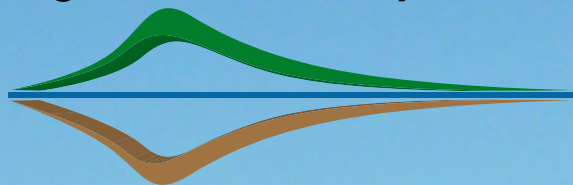


English **Geodiversity** Forum



Geodiversity Charter for England

Foreword

To be added

Geodiversity is the variety of rocks, minerals, fossils, landforms and soils, together with the natural processes that shape them. Geodiversity is a foundation for life and our society. It influences landscape, habitats and species as well as our economy, historical and cultural heritage, education, health and well-being.



Millstones hewn from the gritstone escarpment of Stanage Edge, Peak District. ©Kevin Lowe.

Front cover: A spectacular coastline shaped by outstanding geology. Bedruthan Steps, North Cornwall. ©Julie Harrald.

Introduction

This charter has been developed and is endorsed by the English Geodiversity Forum. It aims to widen understanding of the importance of geodiversity and the influence it has in our daily lives and in shaping the natural and built environment around us. The Charter encourages everyone to work together to promote and look after England's rich geodiversity. It provides a focus for action that recognises and integrates geodiversity and its conservation and management, into policy, practice and decision making at a national and local level and in both the natural and built environment. England's geodiversity is truly special but it is only through celebrating, protecting and managing it in a sustainable way, that we can enjoy the full range of economic, social and environmental benefits it provides.

The importance of England's geodiversity

England is a country of great contrasts. For example chalk coastal cliffs and downs, the Cotswolds, Dartmoor, the Fens, Lake District and Wenlock Edge are all distinct landscapes that give our countryside its character and reflect part of England's geodiversity.

Much of this is due to England's long and dramatic journey through time. Over 700 million years of moving continents, mountain building, volcanic activity, changing climates and sea levels, erosion and deposition have shaped England's landscape. Not only does the resultant geodiversity help us understand the history of our Earth but it also profoundly shapes the world around us.

Many of the concepts of modern geology were first established through studying the rocks of England. The diversity of our fossil record influenced the thinking of Darwin as he developed his theory of evolution and the 'Origin of Species'. The contribution of England's geodiversity to global science is as important today as it has been in the past.

Geodiversity has an influence across all aspects of our lives. Our geology is a source of fossil fuels, the raw materials for construction, and the minerals and metals that help to underpin the nation's wealth and health. It provides the diversity of soils essential for agriculture. It controls fresh water through aquifer storage and the flow of rivers, and is increasingly important as a source of geothermal energy and renewables such as hydroelectric power. Critically, sustainable use of these resources requires an understanding of geodiversity. For example, managing natural processes is critical in responding to the risks of natural hazards such as flooding, coastal change and landslides, whilst peat and soils have an important role in mitigating pollution through carbon storage.

England's geodiversity also underpins biodiversity. It provides a rich tapestry of rocks, landforms, soils, water, nutrients and natural processes that support locally, nationally and internationally valued habitats, species and ecosystems: healthy biodiversity depends on robust geodiversity. Geodiversity also provides key links between people and their 'sense of place' because it characterises our natural and built environments. Through underpinning the character and function of our landscapes, geodiversity connects deeply with human history, culture, industry and creative expression, providing inspiration for art, literature, music, poetry and science.

Geodiversity, therefore, has an essential part to play in addressing the challenges we face today, such as sustainable economic development, changes in climate and

sea level, loss of biodiversity and improving people's health and well-being. The importance and value of England's geodiversity and the many benefits it provides to society may be summarised through ecosystem services: provisioning, regulating, supporting and cultural. Through these services, geodiversity benefits society by :

- providing fresh water (surface and ground water), mineral resources (including oil and gas) and renewable energy
- regulating climate change, for example, through carbon sequestration, and moderation of natural hazards such as flooding
- supporting soil formation, geomorphological processes, terrestrial and marine habitats
- underpinning the cultural, aesthetic and inspirational values of landscape character, and shaping our enjoyment of the natural world through activities such as tourism, education, recreation and outdoor pursuits.

