

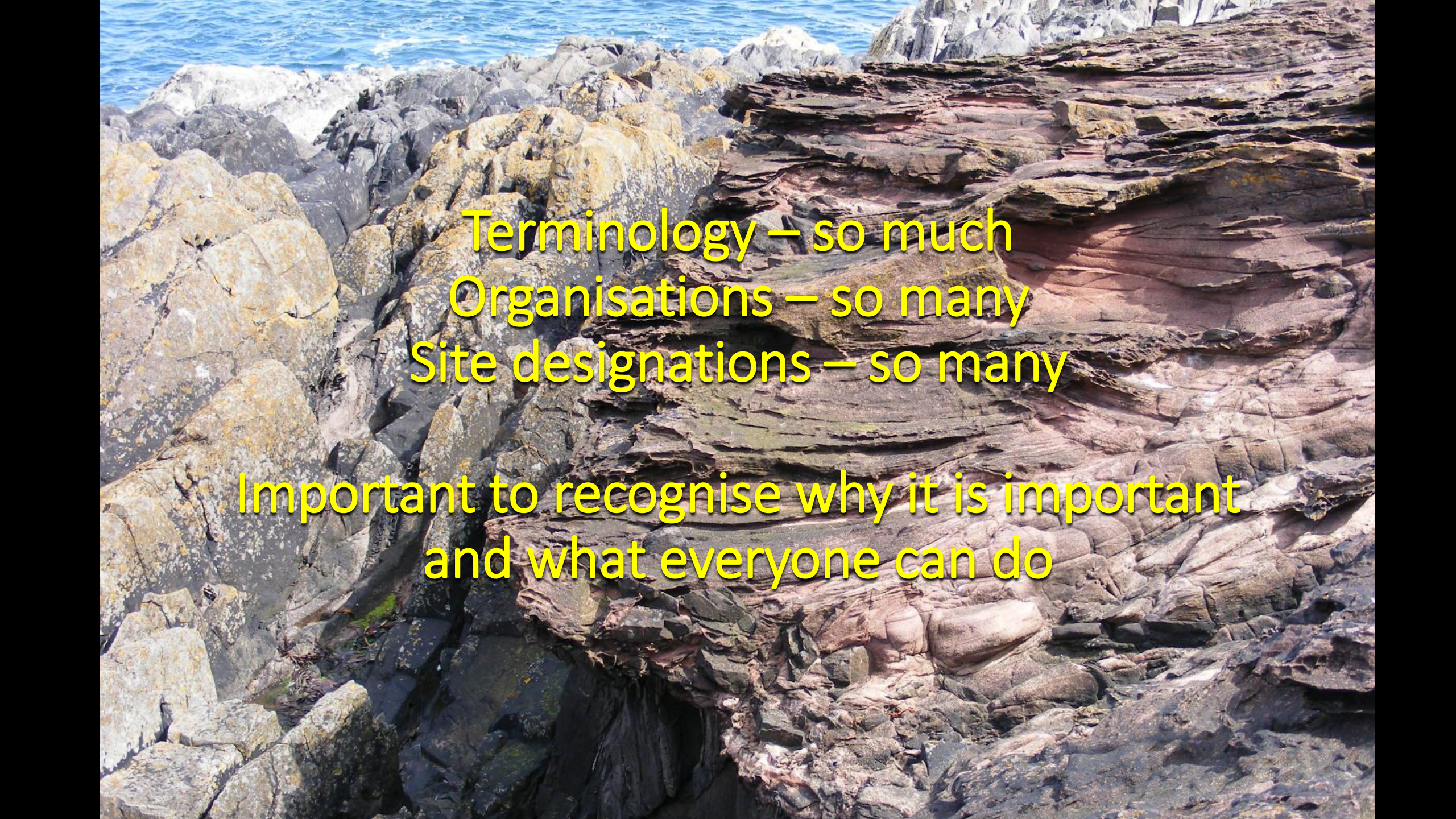


SCOTTISH
GEOLOGY
TRUST



Geoconservation in Scotland

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Terminology – so much
Organisations – so many
Site designations – so many

