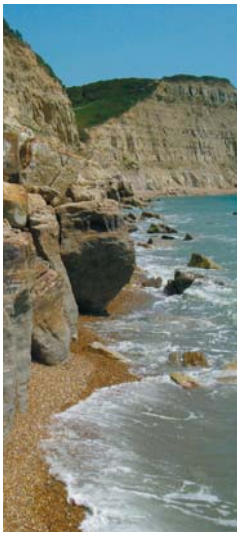
# The High Weald Sandstone Project

*Furthering understanding of one of England's Finest Landscapes*





**Produced by Ruth Childs, High Weald AONB Unit**

**November 2012**

The High Weald AONB Joint Advisory Committee provides guidance to local authorities and other bodies on implementing the statutory AONB Management Plan and on how local and government policy objectives can be accommodated without damaging the outstanding character of this nationally important landscape.

# The High Weald Joint Advisory Committee's Research Programme

*Furthering understanding of one of England's Finest Landscapes*

The High Weald Joint Advisory Committee's management aims and priorities for the AONB are firmly based on an understanding of the fundamental and defining character of the whole area – that is, those components of natural beauty that have made the High Weald a recognizably distinct and homogenous area for at least the last 700 years and that will continue to define it in the future. It develops its understanding through undertaking work itself, through its specialist team, the AONB Unit, or by commissioning independent reports from others.

The primary purpose of its research programme is to better understand the components of natural beauty. The key components are:

- Geology, landform, water systems and climate: deeply incised, ridged and faulted landform of clays and sandstone. The ridges tend east-west and from them spring numerous gill streams that form the headwaters of rivers. Wide river valleys dominate the eastern part of the AONB. The landform and water systems are subject to and influence, a local variant f the British sub-oceanic climate.
- Settlement: dispersed historic settlements of farmsteads, hamlets and late medieval villages founded on trade and non-agricultural rural industries.
- Routeways: ancient routeways (now roads and Rights of Way) in the form of ridge-top roads and a dense system of radiating droveways. The droveways are often narrow, deeply sunken and edged with trees, hedges, wildflower-rich verges and boundary banks.
- Woodland: a great extent of ancient woods, gills and shaws in small holdings, the value of which is inextricably linked to long-term management.
- Field and heath: small, irregularly shaped and productive fields, often bounded by (and forming a mosaic with) hedgerows and small woodlands and typically used for livestock grazing. Small holdings and a non-dominant agriculture. Distinctive zones of heaths and inner river valleys.

By researching the key components – their history, development, distribution, special qualities, deterioration, damage and loss – we can develop an evidence base for the AONB Management Plan and other AONB policy and guidance.

The JAC's secondary purpose is to better understand how the High Weald landscape can contribute to society – food, energy, water provision, flood protection, recreation, biodiversity and fisheries – without damage to its natural beauty.

## Further Information

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HIGH WEALD JOINT ADVISORY COMMITTEE

NATURAL ENGLAND

# The High Weald Sandstone Project

*Background and technical project report supporting the High Weald Sandstone Project.*

## Preamble

By investigating a geologically complicated landscape, this project and background report seek to study some of the High Weald's iconic rock formations - its sandstone outcrops. Through interdisciplinary surveys and background research, the AONB Unit has commissioned research at 6 pilot sites. The overarching project aim is to demonstrate the benefits that a holistic approach to understanding geological features can bring.

This report offers background to the geological evolution of the High Weald, its sandstone outcrops and their associated features. Presenting discussion and commentary about the survey results it also offers some opportunities and ideas for further work.

The project involves a number of partners; wildlife trusts, local geology groups and biological records centres from right across the High Weald – all with a joint interest in the exposed sandstone of the High Weald. The final project workshop engaged with local interest groups representing history, geology, climbing and ecological interests. All the perspectives of sandstone were presented using the High Weald sandstone story. The workshop was very well attended and opportunities for more engagement, both amongst amateur and professionals about sandstone and its management have been identified.

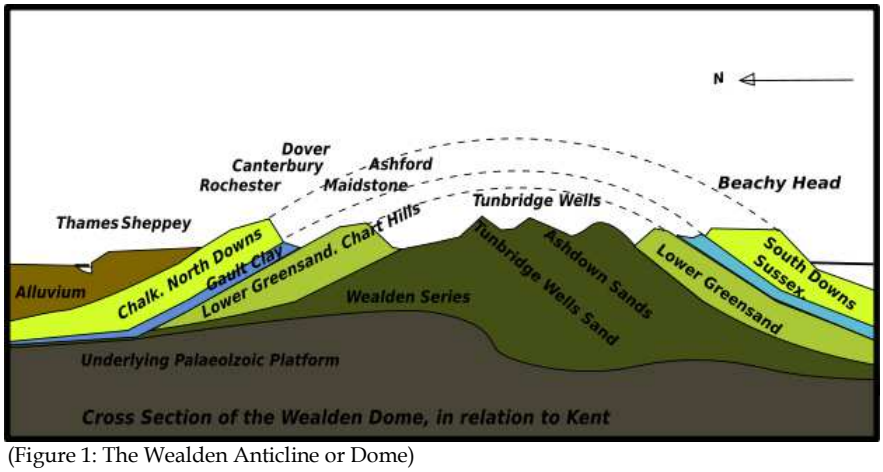
Above all the project demonstrates that building an understanding of such a distinctive feature so typical of this area, can be used positively as a tool for partnership working between disciplines and as a means of engagement with a whole host of interested groups, not just those in the environment sector.

## Why Geodiversity?

The High Weald is one of Europe's most important sandstone landscapes and one of only three in England. The underlying bedrock is primarily interbedded sand and siltstones with mudstones in between. Focused in the areas of sandstone bedrock are the High Weald's six hundred or so, characteristic inland sandstone outcrops and cliff exposures.