National and international context

There is a range of national and international legislation, policy, guidance, resolutions and statements that provide support and context for geodiversity, its relevance and the need to carefully conserve this resource.

Geodiversity is currently protected by the Wildlife and Countryside Act (1981), the Countryside and Rights of Way Act (2000) and, in the marine environment, through the Marine and Coastal Access Act (2009). In England there are currently over 1200 geological and geomorphological nationally important Sites of Special Scientific Interest (representing 30% of the total) and a wider supporting network of over 3700 Local Geological Sites. The importance of including geodiversity within the planning system is clearly recognised in the most recent National Planning Policy Framework (2012).

The recent Government White Paper *The Natural Choice* (2011) advocates an integrated and cross-sector approach to caring for the natural environment and the



Sharply folded Carboniferous rocks in Millook Haven, North Cornwall. ©Mick Murphy.

benefits this will bring to the health and well-being of people and communities. Equally, it is important to widen the role of geodiversity in education, for example through the National Curriculum. The geological collections, held within over 200 museums, also support opportunities for public learning.

Geodiversity is internationally recognised by the Recommendation of the Committee of Ministers of the Council of Europe (2004) that states: *‘geological heritage constitutes a natural heritage of scientific, cultural, aesthetic, landscape, economic and intrinsic values, which needs to be preserved and handed down to future generations’*. This is also an essential consideration in the application of the European Landscape Convention (2002). The International Union for Conservation of Nature (IUCN) Resolution 4.040 on ‘Conservation of geodiversity and geological heritage’ (2008) provides a benchmark statement of the wider role and relevance of geodiversity, recognising that *‘the conservation and management of geological heritage need to be integrated by governments into their national goals and programmes’*.

UNESCO, through the Global Geoparks Network, working with the UK National Commission for UNESCO, advocates the importance of geodiversity, its environmental, historical and cultural links and its role in sustainable economic development; there are currently two Global Geoparks in England—the North Pennines AONB and the English Riviera. UNESCO recognises the global significance of geodiversity through the World Heritage List. Sites can be selected under criterion viii *‘outstanding examples representing major stages of Earth’s history, including record of life, significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features’*. The Jurassic Coast World Heritage Site, England’s only natural World Heritage Site, was inscribed on this basis.

Lastly, providing *‘a framework for enhancing the importance and role of geodiversity’* across the UK is the UK Geodiversity Action Plan (UKGAP). This provides a shared context and direction for geodiversity through a common aim, themes, objectives and targets which link national, regional and local activities. In England this Charter, and the work of the English Geodiversity Forum, will help facilitate England’s contribution to the successful delivery of the UKGAP (www.ukgap.org.uk).



Pale grey soils formed on slate bedrock, South West England.
©Julie Harrald.



High Force waterfall (River Tees) cutting through the Carboniferous Whin Sill and underlying limestone and sandstone. ©Natural England, Colin Prosser.



Top: View of Warwick Castle beside the River Leam. It is built of local Triassic sandstone. ©British Geological Survey.

Bottom: Limestone pavement developed on limestone of Carboniferous age, Holmepark Fell, Cumbria. ©British Geological Survey.

Why action is needed

Geodiversity, like other aspects of the natural environment, is threatened. For example, poorly planned development can destroy geodiversity and irrevocably change natural processes. Similarly, lack of management and co-operation can lead to the progressive decline of geodiversity and loss of access to critical geodiversity sites.

Careful management of geodiversity, and an understanding of its environmental value, has wide economic, social, cultural and educational benefits. In particular, integration of geodiversity into the 'ecosystem approach' will better inform robust adaptations to climate change, as well as supporting policy such as that described in the Government paper *The Natural Choice* and the successful delivery of the UKGAP.