Important to recognise why it is important
and what everyone can do

Various Terms

Geodiversity

Geodiversity refers to the variety of the geological and physical elements of nature, such as minerals, rocks, soils, fossils and landforms, and active geological and geomorphological processes. Together with biodiversity, geodiversity constitutes the natural diversity of planet Earth. (IUCN)

Geoheritage

It is the abbreviated version of the term geological heritage. It is part of the natural heritage of a certain area constituted by geodiversity elements with particular geological value and hence worthy of safeguard for the benefit of present and future generations. Geoheritage can include both in situ elements (geosites) or ex situ elements (collections of geological specimens) with paleontological, geomorphological, mineralogical, petrological or stratigraphical significance, among others.

Geoconservation

Set of actions aimed at informing the management of geological sites comprising inventory and assessment, conservation, statutory protection, interpretation, and monitoring of sites. The management of ex situ geoheritage is also a geoconservation action. Geoconservation is considered as an emerging discipline within geosciences.



Organisations

NatureScot (and corresponding agencies in other UK countries)

Scotland's Nature Agency

Geological Society of London Geoconservation Committee

Meets on an *ad hoc* basis but can respond to consultations and other matters

Geologists Association

Geoconservation is an important part of their remit and they publish many relevant articles

Geodiversity Forum and now Scottish Geology Trust

Designed to be multidisciplinary with a wide remit and focussing on all matters relating to geodiversity

GeoConservationUK

UK wide organisation of local (usually county) geoconservation groups

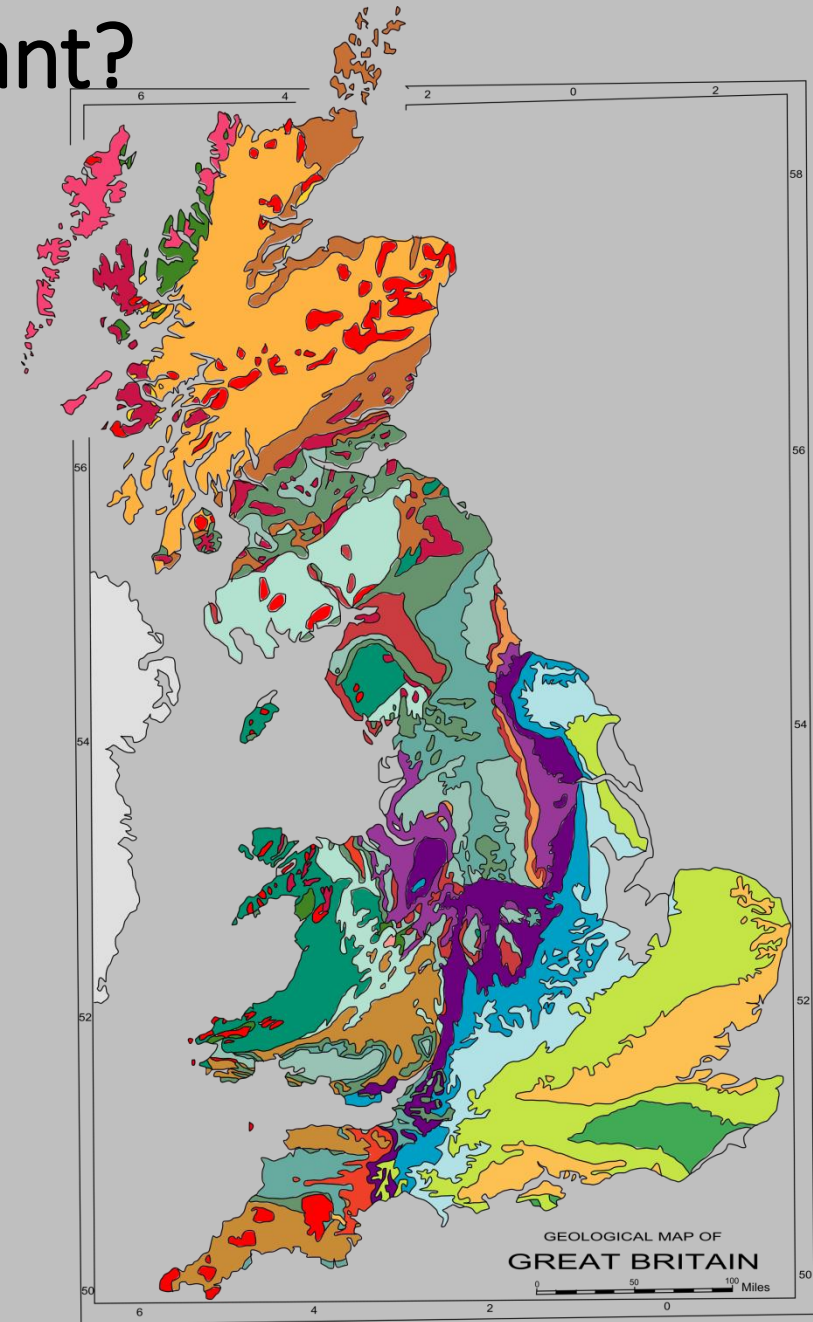
Local Geoconservation Groups and Societies

