

Geoconservation in Scotland



SCOTTISH
GEOLOGY
TRUST

An Introduction to
Geoconservation
and Geodiversity

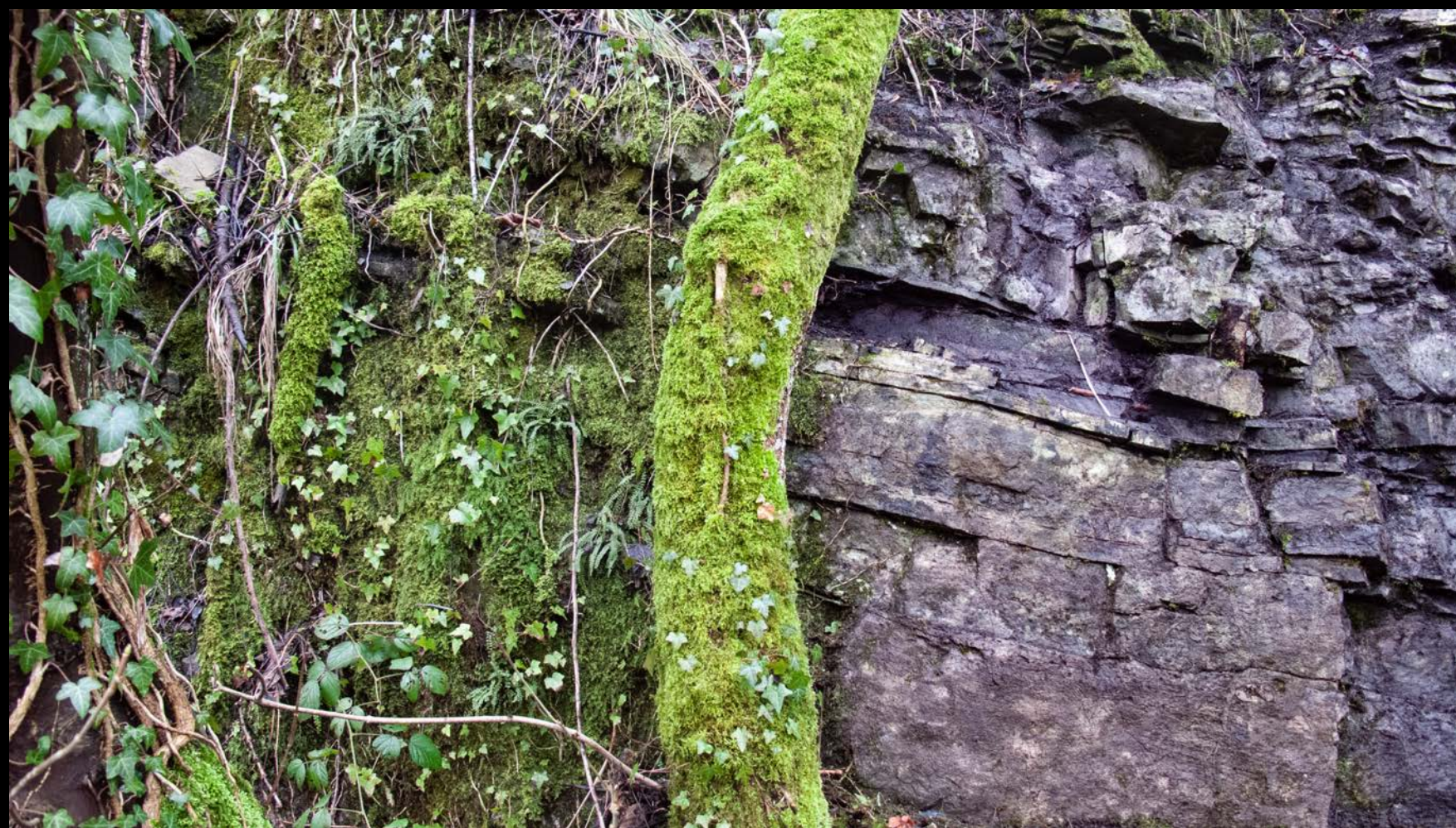


Dr Ian G. Stimpson



Geology is Fragile

Section 1



Geoconservation in Manifold Valley Image: Ian G Stimpson / GCStaffs

It is easy to think that just biology is fragile

Rocks seem so stable it is hard to think of geodiversity under threat

Geoconservation involves action and intent
(Prosser 2013)

Rocks
are
fragile ...