Lack of action will lead to loss of geodiversity and missed opportunities for society, science and education. We need to change our working practices to include consideration of geodiversity and geoconservation to achieve better, and more sustainable, environmental outcomes.

Geoconservation is action taken with the intent of conserving and enhancing geological and geomorphological (geodiversity) features, processes, sites and specimens

A vision for England's geodiversity

This Charter sets out a clear vision for England's geodiversity:

Geodiversity is recognised as an integral and vital part of our environment, economy and heritage that must be safeguarded and managed for current and future generations.

To maintain and enhance our geodiversity it is important to recognise its role in:

- our understanding of England's geological history and global geosciences
- natural heritage, both terrestrial and marine, and landscapes in all their diversity
- supporting habitats and species and the many essential benefits they provide for society
- adaptation to changes in climate and sea-level through sustainable management of land and water and working with natural processes
- sustainable economic development
- the history, character and cultural development of our society through intellectual growth and creative expression alongside industrial and technological development
- public health, quality of life and national well-being and connecting people with the natural environment including active promotion of geotourism.

To achieve this vision it is important that we:

- raise awareness of the importance, value and relevance of geodiversity to our economic prosperity and comfort and its wider links with the natural environment, landscape, cultural and historical heritage and sense of place

- encourage a sense of pride through education and learning, promotion and interpretation
- promote careful management of geodiversity through conservation and enhancement of its special character and qualities across the country and the continued development and sharing of good geoconservation practice
- encourage a sustained legacy through maintenance and conservation of museum geology collections and archives and support initiatives to reach a wide audience
- integrate geodiversity into relevant local and national policies, guidance and advice ensuring a sustainable and integrated approach to the management of our natural environment for the wider benefit of England's people, environment and economy
- carry out research to improve our understanding of the role of geodiversity in providing benefits to ecosystems and people, leading to better decisions about managing our natural environment
- secure resources to support the delivery of these goals from a local to a national level through existing organisations and funding provision and continue to encourage the provision of new resources and funding to support the principles of this Charter.



View across Bassenthwaite Lake to the Ordovician rocks of Skiddaw, Lake District National Park. ©Natural England, Peter Wakely.



Top: The Jurassic sandstone cliff of Cow Bar shelters Staithes harbour, North Yorkshire. ©Kevin Lowe.
Bottom: Weathered granite rocks of Haytor, Dartmoor, Devon. ©Natural England, Mick Murphy.

What you can do

This Geodiversity Charter encourages determined action from all sectors of society to fulfil the vision set out above. Only by working together can we ensure that our geodiversity continues to provide essential benefits that we are proud to pass on to future generations. There are a number of actions we can all take to achieve this ambition. These are set out below and illustrated with examples of what has already been achieved.

1. Individuals and communities

Experience and enjoy your local landscape and appreciate its value and underlying geodiversity.

Actions:

- A. Visit, and explore England's geodiversity to develop your own sense of pride in this natural asset and encourage others to do the same.
- B. Champion your local geodiversity. Adopt a geodiversity site or view and work with others to celebrate, conserve and promote it.
- C. Behave responsibly and sustainably towards your natural environment following guidance and codes when undertaking geological fieldwork and collecting geological specimens.
- D. Help identify and record new sites.

Community Earth Heritage Champions

Co-ordinated by Herefordshire and Worcestershire Earth Heritage Trust this Heritage Lottery grant-funded initiative established community champions across the two counties to look after and promote a network of 19 Local Geological Sites. The work continues beyond the initial funding; sites are maintained and regular events and activities held.

GeoExposure

Set up by the British Geological Survey this crowd-sourcing initiative encourages the recording of temporary geological sections which would otherwise go unreported. This is an example of the importance of citizen science and the input of geologists, amateur and professional alike.



Helvellyn, Lake District—a favourite recreation destination, volcanic rocks sculpted by ice. ©Julie Harrauld.