The geological history of the High Weald can be summarised in three main phases:

1) **Pre-Mesozoic** < 250ma (million years ago) – the creation of the Wealden Basin and culminating in a huge platform of folded rocks.
2) **Mesozoic** 65-250ma – sinking of the Wealden Basin led to sedimentation – sediments deposited by a huge system of shallow deltas, creating thick deposits.
3) **Tertiary** 65-1.8ma - uplift and folding; the creation of the 'Wealden Dome'.



(Figure 1: The Wealden Anticline or Dome)

During the Pliocene (5.3-2.6ma) and early Pleistocene, in a climate interrupted by repeated advances and retreats of glaciers and ice sheets the Weald was surrounded by sea and the uplifted rocks (especially

Wealden Clays) were eroded. In the centre of the Dome, the harder rocks of the Hastings beds were exposed. Evidence of these alternating cold and warm phases can still be seen in the landscape.

The diverse geology or 'geodiversity' dictates the way the landscape is shaped, what can grow here and where and how people settle and live – ultimately it has shaped the natural beauty of the AONB. The conservation and enhancement of natural beauty is the purpose of the AONB designation, so understanding the geology is fundamental to this purpose. Not only shaping our physical landscape - geology also influences for example; our routeways (what they look like, and where they go), buildings, habitats and farming practices, shaping the character of the whole landscape.

Geodiversity today plays a key role in environmental regulation including: absorbing pollution, buffering climate change, filtering, purifying and storing water. By understanding past climate changes, and the impacts they had on the environment, it is possible to better understand and plan for future climate change.[1]

A typical Wealden cottage

Both now and in the past geodiversity provides essential natural resources that society and economic growth depend upon including: soils, aggregates, and metals. Past use by people can still be seen in our built environment; churches, castles and vernacular buildings, and in the historic character of the landscape.

This cultural influence is extremely strong, understanding the integrated value of our geology, in economic, social, biodiversity, resource and heritage terms, is vital to inform the future use and enjoyment of the High Weald.

## The Many Faces of the High Weald's Sandstone

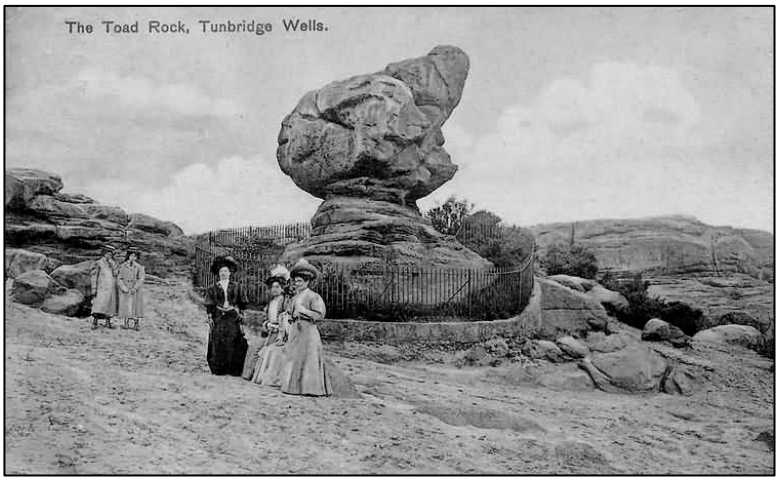
### A Habitat

Sandstone outcrops are highly variable features; vertical walls, ledges, crevices, caves, cracks and gullies – all offering different exposure to light, substrates and moisture – creating a variety of microhabitats. Research has shown sandstone outcrops to exhibit greater species richness compared to other exposed rocks, such as abandoned quarries[2]. These niche habitats are often inhabited by specialist species. The climates created around outcrops allow species which are normally found in the damp western parts of the UK to thrive in the relative dry of the south east. As such, the High Weald is an island stronghold in the south east of the country for many of these species, such as Dumortier's Liverwort, a species normally found along the Atlantic coast of Ireland and south west England.

[1] http://www.naturalengland.org.uk/ourwork/conservation/geodiversity

[2] H. Thiel, & T. Spribille (2007). Lichens and bryophytes on shaded sandstone outcrops used for rock climbing in the vicinity of Gottingen (Southern Lower Saxony, Germany).

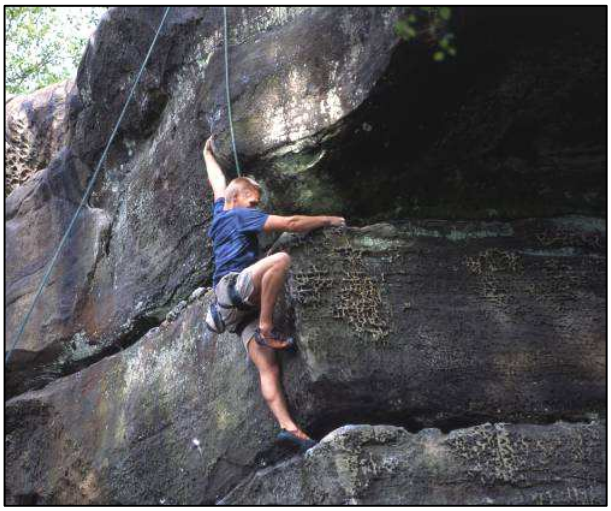
## Cultural Heritage




Much evidence for prehistoric occupation in the High Weald has been found close to rock shelters, within the sandstone outcrops. In the past the vantage points created by the high rock cliffs and the shelter they invariably provided would have made them suitable bases for hunting. More recently the rocks became an obsession for the Victorians and were often represented on postcards and in paintings - they were regularly visited. Outcrops such as Toad Rocks (image[3]) in Rusthall were given names, and rock outcrops were often made a feature of, being incorporated into elaborate garden designs and landscaping.

