton-on-Sea cliffs in Hampshire.

Did you know?

- The Solent's maritime cliffs provide a home for burrowing bees, wasps and the Glanville fritillary butterfly.
- Maritime cliffs provide a fascinating fossil record into the plant and animal species that once lived on the Solent's shores.

Where can Maritime Cliffs be found in the Solent?

Hampshire Coast

Barton and Milford (Hordle Cliffs)
Lepe
Stanswood Bay
Netley Cliff
Solent Breezes
Hill Head
Lee-on-the-Solent
Browdown

Isle of Wight

Bouldnor and Hamstead Cliffs
Headon Warren and West High Down
Colwell Bay

There is approximately fifty kilometres of unprotected soft cliffs around the Solent and this includes seven kilometres of high maritime soft rock cliff between Barton and Milford. Other significant sites include those at Lepe, Stanswood Bay, Netley Cliff, Solent Breezes, Hill Head, Lee-on-the-Solent and Browdown. The Solent's coastal cliffs are characterised by their soft rock geology, including the underlying clays, sands, the capping gravel and topsoils, only found on the coast in a few locations in Britain. The Eocene geology seen in these cliffs was deposited between thirty-five and forty-five million years ago and they are often rich in fossils. Occasionally, previously unrecorded fossils are found in the cliffs and on the foreshore; these sites therefore become the type localities for these newly described species.

On the Isle of Wight maritime cliffs form some of the most dramatic and widely appreciated landscape features. They are home to a rich and highly adapted diversity of wildlife, and provide unique opportunities to view extensive and spectacular geological exposures and are a rich scientific and educational resource. Such cliffs found on the Solent coast include Bouldnor and Hamstead Cliffs, Headon Warren and West High Down. These rock exposures provide an opportunity to understand the prehistoric environment of the Island from about sixty to thirty million years ago, with the fossils found in the rocks including those of mammals, reptiles, plants and insects.

Conservation designations

The nationally and internationally important geological exposures of the Eocene, Barton and Solent Groups between Barton and Milford Cliffs are notified as a geological Site of Special Scientific Interest (SSSI). The low cliffs and upper foreshore between Solent Breezes and Lee-on-the-Solent are also a geological SSSI.

The Headon Warren and West High Down SSSIs are of international importance for their geology and vegetated sea cliffs. They also form part of the South Wight Maritime Special Area of Conservation (SAC) for the broad habitat type known as the Vegetated Sea Cliffs of the Atlantic and Baltic Coasts.

The Boulder and Hampstead Cliffs SSSI and Colwell Bay are nationally important for both their geology and for their vegetated sea cliff interest.

Issues, Threats and Opportunities

Erosion – this is an essential natural process that exposes new surfaces on the cliff face and recycles the botanical succession. It results in the loss of existing habitat, but provides new surfaces to colonise and sediment for other parts of the coastal system. Coastal development, coastal defences and stabilisation all have the potential to upset this delicate natural balance.

Coastal protection - coastal protection works slow or stop the natural erosion and slumping processes that maintain the nature conservation interest of the cliffs and the supply of sediment to the coastal system. They also stabilise the cliff allowing for shrub encroachment and prevent formation of the freshly eroded surfaces. These surfaces are required to maintain the open habitats which are important for rare invertebrates and colonising vegetation.

Coastal squeeze - cliff top habitats can be squeezed when erosion physically removes the fringe of cliff top vegetation between the cliff and adjacent agricultural or developed land; landward development and agricultural land use can physically limit its inland movement. Much of Hampshire's important sea cliff habitats border areas of urban development such as at Barton-on-Sea and Milford-on-Sea.

Recreational pressure - the location of holiday accommodation on cliff-tops can reduce the landscape value of the site and cause heavy localised erosion and disturbance to nesting insects.

Drainage works - drainage, especially active and deep drainage of cliff top land, results in alterations to cliff face hydrology, which can lead to either the stabilisation of soft rock cliffs or the acceleration of erosion depending on the nature and location of the drains.

Defending development - the siting of urban or industrial development and holiday accommodation too close to cliff-tops often results in political pressure to build defensive works with the onset of erosion. Built development prevents cliff-top biological communities from retreating in response to cliff erosion, subjecting them to coastal squeeze.

Agriculture change - in traditional low-intensity grazing systems, livestock were grazed on cliff grasslands where they maintained open maritime grassland vegetation. Post-war intensification of agriculture has led to maritime grassland being abandoned and, where not maintained by exposure, is frequently overgrown by scrub. Localised eutrophication can be caused by fertiliser run-off from arable land above and this encourages coarse, vigorous 'weed' species at the expense of the maritime species.