School fossil hunting visit to a Champions site, Herefordshire. ©Herefordshire & Worcestershire Earth Heritage Trust.

Wrosne: an underground experience

Centred around the geological Wren's Nest National Nature Reserve, the Wrosne project worked with young people on surrounding estates, bringing communities together. It culminated in an underground theatrical performance inspired by geology and its links to Dudley.

Cassop Primary School fossil collecting area

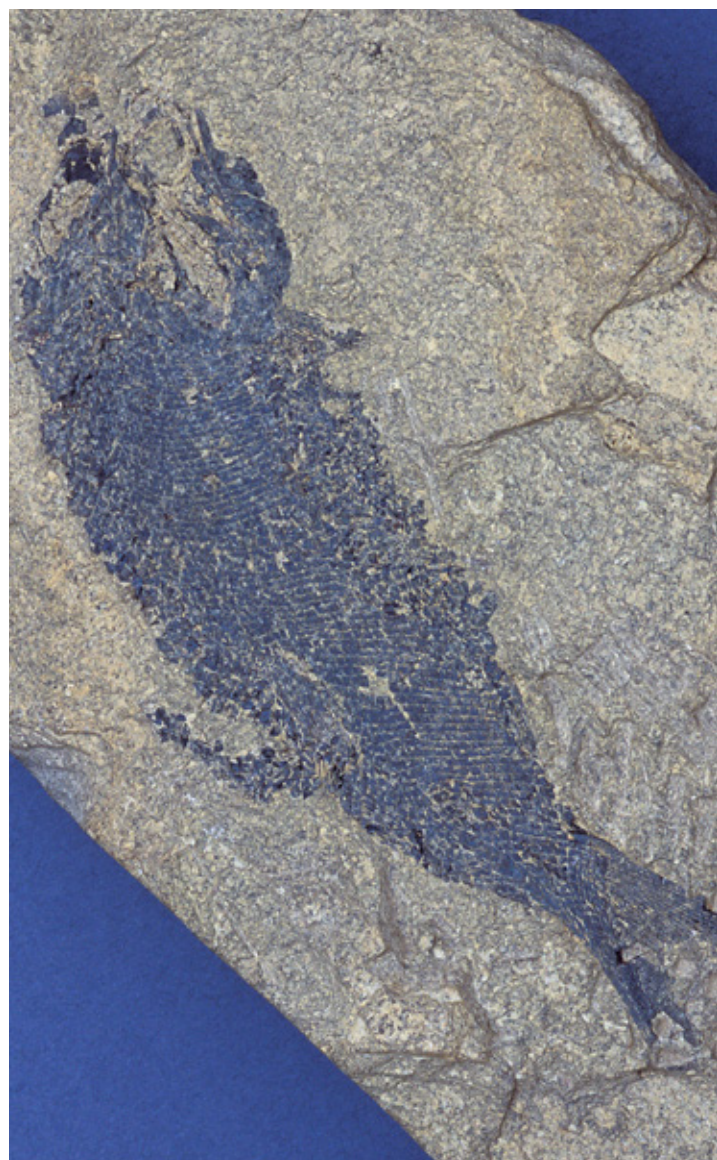
Working with the Heritage Lottery Fund Limestone Landscape Partnership and local quarries, Cassop Primary School, County Durham, has established a Marl Slate collecting area where children can hunt for Permian fossil fish. The Marl Slate is replenished by local quarries.

Teme Valley Geological Society (TVGS)

Martley, Worcestershire by establishing TVGS, is a community taking geology to its heart. European funding has enabled the audit of over 40 sites, trails, interpretation and map boards, courses for adults and juniors, fieldtrips and evening talks attracting audiences of up to 100. Academic work is to follow and TVGS is working with groups in France and Germany on the 'GeoVillage' concept.



Silurian inspired Wrosne performance in limestone caverns under Dudley, West Midlands. ©Dudley MBC.