Calton Hill, Derbyshire 1979 Image: Ian G Stimpson



Calton Hill, Derbyshire 2008 Image: Ian G Stimpson

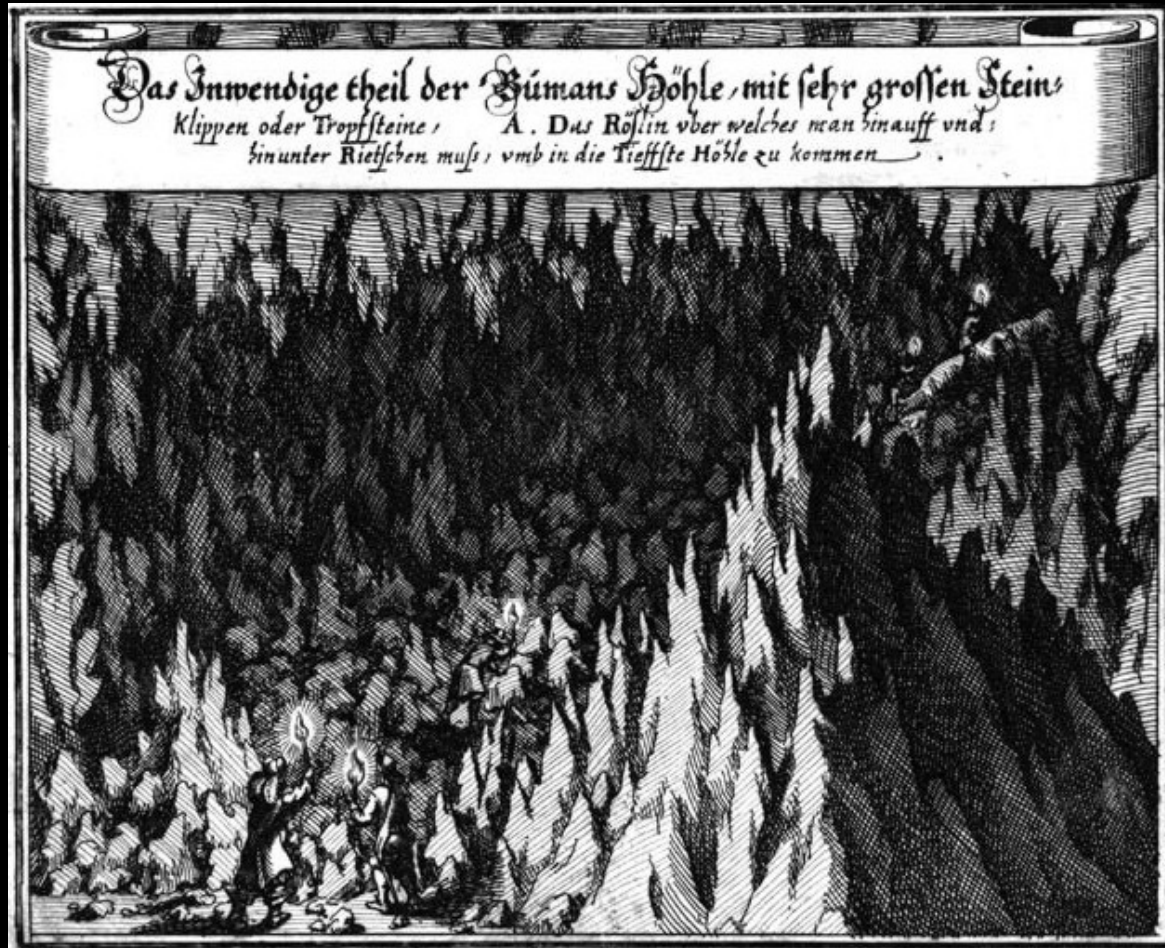


Four Ashes Quarry SSSI, Staffordshire Image: Ian G Stimpson

Geoconservation Origins

Section 2

Origins Of Geoconservation



Baumannshöhle - Baumann's Cave,
drawn by Conrad Buno (1616-1671)

Conservation requires intent & action
Requires management to ensure value
is retained

Origins in wildlife conservation
- Hunting forests

First example of geoconservation
legislation Baumannshöhle, Harz,
Germany

Brunswick Duke Rudolf August issued a
decree on 10 April 1668 to protect
stalactites from damage

Origins of Geoconservation



Salisbury Crags,
Edinburgh

270,000 tonnes of
microgabbro from
South Quarry alone

Court of Session 1819

Act of Parliament 1831

Origins of Geoconservation



1836 Siebengebirge
(Seven mountains)

Germany

First Geological
Nature Reserve

Tertiary Volcanics

Drachenfels, in the Siebengebirge : Image Geochemistry Society

Origins of Geoconservation



1872 Yellowstone

Wyoming, Nevada &
Idaho, USA

First National Park

Yellowstone National Park. Image: Mattias Kabel / Wikimedia Commons

Origins of Geoconservation



1872 Scotland

David Milne-Home set up the "Boulder Committee" to map and conserve glacial erratics

Irrespective of the fact that he thought they derived from Noah's flood (Diluvial Theory), he never ceased to urge the collection of facts, of unbiased accurate description, as a necessity to advancing geological knowledge.