The people with all of the local knowledge who are generally doing all of the work!

ProGEO – international Geoheritage

Why is the UK and Scotland important?

- Over 2.5 billion years of history recorded in the rock sequences
- From volcanoes, enormous mountains, plate collisions and rifting
- Deserts, tropical swamps, glaciations
- Fossil record shows extinctions and diversity



Why is geoconservation important?

‘We cannot take one step in geology without drawing upon the fathomless stores of by-gone time.’

Adam Sedgwick, 1842 in letter to William Wordsworth

‘The noble science of Geology loses glory from the extreme imperfection of the record. The crust of the earth with its embedded remains must not be looked at as a well-filled museum, but as a poor collection made at hazard and at rare intervals.’

Charles Darwin From *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life* (1861), 423.

‘The successive series of stratified formations are piled on one another, almost like courses of masonry. ‘

William Buckland *Geology and Mineralogy, Considered with Reference to Natural Theology* (1836), Vol. 1, 37.

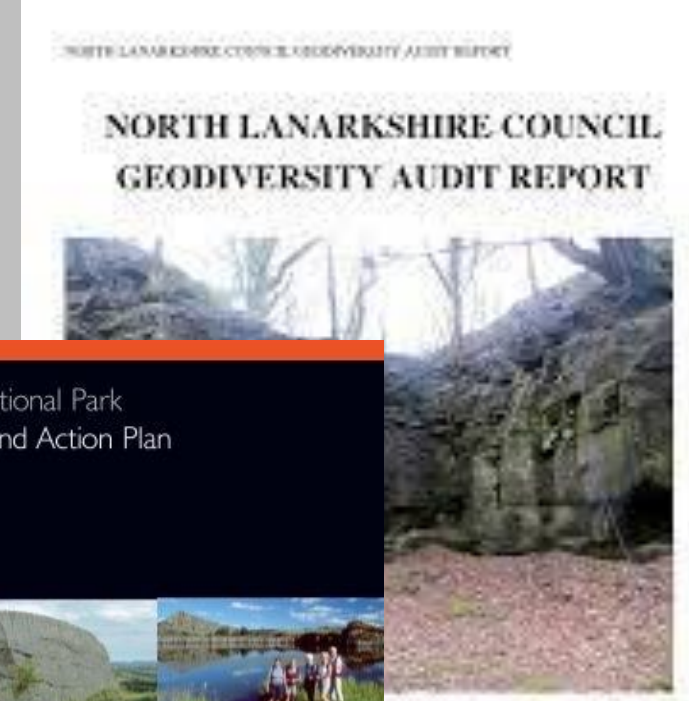
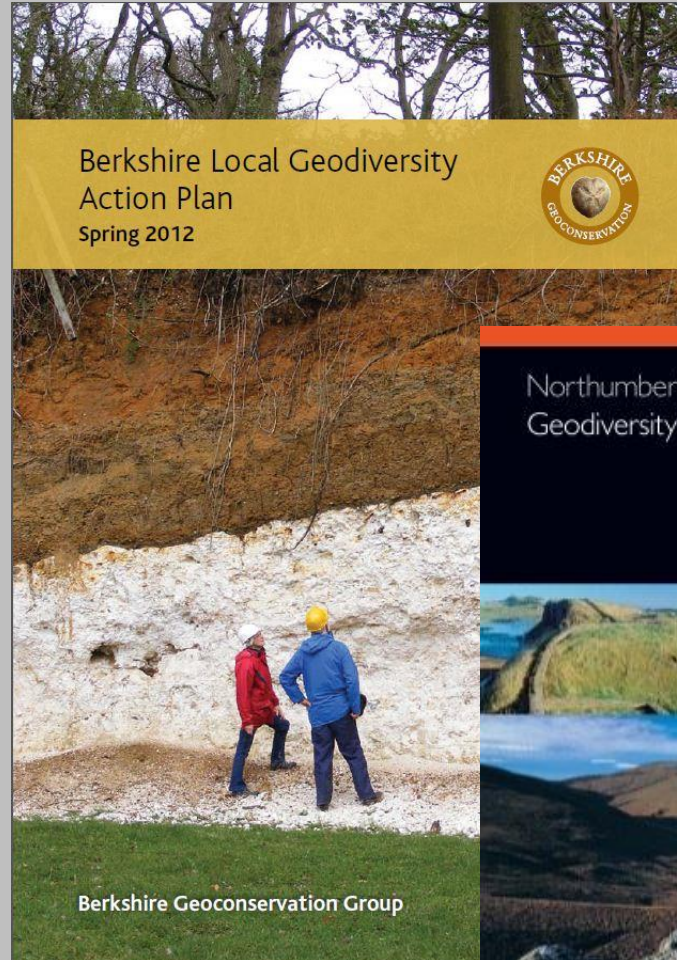
If part of the story is missing does it make sense?

No – not without the story and the comparisons so this is where we come in



Geodiversity Action Plans and Audits

- How do you know what there is in the way of geodiversity?
- Perform an audit
- How can you prioritise the actions
- A Local Geodiversity Action Plan can help



Geological sites - Restricted sites



Views – open to all!



Underpins biodiversity



Work with groups to conserve both



Geodiversity in construction and maintenance

- Threat or opportunity?
- Does it cost?
- Working with partners
 - Good example of the Queensferry Crossing
 - Cross rail - London
 - Motorway extensions
 - HS2?
- Consider it an opportunity to retrieve information otherwise lost as with archaeology



GEOCONSERVATION & PLANNING SYSTEM

Vision for the Future

Integrate Geoconservation into Ecosystem Services

Geoconservation, Geoheritage, Geodiversity all need to be in the Planning System

More Local Geodiversity Sites Working Groups

Geodiversity Site Auditing and Action Planning

Plan conservation sections for some quarries

Natural Capital

How can we ensure this happens?