Permian fish from the Marl Slate, Durham. Fish 20 cm long. ©Natural England, Mick Murphy.

2. Land owners, land managers and non-governmental organisations

Take into account the geodiversity of the land you manage, try to work in sympathy with natural processes and landforms, and consider providing interpretation of sites where geodiversity can be appreciated.

Actions:

A. Maintain geodiversity by seeking information and advice to help you understand what is there and what you can do to conserve and enhance it, including restoration of natural processes and provision of interpretation where appropriate.

B. Help schools, communities, businesses and others to appreciate the connections between your local geodiversity, landscape, land use, archaeology, industrial history and biodiversity.

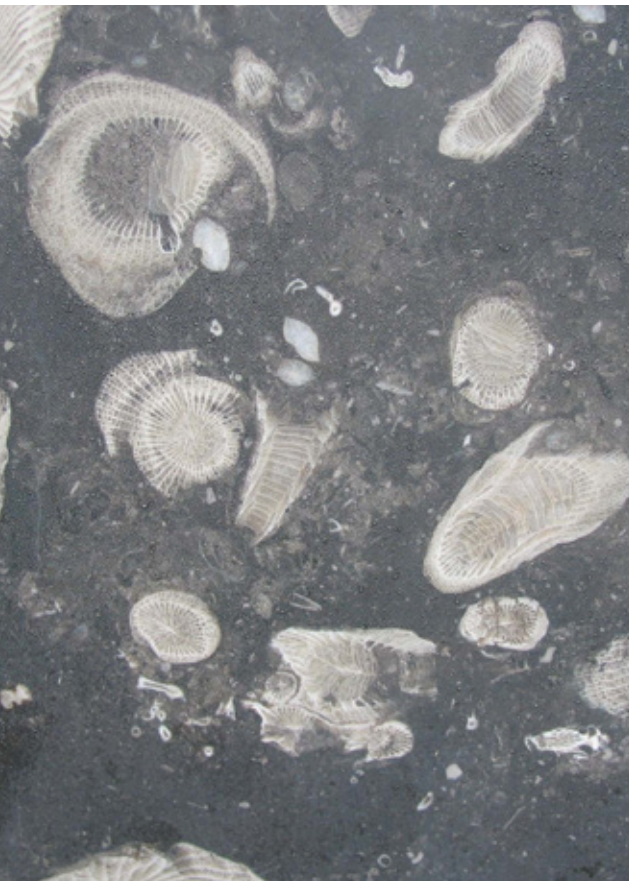
C. Incorporate and advocate geodiversity in planning, including Neighbourhood and Local Plans, and nature conservation initiatives.

National Trust geodiversity policies

The National Trust has established policies specifically aimed at conserving, promoting and valuing geodiversity. The policies recognise the important role that geodiversity plays across their estate and its contribution to visitor experience.

Harehope Quarry Project

This environmental education centre has been developed by the landowner in a disused quarry on the outskirts of Frosterley in Weardale, County Durham. Famously the source of Frosterley Marble, used widely as a facing stone, Harehope has worked on a number of geological projects including the local Rock Detectives Club with the North Pennines AONB and Global Geopark.



Fossil corals in polished Frosterley Marble. Each coral can be several centimetres long. ©NPAP, Elizabeth Pickett.



Rock Detectives exploring Jacob's Pot, a small cave in the Great Limestone at Harehope Quarry, County Durham. ©Harehope Quarry.



Top: Dry valleys in the chalk South Downs form the Seven Sisters cliffs, East Sussex. ©Kevin Lowe.

Bottom: Botallack Head tin mines exploiting local mineralisation in West Cornwall and now part of the Cornish Mining World Heritage Site. ©Natural England, Peter Wakely.

3. Developers, industry and business sector

Ensure that new developments enhance geodiversity and meet best practice standards.