1880 Edinburgh City Council preserves glacial rock striations

(1887 Glasgow City Council protects fossil grove)

Origins of Geoconservation



1873 England
(Protected 1875)

Fossil tree stumps

Wadsley, near Sheffield
South Yorkshire Lunatic Asylum

(Now re-buried – this is a
replica cast)

Wadsley Fossil Forest
Image: 'Anticline' / Wikimedia Commons



Rio Earth Summit 1992

Previously “Natural Heritage”

From Biodiversity

To Protect & Enhance

- Genetic (conserve gene pool)
- Species (reduce loss)
- Ecosystems (conserve habitats)

Biodiversity Action Plans

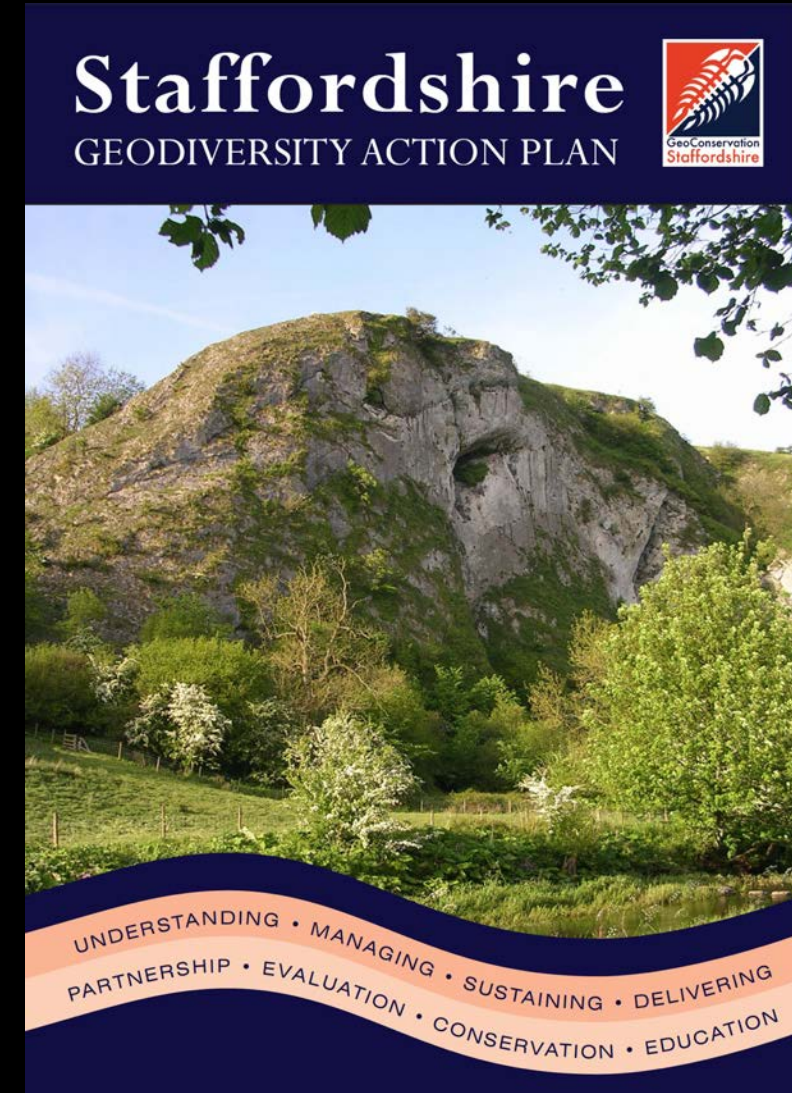
- BAPs & LBAPs