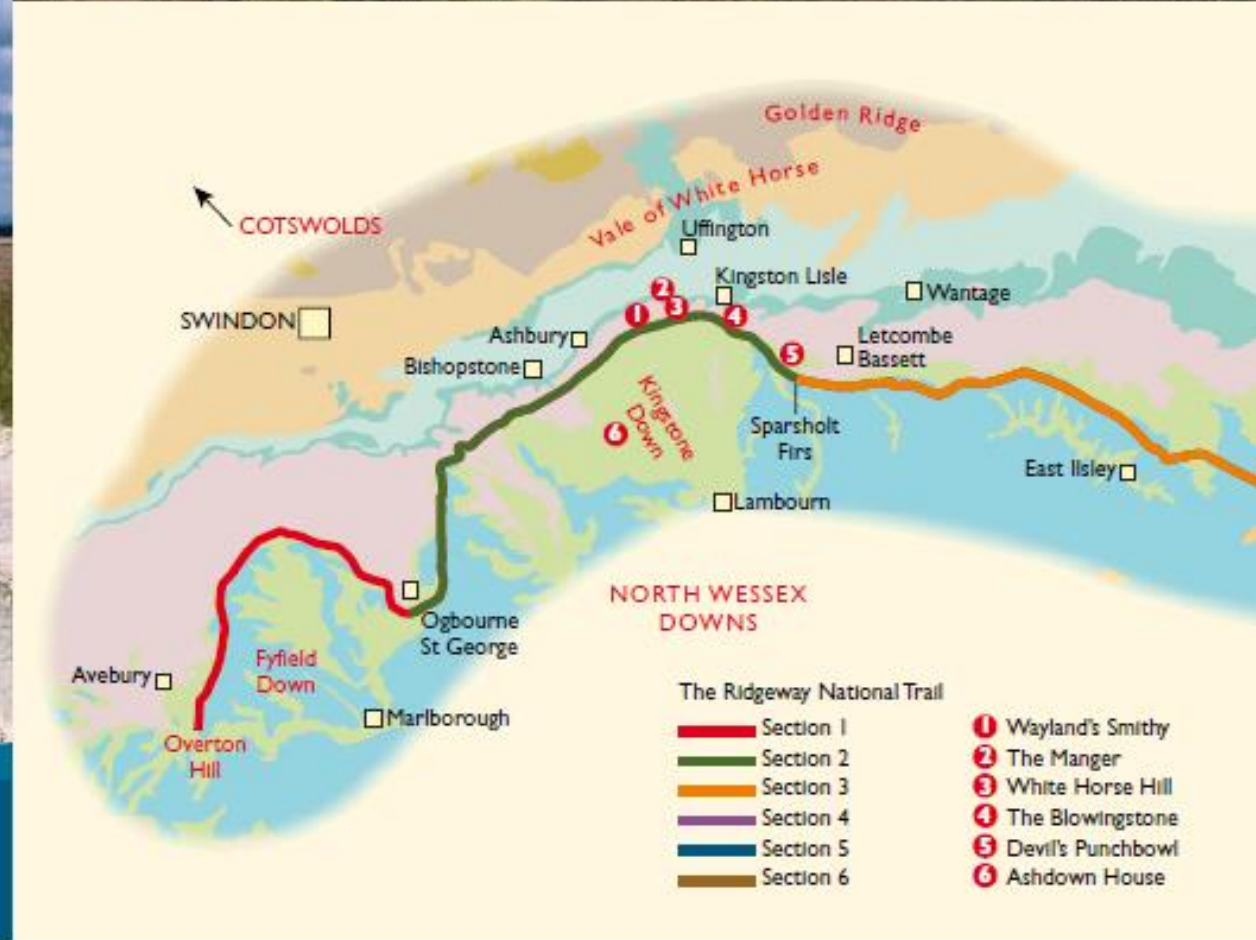
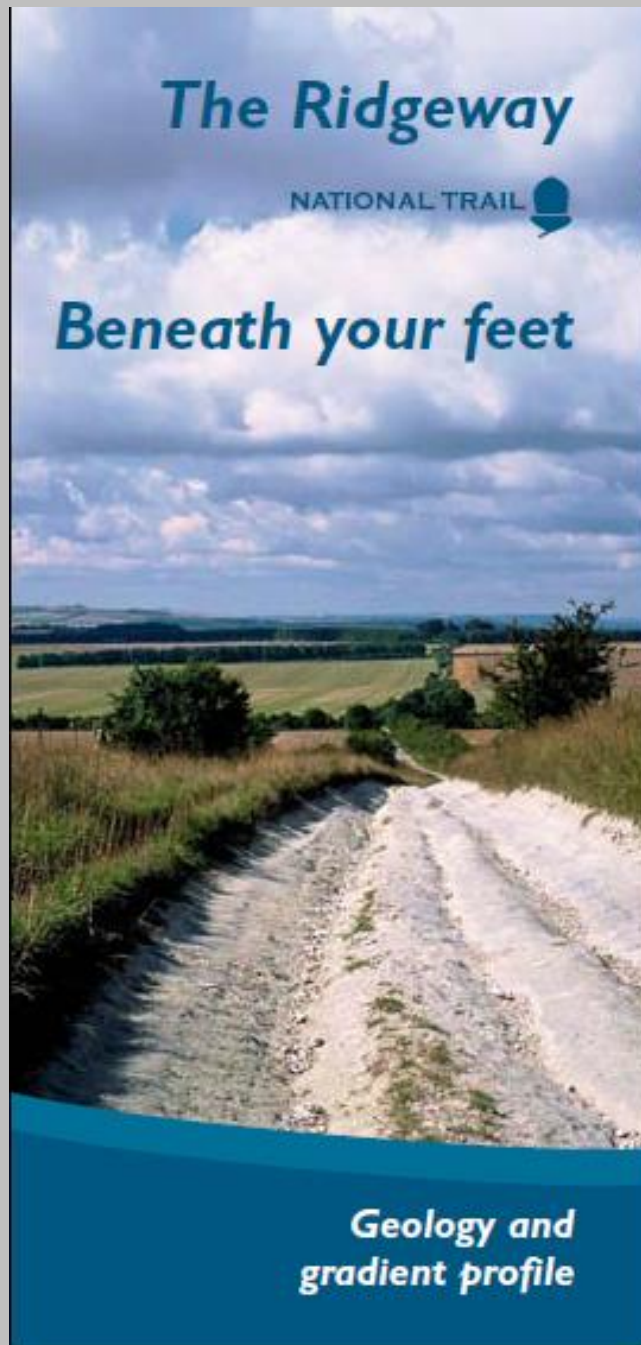
**Spireslack Opencast Coal Site, East Ayrshire;
LGS conservation section**