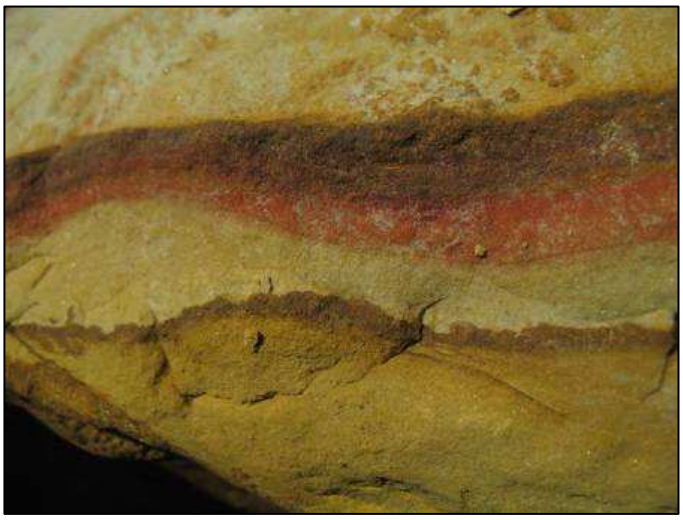
## A Recreational Resource

The High Weald's rocks are loved amongst walkers, climbers and boulderers, who together form an important group of visitors to the AONB. Online articles, clear guidance and a guidebook dedicated to southern sandstone, demonstrate the recreational value of these sites and their importance to climbers. Sandstone is one of the harder rocks to climb due to it being difficult to grip, but it's relatively small stature makes it popular with beginners; the combination of outcrops in the High Weald offer a variety of difficulty levels. Many of the larger outcrops run alongside the popular High Weald Landscape Trail[4].



## A Geological Feature

The sandrock exposures in the Weald are of national significance, noted particularly for their periglacial weathering features such as polygonal cracking and honeycomb weathering. Examples of these features are only found in a few other places in the country. The Ardingly sandstone in the AONB was laid down during the Cretaceous, between 150 and 80 million years ago. Due to its chemical composition the porous sandstone forms a protective crust on its surface, once damaged weathering of the rock speeds up.



[3] http://theweald.org/m13.asp?PicIdto=9900407

[4] http://www.kent.gov.uk/leisure_and_culture/countryside_and_coast/walking/high_weald_landscape_trail.aspx

## A Material

The High Weald has a long history of exploitation – the whole landscape is dotted with quarries and excavations of iron ore, sands, gravels and sandstone. Many of the High Weald's grandest buildings; castles, churches and ironmasters manors were built using local sandstone. The softer clays and mudstones were used to in brickworks and fired to make clay tiles and drainage pipes. Much of the iron ore was made into elaborate wrought iron work and used on famous buildings in London and making guns for the British Navy – many iron products were exported.

# The Sandstone Project

Designed as a pilot project and made possible with a grant from Natural England, the High Weald AONB Unit has been working in partnership to learn more about sandstone outcrops. Through truly integrating diverse knowledge about a site and using this information to inform its management, the AONB Unit hope to provide advice upon the integrated management of sandstone sites. Additionally to raise awareness of sandstone outcrops and share knowledge within and *between* specialist interest groups.

The AONB Unit strives to understand the whole landscape, and the people that use it. This project is a good example of how landscape-scale[5] delivery of projects can happen. A means of integrating understanding to produce and different and better outcome.

Through building knowledge of these four disciplines (lower plants, heritage, geology, and recreation); the Sandstone Project set out to try to answer the following question:

*Is it possible to combine this knowledge to help us manage sandstone sites for multiple objectives?*

## Justification

The High Weald is renowned for a specific geological feature; its sandstone outcrops. This project supports the need for the AONB Unit to improve our own understanding of these features and to develop an up to date evidence base to sustain the integrated objective G2 in the High Weald AONB Management Plan:

G2 - To protect the sandstone outcrops of the AONB.
Rationale: *to maintain the nationally important geological exposures; to conserve the fern, moss and liverwort communities they support; and to protect their value as some of the most significant sites of prehistoric archaeology in the AONB.*

One target with G2 is to produce management plans that accommodate sensitive use for climbing – this is a vital issue for us to consider, as supporting the development of sustainable tourism in the AONB is very important.

## Aims

The aims of the Sandstone Project are:

- To develop a body of evidence to support the AONB Unit to build integrated management advice for sandstone sites.
- To provide an opportunity for stakeholders to discuss openly the possibility of managing sites in an integrated way.
- To generate improved and in some cases updated lower plant records for sandstone sites.
- To generate more historic records from sandstone sites to go onto the Historic Environment Record (HER).
- To use the surveys to engage with and support the High Weald's Local Geological Groups.
- To raise awareness of the importance of *all* the features associated with sandrock.
- To stimulate interest and understanding of one of the High Weald's characteristic features.
- To improve the knowledge of professionals (ecologists/consultants/rangers) of the special features of sandstone, and their context within the High Weald landscape.

[5] Delivering multiple benefits and/or understanding through the integration of disciplines across the landscape

# Project Method

In a bid to make this small project as widely beneficial as possible, we chose to carry out some new surveys of sandstone sites. This approach enabled us to really view the sites through the eyes of each surveyor. It also allowed:

- for a comparison of species change over time;
- to generate new information for lesser known sites;
- to compare climbed and non-climbed sites;
- carry out RIGS condition assessments and
- to allow us to share new biological and heritage observations with the appropriate records centres - this goes on to inform a variety of research and decision-making.

This process raised awareness amongst the surveyors as well – giving them the opportunity to experience sites right across the High Weald.

## Surveys…..

Using a small set of six sample sites that displayed a range of attributes, the AONB unit commissioned a series of specialist surveys. These surveys were to provide the evidence and foundation for future recommendations. The work undertaken included a site visit and where necessary background research for each site's geology, history and bryophyte interest. In addition, the specialists were asked to provide brief management recommendations for each site.

