Sandrock in the High Weald Landscape

Sandrock outcrops are a distinctive feature found scattered across the High Weald. The sandstone from which sandrock is made was formed over 130 million years ago when rivers deposited beds of sand and clay across a vast plain. As more and more layers were deposited and South East England rose up into a broad dome, the earliest deposits were compacted to form sandstone. This became exposed as overlying layers of clay, sand and chalk were eroded away over a period of millions of years, leading to the formation of the High Weald.

The area's geology - sandrock, topography - steep- sided ravines and gills and abundant tree canopy, combined with a relatively high rainfall compared to the rest of the South East, creates a relatively humid climate which provides the ideal conditions for cryptogams (mosses, liverworts and ferns).

Many are unique such as the rare Tunbridge Filmy Fern, making the rocks of international importance.

Tunbridge Filmy Fern

Extent, distribution and loss

The sandstone often outcrops as cliffs or individual boulders or has been exposed by stream erosion, road cutting and mineral working. Extensive exposures of sandrock at low altitude are rare in Europe, the only comparable areas being the Petite Suisse in Luxembourg, the Fôret de Fontainbleu in France, and Elbsandstëingeberge on the Czech/German border

Sandstone outcrops, Rusthall, Tunbridge Wells

There are over 75 significant sites of natural sandrock outcrops recorded in the Weald. Since 1688 a total of 264 lower plants have been found growing on the 15 major sandrock outcrops in the Weald, including 165 mosses and liverworts and 90 lichens. In the last 50 years, surveys have failed to re-record 18 lichens and 21 mosses and liverworts.

Use and management

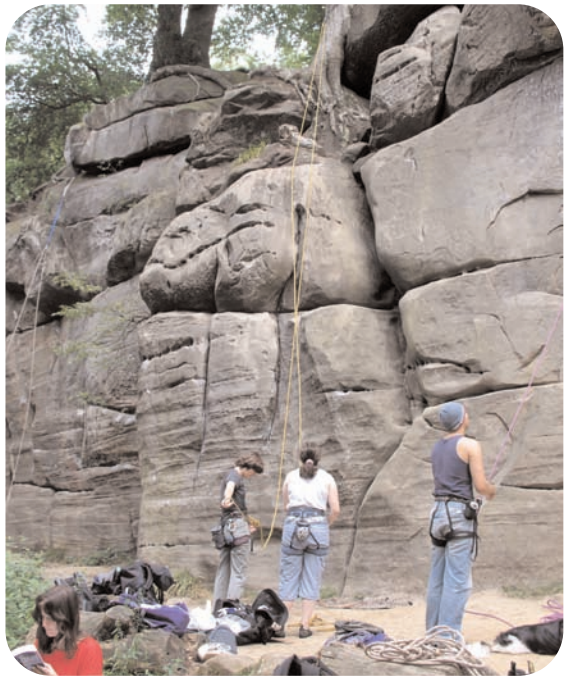
Mesolithic hunters and gatherers who once roamed the Wealden Forests were the first to appreciate the rocks, often choosing to camp underneath the sandstone cliffs.

Sandrock was later valued as building stone and well known local grand houses including Battle Abbey, Bodiam Castle, Wakehurst Place and Batemans, Kipling's house at Burwash, are built of Wealden sandstone.

Toad Rock, Rusthall, Tunbridge wells

In Victorian times the rocks were often popular visitor attractions in and around Royal Tunbridge Wells and tearooms could be found nestling in the cliffs. Many of the rocks were given names; some on the basis of their resemblance to other objects – Toad Rock, Loaf Rock, Pulpit Rock and Lion Rock –others on the basis of their proximity to nearby landmarks; Wellington Rocks was named after the nearby hotel. Bell Rock was so called because it yielded a metallic ring when struck. It was in the 1920s that the value of the rocks for climbing was discovered.

As the only climbable rock in the South East, some of the cliffs such as Harrison's and Bowles rocks have now become the most heavily used in the country.