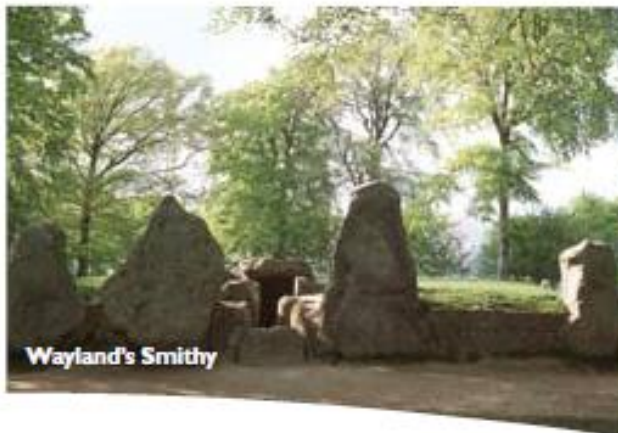
Village atlas of Building stones

Things that can be more visible and accessible to the public



Leisure





Wayland's Smithy



Sarsens at Ashdown

Sarsen Stones

Sarsen stones are scattered all over the chalk hills. They are surrounded by hundreds of years of legend and mystery, and have been used to build Wayland's Smithy, the Avebury Stone Circle and Stonehenge. One famous stone, the Blowing Stone in a cottage garden at the foot of the Downs near Kingston Lisle, is pierced with a number of holes. One of these, if you are able to close the hole completely with your mouth and blow, will resonate loudly and can be heard from a great distance. Legend says it once stood high up on Kingstone Down and was used by King Alfred the Great to call the local militia to fight at the Battle of Ashdown.