## Integrated Advice….

The survey results and subsequent recommendations were then grouped together and analysed to look for areas of conflict and consensus between the different discipline's management suggestions. This analysis is designed to begin to identify a way forward for offering integrated advice. The results of this process are presented to site owners as site summaries.

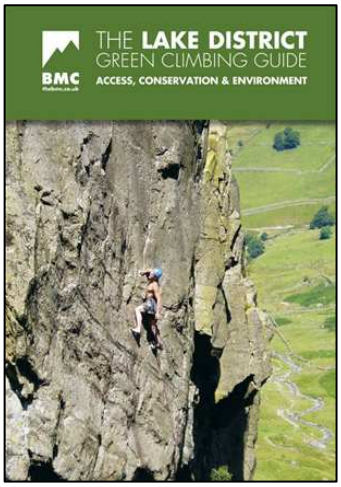
## Communication….

We wanted to begin to communicate the project ideas early on and obtain valuable input from stakeholders. So we hosted a half-day site visit to encourage people to share their own knowledge and ideas about what makes sandstone so special and discuss some of the difficulties around management. The day, attended by all the surveyors, aimed to provide people with a better understanding of all the features of sandstone and their value from different perspectives.

# Literature Review

A short review of existing integrated guidance which considers multiple criteria for managing geological sites.

## Guidance




There is very little published, *integrated* management guidance for geological exposures of any rock type. However there are some useful documents, illustrating how a collaborative approach is beginning to be taken through offering advice for specific features. One example is a partnership between Natural England and English Heritage looking at the conservation of historic cemeteries[6] – combining advice for both their heritage and biodiversity value.

The BMC produce a series of Green Climbing Guides[7] for various popular climbing destinations around the country. These guides successfully combine conservation and access advice for walkers and climbers and culminate in straightforward, best practice guidance. The guides present conservation information significantly from a 'users' perspective: in this instance climbers and walkers. Allowing for the

[6] http://www.helm.org.uk/upload/pdf/Paradise-Preserved.pdf?1341377760
[7] http://www.thebmc.co.uk/bmc-green-guides

climber perspective is a demonstration of how to integrate the needs of the user with the limitations of the environment.

The High Weald Land Manager's Pack offers a series of short guidance notes on managing some of the AONBs most characteristic features. Sandstone outcrops are one of these features and the guidance highlights their value as a heritage, geological and biological asset. The management options however, are typically focussed upon management for lower plant species. Perhaps this highlights a need for more information to be made available on this subject.

Some very good geodiversity action plans exist – outlining management options and requirements. Limited heritage guidance exists for sandstone sites – English Heritage has recently produced a report considering rock shelters for other rock types[8], however this is restricted to shelters in north east England.

The RIGS condition assessment process allows for historical and biodiversity to be considered. This could provide an opportunity to begin to incorporate understanding of all aspects of the sandstone in the Weald. Natural England has produced geological conservation guidance. This recognises the value of landscapes, and integrated environmental management, with some good examples, but lacks the detail.

## Research

There is limited academic literature considering sandstone outcrops in an integrated way. However, a research paper describes a series of bryophyte and lichen monitoring surveys undertaken in Germany as a result of the increased popularity of sandstone climbing in Lower Saxony. It identifies the particular issue of the dry faces of sandstone which are preferred by climbers but which are also home to crustose lichens. The research offers a useful comparison of exposures and disused quarries as supporting bryophytes.

A historic paper demonstrates that sandstone heritage is not only relevant to the High Weald. Sandstone rock houses of the eastern United States[9] are considered in a paper from with particular reference to the ecology and evolution of the endemic plant taxa.

A selection of Wealden sandstone outcrops were last surveyed for their bryophytes in 1996 in a project commissioned by English Nature (now Natural England)[10]. With a view to being able to improve knowledge of sandstone and offer evidence-based advice on it's management. The survey considered climbing, but only with respect to management of these sites. Other attributes of the rocks, their heritage or geological features were not considered.

Studies linking underlying geology to Mesolithic finds have been undertaken; concluding the favourability of sandy soils for Mesolithic hunting and settlement sites[11].

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[8] English Heritage (2011) *Caves, Fissures and Rock Shelters.* Introduction to Heritage Assets.

[9] Baskin, C., Baskin, J., & Walck J. (1996) Sandstone Rock Houses of the Eastern United States. The Botanical Review 62 (4).

[10] Davey, S. (1995). Wealden Sandrock Survey. English Nature Contract Report (18/16/E/94-5)

[11] Notes on the South East Research Framework public seminar on the Upper Palaeolithic and Mesolithic periods (13/10/07) http://www.kent.gov.uk/leisure_and_culture/heritage/south_east_research_framework/serf_seminar_notes_docs.aspx

# Site Selection Criteria

As the project is looking to see if sites could be managed for multiple objectives choosing a variety of sites which display as many different attributes as possible was important.

The table below outlines some of the key criteria used when selecting sites for survey. But in addition, we wanted some sites to show extremes; i.e. be heavily climbed, be not climbed at all in order to see if these had an impact on other features or indeed if they were co-existing.

*Table 1.*

| | Hastings CP | Isle-of-Oxney | Chiddingstone | Nr. West Hoathly | Harrison's Rocks | Stone Hill Rocks |
|---|---|---|---|---|---|---|
| | | | | | | |
| LGS | ■ | ■ | | ■ | ■ | ■ |
| SSSI – geological | ■ | | | ■ | | ■ |
| SSSI – biological | ■ | | | ■ | | |
| Heritage* | | | | ■ | | |
| None | | | ■ | | | |
| SAC | ■ | | | | | |
| | | | | | | |
| Recreation | ■ | | | | | |
| Climbing | | | | | ■ | ■ |
| None | | | ■ | ■ | | |
| Farmland | | ■ | | | | |
| | | | | | | |
| Public or private with public access | ■ | | | | ■ | ■ |
| Private | | ■ | | ■ | | |
| Other (none) | | | ■ | | | |
| Links with other AONB features | ■ | | ■ | | | |
| Included in the 1995 Wealden Sandrock Survey | ■ | | | ■ | ■ | ■ |

* Refers to presence of heritage records on the HER or a SAMS.