Climbing at Harrison's Rocks

Biodiversity value and current threats

The lichen and bryophyte communities of Wealden sandrocks are unique in Britain and there is little to compare in the rest of Western Europe. A significant number of the species associated with the rock-face communities are usually only found outside the Weald in the oceanic west region of Britain, for example the moss Dicranium scottianum, the liverwort Scapania gracilis and the famous Tunbridge Filmy-fern Hymenophyllum tunbridgense, first discovered by Dr Dare at High Rocks, near Tunbridge Wells in 1686.

Many sandrock sites have deteriorated in recent years as demonstrated by the decline in frequency of key species.

Main factors attributed to this loss are:

1. Exposure after the destruction or removal of the tree canopy
2. Shading of the rock surface by vegetation such as rhododendron, holly, bramble and other scrub
3. Physical damage to the rock surface by climbers
4. Pollution (including nutrient enrichment).

Why manage sandrock?

The oceanic flora found on Wealden sandrock is unique in lowland Britain and even in Western Europe: comparable sites are hard to find. Natural England have identified the Wealden sandrocks as amongst the top 10 sites for bryophyte (mosses and liverworts) conservation in the UK.

The cryptogamic flora of the sandrocks have declined over the last 150 years largely due to a lack of sympathetic management and if the rate of loss is to be checked and species recovery programmes introduced, this has to be addressed.

Caring for and maintaining sandrock

What factors should I consider before I decide on the best management for my sandrock?

Assessing the current state of site

• Does the sandrock across the site have a good balance of mosses, liverworts, ferns and hornworts (cryptogamic vegetation)?
• What percentage of the area around the rocks is covered by bracken, scrub,
Rhododendron, birch? These types of vegetation can spread quickly and too much can cause a loss of desired species such as mosses, liverworts, ferns and lichen. If one of these plants covers a large proportion of your site, then restoration management will be needed.
• Are there any rare species on the site and has monitoring of vegetation taken place previously? Your county Biological Record Centre can provide help here (see www.highweald.org [guidance]). Management should aim to protect rare species of wildlife or plants.

Rocks can be overcome by invasive scrub

Past management

• Has the site been managed in the past? Has this been done by grazing or cutting? *It is often best to continue management that has been carried out in the past if it has allowed important species to flourish. Plants and wildlife would have adapted to this management. Farm records, historical information and aerial photographs could be used to establish information on previous management.*

Current management

• Is the site currently being managed? If so, how?
• Grazing practice - What type of grazing animal is used, how many animals and for how long? *Grazing can be a very effective way of controlling invasive scrub species.*

Boundaries to the sandrock site

• Are there crops or livestock in neighbouring fields? Could fertiliser from these fields be a concern for the site? *Sandrock sites are very low in nutrients and chemicals could increase this fertility, causing invasive plants to dominate.*
• Note the location and condition of boundaries such as fences. *Secure boundaries are needed for livestock.*
• How easy is it to access the site for livestock, people, and machinery?

Local conditions to consider

• Slope and aspect. Is the site on a slope? Is it possible for livestock to graze this area? *If vegetation growth is greater on a south facing slope, more livestock may be needed.*
• Land use of adjacent land. Is it likely that fertilisers could drift over from neighbouring fields or pollute any streams which are important to the floral communities?
• Size of site. This will influence the cost of management, whether by grazing or alternative physical means.

Monitoring

• Consider how you are going to monitor whether your management is working. Establish a monitoring programme by identifying species associated with the sandrock and their location. Experts such as Natural England will be able to help (see www.highweald.org [guidance]).
• Once new management regimes are in place, compare vegetation type, cover and extent with original records prior to management, if any.
• Determine the best method for recording data and surveying on a repeatable basis so that data is comparable, year on year. *This could be done by monitoring fixed plots on the sandrock, for example hanging a quadrat from a pin inserted in the rock face and listing the species in each quadrat.*
• Fixed point photography or mapping can be effective monitoring techniques.

Lichens and ferns cling to the sandstone rock face

Restoration management

How do I know if an area needs restoring?

Invasive scrub plant species such as bramble, birch, bracken and rhododendron can cause too much shade for lower plants, rapidly leading to their loss. However given the right conditions, some of the species that have apparently disappeared could return from an existing seedbank or re-colonise.