Geodiversity Action Plans

UK Geodiversity Action Plan



A framework for enhancing the importance and role of geodiversity



Geodiversity, Geoconservation & Geoheritage

Section 3

Geodiversity

- The quality we are trying to conserve

Geoconservation

- The endeavour of trying to conserve

Geoheritage

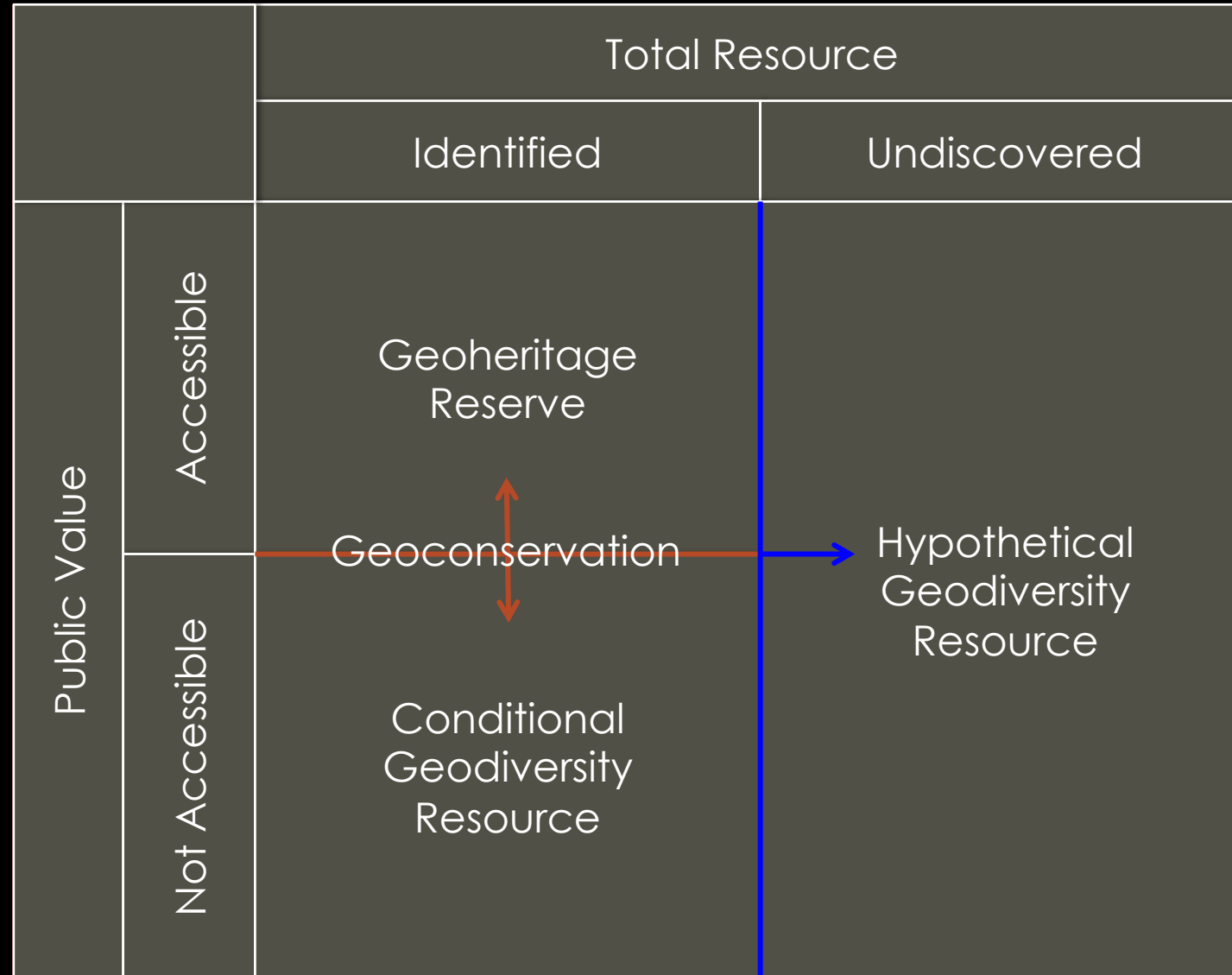
- Concrete examples having conservation significance

“The natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landforms, topography, physical processes), soil & hydrological features.

It includes their assemblages, structures, systems and contributions to landscapes”