In addition to the criteria above, below is a list of additional factors we considered:

- Sites with existing Management Plans
- Sites covered by Lidar (Light Detection and Ranging)[12]
- Exposures in holloways/routeways
- Sites in different ownership
- Sites which have received no management
- Gill woodland site
- Types of exposure: Sandrock outcrops are referenced in the management plan but these can include all sorts of exposures.

We also ensured the sites had a wide geographical spread, representing areas right across the AONB, from Kent to West Sussex, to include the full range of sandstone sites and their historic and cultural use.

[12] English Heritage Report (EH51577) The Light Fantastic http://www.english-heritage.org.uk/publications/light-fantastic/

# Survey Method

## Geology:

The survey followed the standard condition assessment approach used by local geological groups. Where the site was not a Local Geological Site (LGS) a simple initial assessment was undertaken, whereby the basic contents of the form were completed. Many of the sites chosen were already designated LGS, so these were simply updated. All of the Sussex LGS sites had recently undergone a condition assessment, so where these sites coincided with this survey they weren't re-surveyed.

## Bryophytes:

Site surveys were carried out by two surveyors. Each site was surveyed once during late January and February 2012. The surveyors were asked to focus initially upon any sandstone exposures, seeking species supported directly by the rock itself, before looking at the wider species assemblage deemed to be part of the 'sandstone ecosystem'. Those species difficult to identify, were sent to a third person for verification.

## Heritage:

The heritage assessments combined desktop and on site surveys to develop an approach for the rapid survey of sandstone sites. The method collated historic documents and maps to inform conclusions and was based upon the levels and standards in an English Heritage Level 1 survey[13].

# Survey Results Summary

*For specific information and detail about each site please refer to site summaries.*

The surveys produced valuable new information for the sites – more so for the heritage and lower plants records, as many sites were already designated for their geological features. The project allowed for each of the 6 sites to be visited once by each specialist. Given the huge variation in size, some of the sites will naturally have received a more detailed survey than others.

## Bryophytes (mosses and liverworts)

A number of notable species have been observed. Some sites were not naturally pre-disposed to supporting bryophytes, due to their situation on an exposed ridgetop or an open site in full sun. A total of 336 records for species associated with sandstone have been recorded (this includes some vascular plants), verified and provided to the appropriate Biological Records Centre. Of these, 9 rare species have been recorded, and a new record, not seen for 50 years for Sussex. (Image © Jan Hendey *Pallavicinia lyellii*)

## Geology

With the recent condition assessments carried out by SxBRC of all of the Sussex Local Geological Sites, some additional geological surveys have still been undertaken as part of this project. One site offered an opportunity to look at the condition of a different outcrop within the designated area, allowing us to complete the LGS assessment for the whole site. Both the Kent sites offered an opportunity for the GeoConservation Kent to update their condition assessment and to visit a new part of the site.

## Heritage

These surveys have generated much new evidence for the Kent and Sussex HER and offer plenty of scope and opportunities for further investigation. In total 26 new records for the HER have been recorded plus other background observations. These surveys uncovered evidence of previous farming practices, quarrying and routeways. Particularly interesting is the old coastline in Kent, with routes down onto the marsh – this

[13] Understanding the Archaeology of Landscapes http://www.english-heritage.org.uk/publications/understanding-archaeology-of-landscapes/

area offers huge potential for further investigations. The links between some of the rock sites and prehistoric settlement or use was also recognised, in both West and East Sussex. The importance of the talus (sediments) at the foot of the rocks was emphasised as its potential for preserving finds or evidence of activity. Image © Nicola Bannister, Hollow way

## Analysis & Discussion of Surveys

Whilst recommendations amongst different specialists were not always the same (and we wouldn't expect them to be across such diverse subjects), importantly they were rarely conflicting. This positive outcome offers real scope for designing holistic management plans. This section looks at all the features individually and then discusses their integration for management.

The overall project aim of gathering more information about sandrock was well met – a wealth of new data, interesting observations and further research opportunities have been identified.

### Bryophytes

The complex shapes created in sandstone outcrops – damp crevices, under hangs, open gullies, or crumbly cliff-faces provide a variety of habitats. Each has different conditions, together supporting a wide range of both specialist and generalist species, often within a small area. Having such a limited distribution means all sandstone sites are important habitats. But we know some sites are more naturally suitable for bryophytes than others. An exposed site, open to the sun may not offer the opportunities for a diverse selection of bryophytes that other sites with a range of conditions would. This is likely to become an important consideration when designing site specific management plans.

The updated species records have provided results which we can compare with the 1995 Wealden Sandrock Survey[14]. Having these historic records available has provided additional evidence. For example we can see the positive impact of improved land management practices upon bryophytes at Hastings Country Park[15].

Species diversity at climbed or recreation sites were shown to not be poorer than at any other surveyed site. In fact, whilst there's always room to improve the habitat for bryophytes, Harrison's Rocks supported one of the key species of the survey. Hastings Country Park, renowned for its nationally important bryophyte flora, has been successfully managed alongside public access.

### Heritage

Sandstone sites harbour a broad range of historic/archaeological observations, but we were unable to see clear patterns in the types of observations from these surveys. Sandstone sites on promontories, such as Stone Hill and Harrison's, were likely to have been used by prehistoric people as they offer a strategic location with wide views across the landscape. This project provides the opportunity to begin to document the long association between people and sandstone outcrops. New observations were typically; historic quarrying, 'lost' routeways and evidence of historic agricultural practices.