The dispersal mechanisms for cryptogam species are very effective and many species on the Weald sandrocks are suitable candidates for species recovery programmes.

Management practices

These are for general guidance only and requirements will vary from site to site.

Canopy structure

The best tree canopy structure is comprised of mature broadleaved species such as oak, beech, hornbeam and birch, so that rocks are not subject to extended exposure to summer sunlight and prone to drying out.
Ideally summer humidity levels should be maintained without reducing light levels that inhibit growth and development. Adequate shading should be provided for south and west facing surfaces.

Scrub encroachment

The rock surface should be free from encroaching scrub, particularly holly and rhododendron.
Care should be taken not to damage the rock surface or any bryophyte communities in the process of removing scrub.

It is important that the cut trees and scrub are not left on the ground as this will eventually break down adding unwanted nutrients to the soil.

Holly can encroach onto rock surfaces

Scrub management should be carried out in the winter months so disturbance to wildlife is kept to a minimum.

Yew is a natural species often associated with sandrock outcrops in the Weald and as cryptogamic communities on rocks underneath yew are generally poor, there may be a case for retaining it unless it is encroaching on rare species.

Bracken

Bracken can grow very invasively casting shade on the ground below, resulting in little growth underneath it. It can also grow very quickly as it spreads through rhizomes (underground root network) making eradication more difficult. On smaller sites where bracken has become a problem, mechanical cutting is often the most productive method for restoration.

Cutting does not kill bracken but depletes its vigour and energy over time. Cutting when bracken is at maximum growth rate, July to August, will increase the intensity and rate of depletion. It is crucial that the area to be cut is checked for nesting birds prior to work being undertaken. This process should be repeated with two cuts the following year which should have a significant effect on its growth. Collecting and removing cut bracken from the ground is advisable as this will increase the susceptibility of any new shoots to frost.

Bracken mowing eventually weakens the plant

Bracken is unpalatable to livestock so cannot be managed by grazing. If you have an extensive area of bracken that is well established, treatment with a herbicide may be the most effective option. Please seek professional advice before undertaking this as a restoration option.

It is essential that bracken continues to be managed on an annual basis. If management is abandoned, it can re-establish within five to seven years. Following the same management adopted for restoration is advisable for maintenance management.

Rhododendron

Rhododendron is an invasive non-native evergreen shrub that grows vigorously in woodlands and should be eradicated on all areas of sandrock as it reduces native vegetation. This causes problems for wildlife and the appearance of a landscape can be dramatically changed. No vegetation can grow underneath it because of the density of shade that it creates and the vast amounts of water that it consumes.

Rhododendron can rapidly shade out native vegetation

Rhododendron can be difficult to eradicate, as it is able to regenerate from root fragments and produces large numbers of seeds. It is not possible to graze as it is poisonous to livestock. To eradicate rhododendron, begin by cutting the bushes to ground level either mechanically or by hand (choice will depend on scale of the problem and available resources). The arisings should be removed from the ground and stumps then treated with an approved herbicide.

Any new plants should be removed immediately either by hand or machine. Monitoring a site cleared of rhododendron is advisable due to the potential of the seedbank that could have built up to generate new growth.

Isolated boulders

Many rare species are found on boulders rather than rock escarpments and should not be neglected. The boulders require the same conditions of humidity, shading and clearance from encroaching scrub.

Isolated boulders can support rare species (Tunbridge Filmy fern)

Top of the escarpment

The tops of rock faces can develop a rich lichen-moss carpet under the right conditions on the thin soils overlying the rock. This community requires higher levels of light than the rock face and so should be cleared of invading scrub appropriately.

Are grants available to help with sandrock management?

Environmental Stewardship (ES)

Environmental Stewardship run by Natural England (see www.highweald.org [guidance]) may offer restoration and management payments depending on the type of conservation and landscape work required on a site.

Natural England

In certain cases, funding may be available from Natural England for management work on SSSIs (see www.highweald.org [guidance]).