- Murray Gray 2013

Geodiversity as a Resource



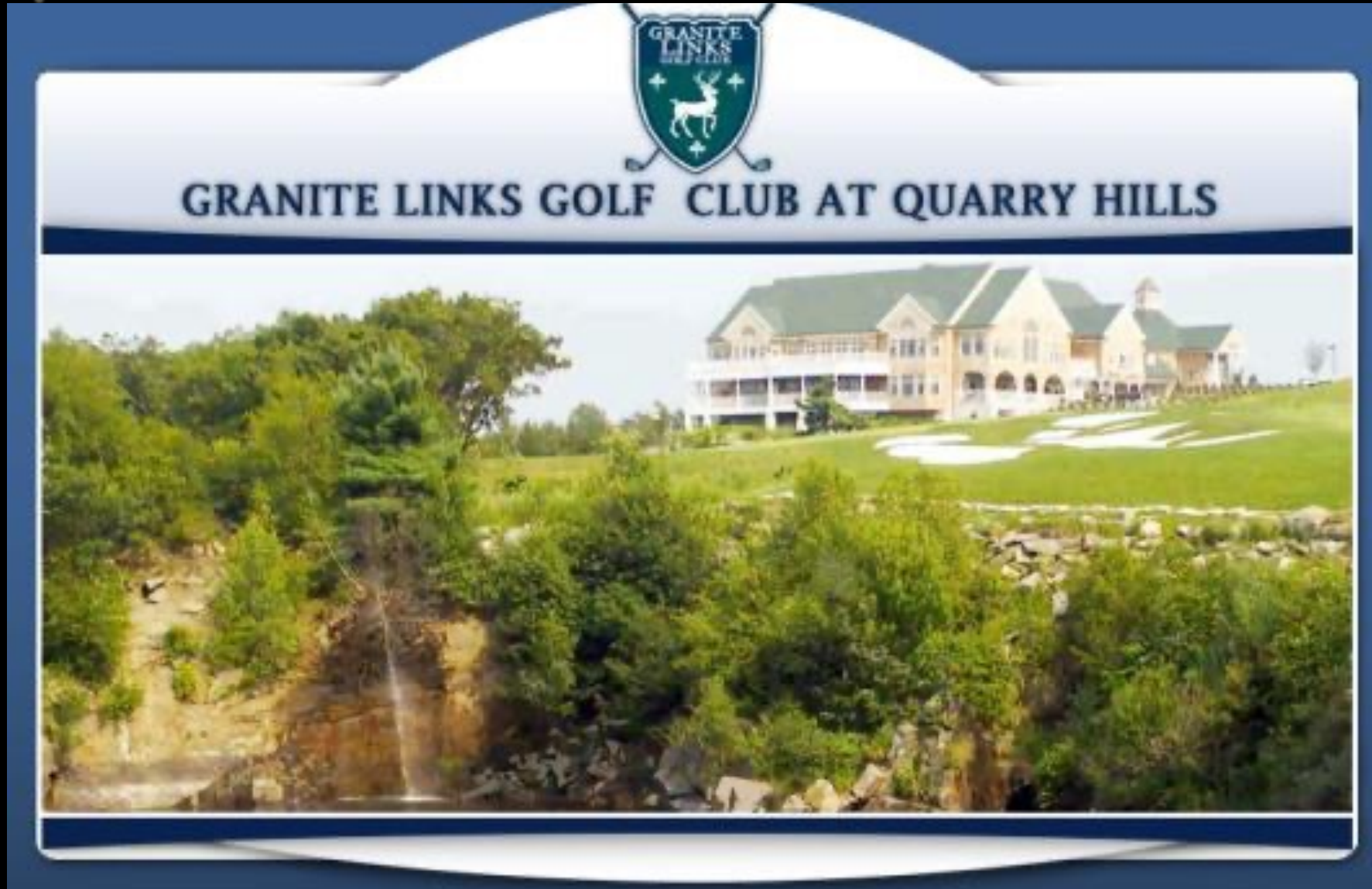
Threats to Geodiversity (and Opportunities)

Section 4

Mineral Extraction



Spireslack : Image BGS



Reclaimed Quarries
Image: Granite Links Golf Course
Geoconservation in Scotland

Coastal Erosion Protection



Undercliff, Brighton Image: Paul Gillett / Geograph

Geoconservation in Scotland

River Management



River Management, Langdale Image: geographyalltheway.com
Geoconservation in Scotland