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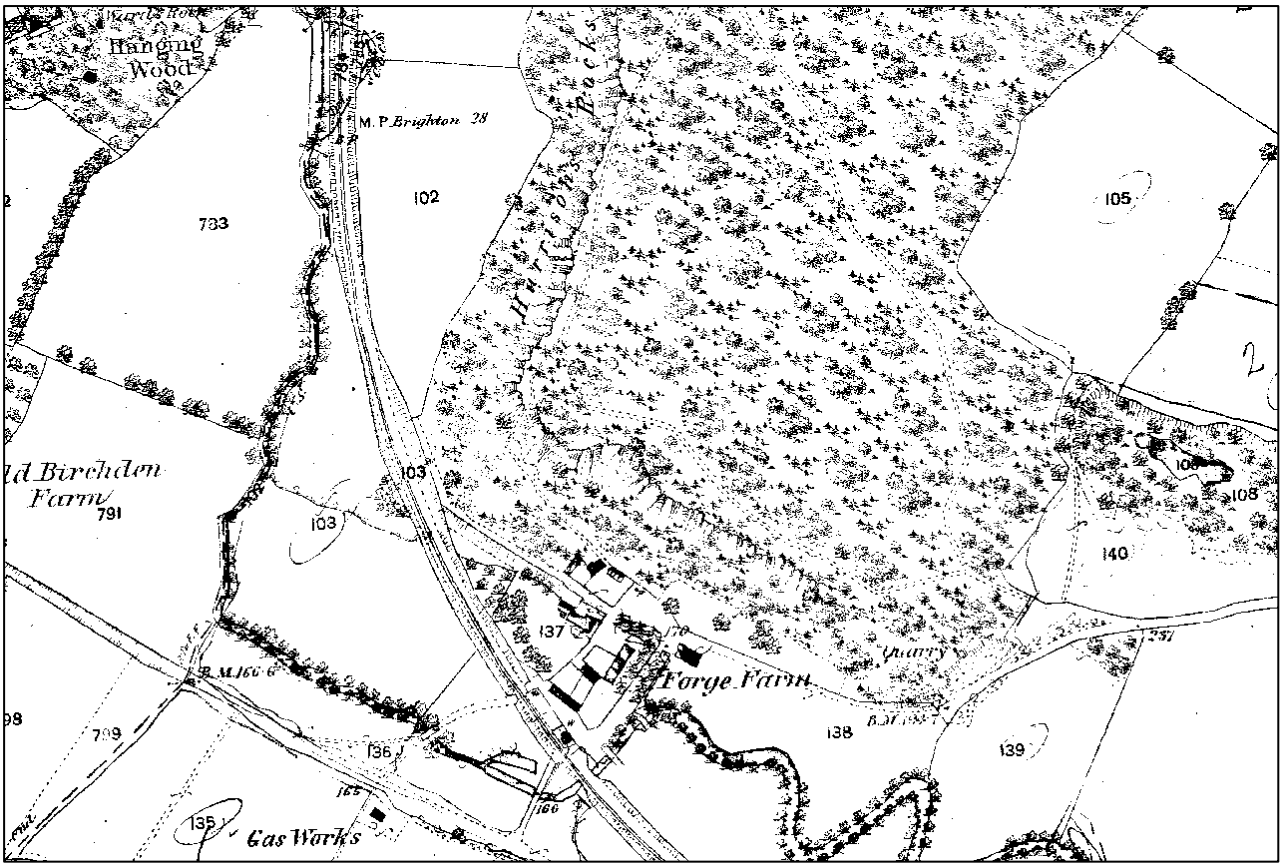
[14] Wealden Sandrock Survey, Davey, S. (1995). English Nature

[15] Pitt, J. & Hendey, J. (2012) High Weald Sandstone Project. Bryophyte Survey

Much of the heritage interest at these sites was around the rocks rather than the rock itself, although tool marks were observed at Chiddingstone. This wider 'catchment' of historic evidence will be an important consideration when undertaking management for other features. Perhaps this is also a reason why there was little direct conflict in the management recommendations. This also means that whilst carrying out other management or recreation at sites we may be unknowingly disturbing some of this evidence. The 'talus' at the foot of the rocks may harbour important stratified evidence for the site's previous use. Understanding the wider landscape context formed a key part of the heritage surveys supporting the development of understanding of the site's wider use and situation.




In the more recent past the Victorians regularly visited sandstone sites like Eridge Rocks. Planting of exotic species close to the rocks is part of their history and offers an important insight into how they were perceived. Although these trees now cast a deep shade leaving conditions on the rock itself far from ideal for bryophytes, it demonstrates a need for compromise when managing these sites holistically. For instance, An understanding of these key periods in history, their impact upon the rocks as habitats and the location of the important features seem key to supporting improved site management. These level 1 surveys have just pulled together some of the evidence found at or close by these sites. There is much potential for uncovering more detail and possible finds through an in-depth walkover survey or excavation – few sandstone outcrops have been studied using archaeological digs.

## Geology

All but one of the sites is designated either locally or nationally for its geology. The presence of geological features of interest was therefore high and according to recent condition assessments the condition of all the sites was good. Having said this understanding of the geological story at each site is invaluable to deciding upon a management strategy and to be able to offer site interpretation. When considering management choices directly affecting the rock, understanding the geological processes, especially weathering and crust formation is going to be important.

The rocks and wider geology and geological story literally form the foundation of all the other features at the site. Quarries and particular species may only be found on certain geologies. These intrinsic links are always there, but perhaps not recognised as clearly as they could be.