Actions:

- A. Develop sustainable business opportunities based on geodiversity, including tourism, accommodation, local products, guiding and interpretation, retail sales, and local arts and crafts.
- B. Work with natural processes as far as possible, and consider the future impact of natural processes when planning new developments.
- C. Support efforts to encourage public awareness and enjoyment of geodiversity, by enabling safe access to geodiversity on completion of site operations.
- D. Involve geologists, geodiversity groups and museums in advising on and recording geodiversity.
- E. Develop company Geodiversity Action Plans (cGAPs).

Kingsdyke Nature Reserve, Peterborough

Developed by Hanson in a disused Peterborough brick pit this extensive Nature Reserve includes ponds, bird hides and a fossil collecting area. The collecting area is replenished with clay from the nearby brick pit and regularly visited by groups looking for marine Jurassic fossils.

Company Geodiversity Action Plans

Aggregate Industries instigated the Aggregates Levy Sustainability Fund (ALSF) project undertaken by Capita Symonds to develop company Geodiversity Action Plans (cGAPs). Lafarge Aggregates and Aggregate Industries have produced quarry specific Geodiversity Action Plans and both Aggregate Industries and Hanson Aggregates produced overarching company Geodiversity and Biodiversity Action Plans.

Sunderland tufa

Discovered as part of regeneration of Sunderland North Dock in 1992, this actively forming tufa was incorporated in the new Marina Activities Centre, rather than being removed. Design modification to the original plans provided a viewing area within the building and stabilising posts to prevent collapse of the tufa which continues to grow today.



'Ammonite' lamp post inspired by the fossils of the Jurassic Coast World Heritage Site, Dorset and East Devon. ©Natural England, Hannah Townley.



The growing tufa, North Dock, Sunderland. Natural England ©Jonathan Larwood.



Top left: Fossil collecting from the Oxford Clay of Kingsdyke Nature Reserve, Peterborough. ©Natural England, Colin Prosser.

Top right: The working brickpit adjacent to Kingsdyke Nature Reserve, Peterborough. ©Natural England, Mick Murphy.

Bottom: Precambrian rocks in Bardon Quarry, Charnwood Forest, unconformably overlain by red Triassic mudstone. ©British Geological Survey.

4. Local authorities, public agencies and government departments

Ensure that conservation, enhancement and promotion of geodiversity are an integral part of the planning process and decision making, and support action by local communities to achieve this.

Actions:

A. Acknowledge the value and importance of geodiversity incorporating it in policy and guidance documents at a national and local level and seek expert advice in decision-making where appropriate.

B. Promote England's geodiversity as a tourism asset that adds value to visitor experience and enjoyment.

C. Work with local geoconservation groups to better understand and conserve local geodiversity and develop Local Geodiversity Action Plans (LGAPs).

D. Encourage developers to involve geologists, local geodiversity groups and local geology museums in recording and sampling.

E. Provide information for schools and the public, making known the importance of geodiversity sites on a local, regional or national scale, encouraging life-long learning.

Supplementary Planning Guidance

Dudley Metropolitan Borough Council has developed Supplementary Planning Guidance for early engagement with geodiversity in the planning process. It encourages early discussion about geodiversity, the recording of temporary sections and the retention of geodiversity within developments.

Northumberland National Geodiversity Audit and Action Plan

The first of its kind for a National Park, the audit provides a comprehensive description of the Park's geodiversity and its influence on the wildlife, landscape and industrial and cultural heritage. Geodiversity sites are identified throughout the Park and shared objectives and actions clearly set out through the Geodiversity Action Plan.



Local sandstones were used for bridges on the Shropshire Union Canal. ©Julie Harrald.

Tendring Geodiversity Characterisation

The contribution of geodiversity to landscape character in Tendring District, Essex, has been mapped and characterised using a new GIS-based methodology. Tendring is divided into 18 Geodiversity Characterisation Areas and component Zones. The result is detailed information to guide planning decisions and help reflect local geodiversity distinctiveness.