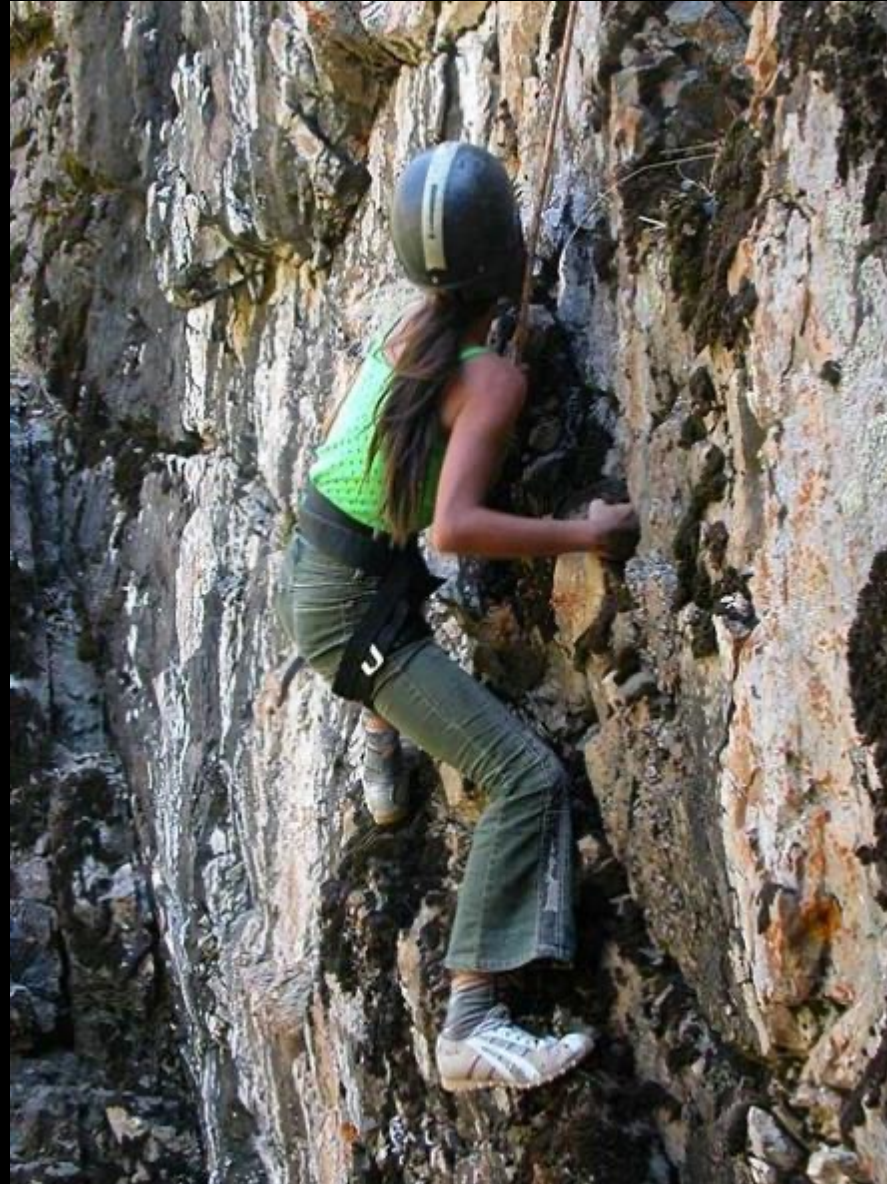


Lulworth Fossil Forest Image: Peter Snape



Forestry Image: Wikimedia

Geoconservation in Scotland



Rock Climbing Image: Wikimedia Commons

Geoconservation in Scotland

Fossil Hunting



Smashed Fossils, Bearreraig Bay SSSI, Skye Image: Scottish Natural Heritage

Climate Change



Birling Gap: Image: Eddie Mitchell / Eastbourne Herald

HM Government

The Natural Choice: securing the value of nature



What we mean by 'natural environment'

In this White Paper, we have given 'natural environment' a broad meaning. It covers living things in all their diversity: wildlife, rivers and streams, lakes and seas, urban green space and open countryside, forests and farmed land. It includes the fundamentals of human survival: our food, fuel, air and water, together with the natural systems that cycle our water, clean out pollutants, produce healthy soil, protect us from floods and regulate our climate. And it embraces our landscapes and our natural heritage, the many types of contact we have with nature in both town and country. In England our natural environment is the result of thousands of years of interaction between people and nature. It continues to be shaped through the care and attention invested by the individuals and organisations who actively manage it.

The Natural Choice www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature

Geoconservation in Scotland

Protecting & Conserving Geoheritage Globally

Section 5

Protecting Geodiversity

- World Heritage Sites
- National Parks, Geoparks & Geosites
- NNRs, NSAs/AoNBs, SSSIs, GCR sites & LoGS/RIGS



IUCN Protected Areas



International Union for the
Conservation of Nature and Natural
Resources 1948

1980 World Conservation Strategy

'Protected Areas'

Currently Globally:

15.7% Land area, 7.7% Marine area

Protected Areas

1a Strict Nature Reserve

1b Wilderness Area

2 National Park*

3 National Monument

4 Habitat/Species Management Area

5 Protected Landscape / Seascape

6 Managed Resource Protected Area

10% of area target for each nation

*UK "National Parks" are level 5

UNESCO World Heritage Sites



UN Educational Scientific and Cultural Organisation

World Heritage Sites : 1972

States nominate sites for list and are responsible for legislation, funding and management