### Integrated Management

These surveys have shed light upon otherwise unseen historic features which can help us to both understand a site's history and wider landscape context. Survey work has also shown this project isn't about every sandstone site being fantastic for heritage, climbing, bryophytes *and* geological features – it might not be! But rather its about recognising the value of elements within individual sites, and ensuring management practises that, whilst supporting one or more, do not damage others.

With that in mind it seems there may be two approaches to considering sandstone sites;

1) To continue to manage a site with a single aim – for example as a habitat for bryophytes, but whilst also having a good knowledge of all the features on site. With this understanding the methods chosen can ensure no adverse impacts upon other features.
2) The second option may be to consider all elements of the site and include small management practises which seek to support each element.

In many cases the sites surveyed were already under some form of management. Often this management was not conflicting with other features – although this doesn't mean all features were actively addressed or understood. It seems that whichever option above is chosen, having an informed understanding of the site before deciding upon a management regime is absolutely key. Also the site's attributes and access may well dictate how it's managed. A SSSI designated for its lower plants may well mean an approach such as 1 is taken, or a climbed site with a variety of interests may mean something more like approach 2 is taken. Either way, knowing what's there and which features are important, will mean more integrated management can take place.

The current approach already undertaken by local geology groups begins to integrate the different elements of sandstone sites – recording recreation and some basic ecological information. This approach is fully supported – and there may be opportunity to develop it further, a way for historic and biodiversity evidence to feed directly into their condition assessment or designation processes. Currently this is carried out by the surveyor; potential new partnerships could provide more information for the assessment of geological sites.

## Survey Conclusions

Overall, the surveys have been a real success – despite covering just 6 sites, they have helped to inform our collective (the AONB Unit, wider partnership and surveyors) understanding of *all* the features associated with sandstone. This information has been shared as widely as possible, with new records passed on to the appropriate Heritage Environment Record and Biological Records Centres across 3 counties, providing a useful result of the project. This will inform planning and development decisions as well as supporting further research or site monitoring.

The interest amongst specialists in the other surveys was very high and shows the desire to know more about other aspects of these sites. Invariably having a broad, holistic knowledge and sympathy for other elements of a site is an important aspect of integrated approaches to management. The surveys have demonstrated these sandstone sites are significant for a whole variety of reasons, even where sites support a diverse array of bryophytes they may also have an equally interesting history or set of weathering features, which shouldn't be forgotten. It is hoped that these are more widely understood and appreciated as a result of this project.

### Joint Surveys

We considered asking surveyors to carry out the surveys together to provide a completely integrated view of each site, this became difficult to organise, so instead this approach was tested using Chiddingstone as a pilot site. 2 of the 3 site surveyors were able to attend. It was found that surveying together was unhelpful – as surveyors viewed the site in such a specific way. Bryophyte specialists looking closely to identify species and the heritage survey involving long walks around the site weren't conducive to a joint approach. However, both surveyors who took part were keen to know afterwards what the other thought of the site.

Eridge Rocks and Hastings Country Park are two sites currently being managed for multiple outcomes. Both are open to the public, and part of Eridge is climbed. Both are home to key bryophyte, heritage and geological features on top of this. For sites like this it is hoped the surveys could provide additional detail that could be used in management or for interpretation and in the case of Eridge, an opportunity to share experience of managing such a unique site with others. Lessons learnt from their experiences and opportunities to share these with others are explored in the project round up.

### Workshop

Eridge Rocks were host to a sandstone workshop – an opportunity for all to share their own experiences and perspectives of sandstone sites in the High Weald. Open invites were sent to High Weald AONB Partners (who represent a variety of interests) and Local Geology Group members. 25 attendees helped make the morning successful with 3 specialists, each representing one of the three features. Eridge hides amongst its outcrops of sandstone, important heritage features and diverse bryophytes; a particularly fantastic achievement considering only a couple of decades ago, it was thickly covered with Rhododendron. Having the rocks as our cue meant the group could follow the cliff line, stopping at particularly good examples of honeycomb weathering or to look at a carpet of diverse mosses on the cliff face and discussing their management needs.

Having all we needed on site to spark a question or discussion, meant the interest amongst and between all the groups was fantastic. Questions came naturally and often smaller discussion groups had to be interrupted to draw attention to a specific feature. There appeared to be a huge amount of interest amongst people in all aspects of sandstone and feedback certainly highlighted a feeling of having learnt something new about the High Weald's sandstone. The workshop at the rocks was a perfect way to discuss all sorts of issues about sandstone, the pressures, and wider landscape context.

## Project Round up

A summary of the project, which elements of the project worked well, and which not so well and the identification of opportunities for further work.

### AONB Benefits

*A summary of benefits experienced by the AONB Unit as a result of carrying out this project.*

- The completion of the Sandstone Project has provided a useful foundation for the review of the geological element of the High Weald AONB Management Plan.
- Development of some new and important relationships with key contacts representing each element of the project, but most notably some new contacts regarding Wealden geology.
- Whilst always considering geology as fundamental to the landscape, the AONB Unit has previously not embarked upon many specific projects where geology has been the focus. As such, this project as meant new people who haven't been involved with the AONB before have been contacted. Through these people the AONB Unit can now reach a new audience, and potentially involve new contacts in existing projects.
- The AONB Unit now has valuable experience of undertaking a geodiversity project.
- Having specialist contacts and access to geo-conservation advice to support the Units project development and Management Plan Review is an invaluable resource.
- This project also has resulted in more informed local groups; vital for voluntary groups who carry out work within the AONB – these groups can now pass on their own knowledge about the AONB to others.
- A methodology for rapid heritage assessments of sandrock sites.
- Knowledge about geodiversity and sandstone in particular will feed into the High Weald's National Character Area description.
- Use of new knowledge in other projects such as High Weald Heroes.
- Information incorporated into Landowner Advice and Our Land Tourism projects, currently running at the High Weald AONB.