The Avenue, Avebury



The Blowing Stone

Sarsen stones are also known locally as Grey Wethers, as from a distance they can resemble flocks of sheep (a wether is a castrated ram). They are blocks of hard sandstone and may be the remains of the Reading Beds. Although their formation is not well understood, it is thought they formed when evaporation from the surface drew groundwater up through the Reading Bed sands, depositing silica around the sand grains to form a strong cement. Most of the soft Reading Beds sands have since been eroded away, but the harder, more resistant sarsen stones have been left scattered across the area. Sarsen stones can be seen in the Fyfield Down National Nature Reserve northeast of Avebury and at the foot of Kingstone Down near Ashdown House.

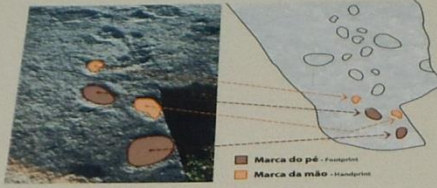
Things that can be more visible and accessible to the public
Small site in Portugal

Zambujal, Portugal

Rastos de animais quadrúpedes? Quadrupedal trackways?

A forma das marcas das mãos e dos pés e a sua disposição ao longo da pista permite saber que estas pegadas são de dinossauros quadrúpedes herbívoros, de longa cauda e pescoço comprido, conhecidos por saurópodes.

The shape of the hand and foot prints and their position along each trackway, allows us to recognise these impressions as the result of quadruped and herbivore dinosaurs, with long necks and long tails, known as sauropods.



Reconstitution of two of the sauropod track makers (Illustration by Mário Esteves)

Estes dinossáurios corriam? Did these dinosaurs run?

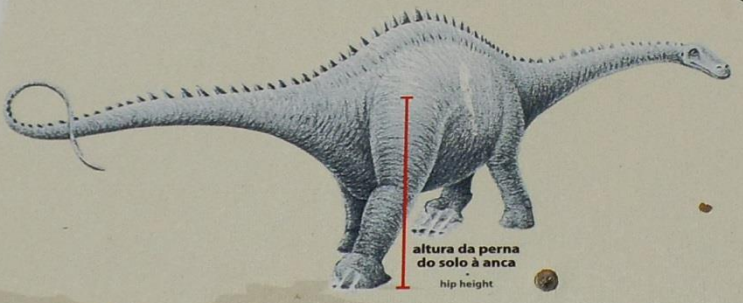
Reconstitution of two of the sauropod track makers (Illustration by Mário Esteves)

De que tamanho eram estes animais? How large were these animals?

A altura do membro posterior de um saurópode, desde o solo até à anca, pode ser estimada multiplicando o comprimento da marca do pé por quatro. Assim, o saurópode que deixou a pista AVL-N3-P2 teria apenas 1,2 metros até à anca, enquanto o que deixou a pista AVL-N3-P4 teria um membro posterior com altura de cerca de 4 metros. Estas pistas revelam a passagem de um saurópode juvenil e de um adulto corpulento, quase três vezes maior. Há ainda evidências de dois outros saurópodes com 1,8 metros até à anca (AVL-N3-P1 e P5) e de um outro (AVL-N3-P3) com 2,2 metros.

The hip height of a sauropod hind limb can be estimated by multiplying the footprint length by 4. Therefore, the sauropod that left AVL-N3-P2 trackway had only 1.2 m (3.9 ft) to the hip, whilst the one that left AVL-N3-P4 trackway would have had a hip height of roughly 4 m (13 ft) – these tracks reveal the passage of a juvenile sauropod and of a robust adult, more than three times higher. There are also evidences of two other sauropods (AVL-N3-P1 and P5) with a hip height of 1.8 m (5.9 ft) and of another one (AVL-N3-P3) with 2.2 m (7.2 ft).

At this tracksite there are no evidences of gregarious behaviour among these sauropods since the trackways were produced by animals of many different sizes that all moved in separate directions.



5m

28m

Things that can be more visible and accessible to the public
Small site in Portugal – face with dinosaur footprints

Zambujal, Portugal





Cabo Espichel, Portugal
More footprints!!



Thank you