Doesn't cover all of geodiversity

Sites like Uluru listed for culture not geology

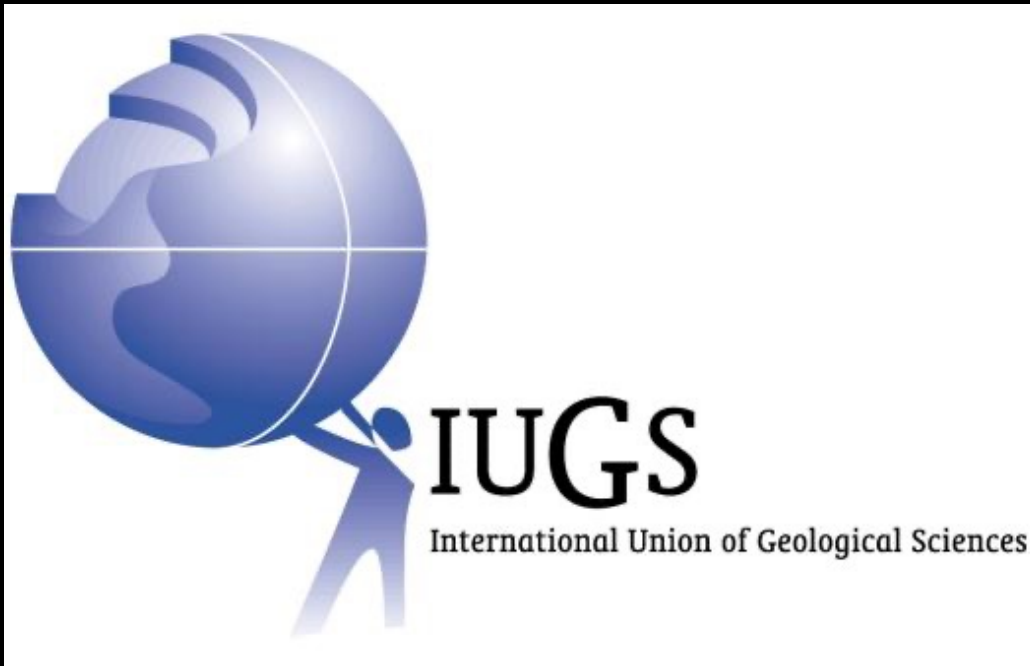
World Heritage Sites



Giant's Causeway [Wikimedia Commons](#)

Geoconservation in Scotland

UN Global Indicative List of Geological Sites early 1990s
“First-class” sites of importance to global geology
Outstanding examples (volcanoes, faults)
... but inconsistent between countries
National Park to outcrop scale



1995 Global Geosites
IUGS Geosites Working Group
Nominated by scientists in regions
... got round inconsistencies of
World Heritage Sites

Unworkable. Disbanded 2003

SHETLAND HERITAGE TRAILS

Shetland's volcano

Journey through an ancient landscape and discover a blast from the past...

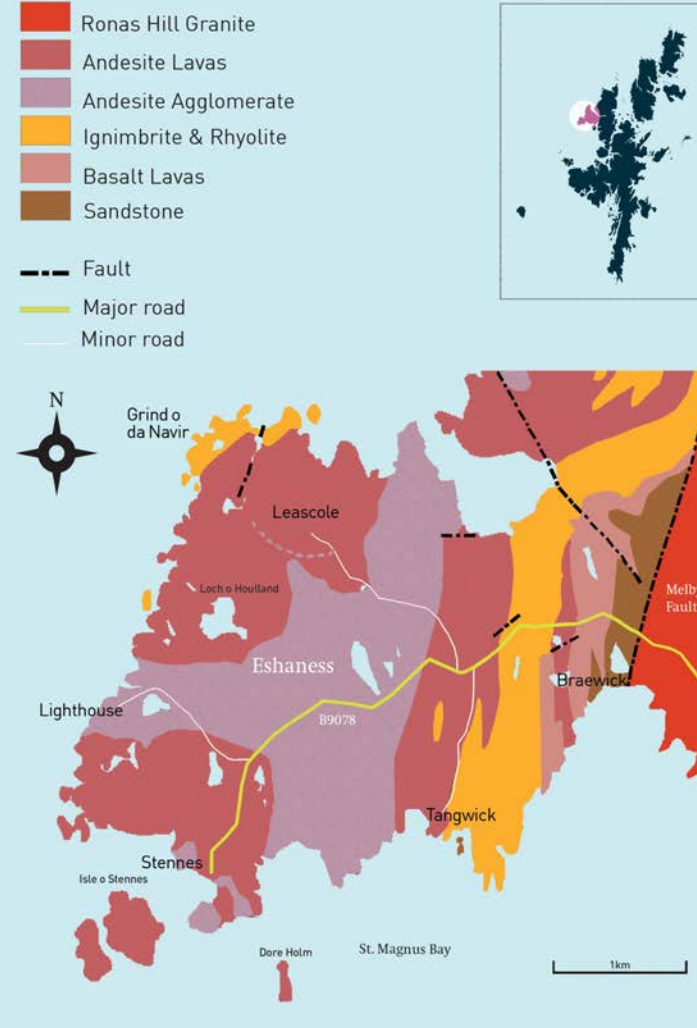


Image: Geopark Shetland

- UNESCO “Second Division” below World Heritage Site
- A management plan that encourages sustainable geotourism
 - A means of teaching geoscientific disciplines
 - Part of a global network of best practice in geoconservation

Nominations from local communities / local authorities

National Parks (US sense)



National Park Service
Organic Act (1916)

“to conserve the
scenery, natural and
historic objects and
wildlife therein”

** note the order

Yosemite National Park Webcam

Protecting & Conserving Geoheritage Nationally

Section 6

UK “National Parks”



Cairngorms National Park Image: PeakVisor

UK “National Parks”
neither ‘national’
nor ‘parks’ but
Protected
Landscapes

Geoheritage is
coincidental
All National Parks
must have
management plans
that refer to
geology /
geomorphology

National Nature Reserves



Glen Roy NNR Image: Wild Lochaber

NNRs – areas preserved for their scientific status and research potential. Owned by the state.