### Geology Group Benefits

- Identified opportunities for support from the Unit to local groups.
- Generated project ideas which could be supported by SDF or communication support – helping geology groups attract new volunteers through promotions on the AONB website.

- A better understanding by others of the AONB, the High Weald landscape and the Unit itself.
- Links with other AONB projects
- New links with neighbouring geology groups – opportunities for joint-working.

### Other/Unforeseen Benefits

- The project highlighted the wealth of existing interest within groups for knowledge from other disciplines.
- Much of the work in developing the Sandstone project, improved sandstone knowledge and making contacts was used to inform Battle to Brede Landscape Partnership Scheme bid submitted by the High Weald AONB.
- A new awareness (certainly for the AONB Unit) of the keen interest in geodiversity in the region – this was then seen by the wider partnership.
- The Project demonstrated clear links with other existing AONB projects – particularly routeways.
- New contacts have been made within existing partnerships.
- The potential for us to consider the presence of rocks in our understanding of early settlement in the AONB. Previously considered woodland and water as key sites which were settled as 'dens but considerably earlier in time rocks could have been just as important.
- Improved landscape context/knowledge of local site management and advice provision via geology groups.
- New records of rare species.
- Bryophytes as indicators of air/water quality, improved land management practices.
- Surveyors who work in and around the High Weald now much more aware of the rocks and their wider landscape significance.

### Lessons Learnt

Whilst being a short project on a tight budget, it has been a valuable exercise for the AONB Unit. Importantly the project has highlighted huge enthusiasm for sandstone outcrops. Most noteworthy is the interest amongst such a wide range of individuals and organisations, all of whom clearly recognise the importance and sensitivity of these sites.

The Unit has begun to develop new contacts, although in the time available gathering interest in and generating opportunities for volunteering was difficult.

Both geology groups are in their early stage, fully run by volunteers and still deciding on broad aims and targets for the group's activities. However it is hoped that we can continue to support the groups and develop any ideas, which come about as a result of this project.

With hindsight, more time should have been given to developing opportunities for volunteers – this was underestimated during the planning of the project. However, the geology groups are still developing their own aspirations for the group and potential roles for volunteers – so the Unit will continue to support this.

## Next Steps

To be undertaken by the AONB Unit:

- Invite a representative from GeoConservation Kent to attend the next Sussex Geodiversity partnership meeting. To share ideas and demonstrate opportunities for joint working on shared goals.
- Maintain contacts – keep individuals and organisations updated with the AONB via the e-newsletter.
- Communicate Project findings at the next Geology meetings. Discuss ideas and opportunities for further work and training if appropriate.
- Each geology group to receive a High Weald Map Set showing designations, sandstone outcrops and historic quarries.
- Update the geology section of the AONB webpage.
- Feed reports to relevant Parish Councils for interest/incorporation into their own Plans.
- Update the High Weald land manager's pack guidance for sandstone outcrops to include information about heritage.

## Opportunities

Wider aspirations and ideas:

- Information about heritage features for Climbers or walkers.
- Potential collaboration with the BMC – Green Climbing Guide.
- Tackling specific management issues – e.g. Rhododendron, or how to choose the right amount of shade.
- Communicate to users of sandstone sites about its heritage potential, and the importance of the sediment at the foot of rocks.
- Interpretation at Stone Hill Rocks.
- Geological surveys at the lesser known sites.
- Incorporation of climate change assessments.
- Encourage geodiversity visits to the High Weald – particularly by Universities – to use the area for research, field work etc. Raise awareness amongst these Universities of the High Weald and what it can offer, and build upon existing knowledge. Ensure visitors come with the whole story about the High Weald's sandstone.
- Potential to use Weald Forest Ridge (WFR) legacy of Heritage Survey briefs to encourage surveys to be conducted at Harrison's and Birchden. WFR legacy could supply a ready written project brief, and woodland archaeology toolkits. If completed, this and the 4 'maidens' woodlands would all have been surveyed using the same criteria. Opportunity to put the Lidar flown by the WFR scheme to use.
- Sustainable building materials and opportunities for economic benefits.
- Develop guidance around surveying sandstone sites for heritage surveyors.
- English Heritage has produced a cave, fissure and rock shelter guidance leaflet – which could now include sandstone sites from the High Weald.
- Share our knowledge of carrying out a geodiversity project with peers from other protected landscapes.
- For the High Weald AONB to support the development of geotrails and associated interpretation
- Support the development of a Sussex geo-website.

## Conclusions

In some places, geodiversity and heritage go hand in hand – such as the historic mining legacy in the North Pennines. They've produced detailed action planning around these features. In other places geodiversity and biodiversity are a recognised partnership, such as derelict (modern) quarries and their importance for nesting birds or as new wetland habitats. Throughout the delivery of this project, there has been little evidence found of attempts to pull all three together, to provide a more rounded view of a geological site.

Whilst many protected landscapes understand their own geological heritage, the cultural links to these sites are not always explored. This may not be relevant at all sites, but certainly in the High Weald cultural heritage is strong – even if sites are not actively managed for heritage, its historic value needs to be recognised in the management for other features.

The need for this project was not borne out of a lack of management across sandstone sites in the AONB. It was designed to draw to the attention of landowners, interest groups and advisors the value of assets from multiple perspectives. It was also designed to pilot an approach to enabling and encouraging cross-discipline partnership working. This is an approach, which is equally applicable to whole sites and areas and one the AONB Unit takes in its own work understanding the High Weald landscape. Appreciating a feature or a landscape from different perspectives helps you to test your own assumptions and provides a greater depth of understanding.

A lack of heritage guidance exists generally for rock exposures, but especially in a way that is accessible to land managers in the environment sector. Protected landscapes are in a unique position to be able to have an overview of these sites and encourage new partnerships at sites to be able to truly work at holistically at the landscape scale.

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