Managed by Natural England / NatureScot / Natural Resources Wales / Northern Ireland Environment Agency

A few geology / geomorphology based

National Scenic Areas



Skye Cuillins NSA: Image: Geological Society of London

NatureScot designate
National Scenic Areas
40 Areas / 13% area

NE, NRW, NIEA are
responsible for
formally designating
Areas of Outstanding
Natural Beauty
(AoNBs)

Management plans
must include
geodiversity

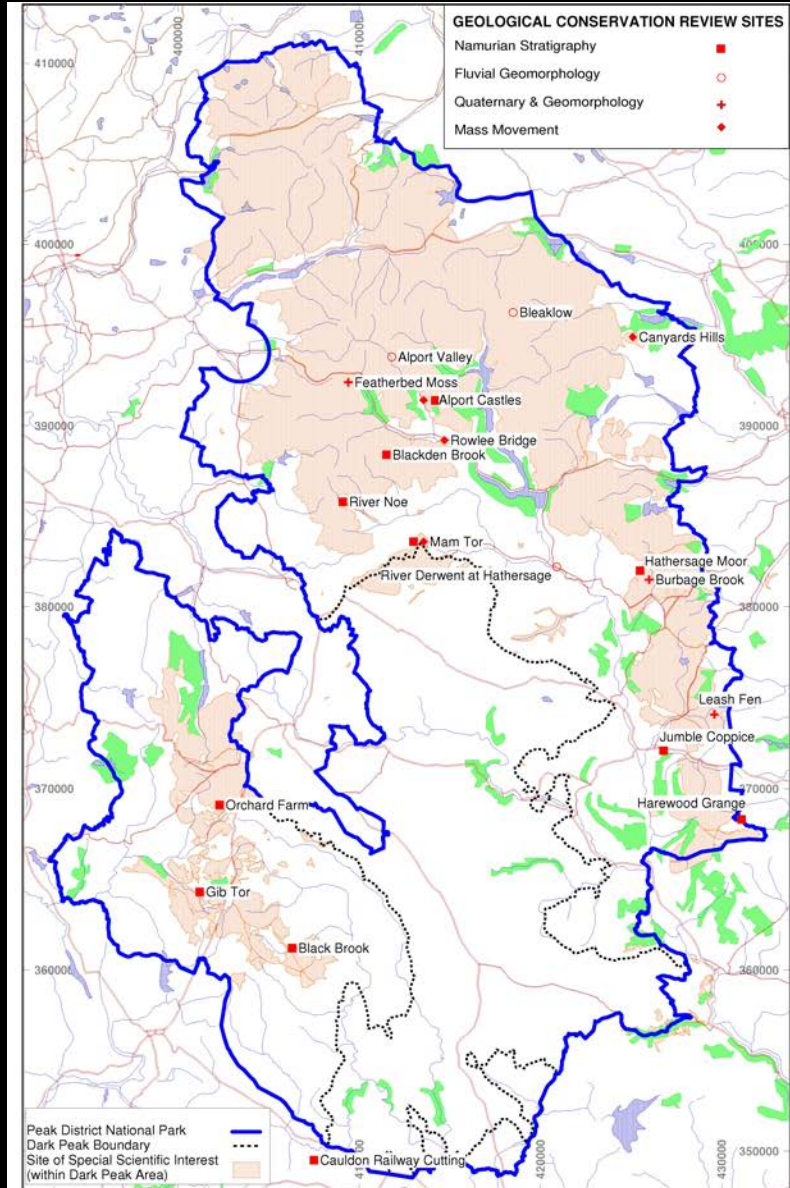
Sites of Special Scientific Interest - SSSI



Site of importance to the international community of Earth Scientists e.g., stratotypes, type localities for rocks / fossils, historical significance, designated by NatureScot
Nature Conservation (Scotland) Act 2004 - offense to knowingly or recklessly damage a SSSI - Protected (but not guaranteed) under planning law

Siccar Point. Image: Chris Rowan

Geoconservation Review Sites



GCR Sites and SSSIs in the Peak District : PD GAP

A major initiative to describe the most important geological sites 1977-1990.

Over 3,000 GCR sites were selected encompassing the range of geological and geomorphological features of Britain.

Those that are not SSSIs, should be. (but there is little money to make them so – designate as RIGS?)

Some GCR sites are larger than the equivalent SSSI

Local Nature Conservation Sites (LNCS)



Dark Slade Wood LoGS Image: Ian G. Stimpson

Designated by local professional & amateur geologists

Must be considered in planning applications but not protected by law

Scotland: Local Nature Conservation Sites (LNCS)

England: Local Geological / Geomorphological Sites (LGS / LoGS)

Wales: Local Geodiversity Sites (LGS)

[Were formerly RIGS]

Local Nature Conservation Sites (LNCS)



Criteria:
Aesthetic
Scientific
Historic
Educational

Site Condition
Monitoring

Site Management
Planning

Goniatite Bed, Star Wood LoGS, Staffordshire Image: Ian G. Stimpson