The London Rivers Action Plan

This action plan highlights opportunities and provides guidance for a range of sectors including local authorities, NGOs and developers for river restoration in London. There is a particular focus on improving both flood management and wildlife habitats whilst enhancing access and reconnecting people to the natural environment.



5. Research and education sector

Share and promote the value and use of England’s geodiversity through research and teaching.

Actions:

- A. Share evidence and science and encourage research to demonstrate the wider benefits of geodiversity and geoconservation.
- B. Inspire teachers and students at all levels about England’s geodiversity and its wider relevance and links across the curriculum.
- C. Develop and share geoconservation techniques, including monitoring, and encourage better use of localities and the sharing of existing information and data.
- D. Help promote the case for geodiversity at a policy level, supporting the designation of geodiversity sites at local and national levels.
- E. Participate in, and support, the activities of local geodiversity groups.
- F. Follow the Countryside Code, Geological Fieldwork and Coring Codes of the Geologists’ Association, and collect geological samples responsibly following Natural England’s collecting guidance.

Rotunda Museum, Scarborough

Opened in 1829 this purpose-built geology museum was based on a design by William Smith ‘the Father of English Geology’. Refurbished in 2008 the museum still contains the original displays alongside new geology galleries and temporary exhibitions such as ‘Scarborough’s Lost Dinosaurs’.

Earth Science On-Site

Developed by GeoConservationUK, Earth Science On-Site provides field-based teaching resources for 16 disused aggregate sites. Linked to the National Curriculum these resources can be adapted by teachers for other geodiversity sites.



Inspiring through dinosaurs at Scarborough’s Rotunda Museum. ©Rotunda Museum.

Earth Learning Idea

The Earth Learning Idea website, developed by teaching professionals from the Earth Science Education Unit at Keele University, provides a free and extensive collection of Earth-related practical teaching ideas, designed as resources for teachers and to provide fun experiences for students. Each activity maximises pupil participation and learning, using minimal, low cost equipment and materials.

Wheels to the Wild

Devised by the North Pennines AONB and Global Geopark 70 miles of cycle route with accompanying geology guide take visitors through the landscapes and geological story of the area. The guide also connects with local businesses and provides information on local B&Bs and bicycle service facilities.

Rockband

This Heritage Lottery Funded initiative brought together five museums in south east England to enable museum staff and volunteers to better deliver geological outreach. The project developed a number of resources including a 'Collector's box of geological curiosities' and textile mats depicting the geological formations of each of the partner areas.



6. Funders, sponsors and grant givers

Increase available funding and widen understanding of the potential and value of supporting geodiversity linked initiatives.

Actions:

A. Strengthen the relevance and role of geodiversity within the heritage sector and develop a wider range of grant initiatives to support geoheritage.

B. Relevant industry and business to increase sponsorship for geodiversity.

C. Develop joint initiatives across the heritage sector seeking mutually supportive funding and resources for geodiversity.

Jurassic Coast and collecting cultures

This £230,000 project supported by the Heritage Lottery Fund enabled the responsible acquisition, display and interpretation of fossil specimens for museums along the Jurassic Coast, Dorset and East Devon. The initiative culminated in the conservation and display of a unique pliosaur skull at Dorchester Museum.

The Geologists' Association Curry Fund

The Curry Fund is a small grant scheme with a particular focus on widening understanding of geology and supports the work of a wide range of groups and individuals. Since it was established in 1986 approaching 600 different projects have been supported including interpretation, such as sign boards, leaflets and museum displays, and the conservation of geological sites and collections.



'The world's largest bite': a recently discovered Pliosaur skull now displayed at Dorchester Museum, Dorset. ©Dorset County Council.

**Paignton Geoplay Park,
English Riviera Global
Geopark**

Supported by Big Lottery Community Spaces funding, this £500,000 park opened in Spring 2012. Inspired by the Geopark's past environments and life, the Geoplay Park on Paignton seafront is a pioneering and unique example of geodiversity being used to bring real benefits to a local community and help regenerate this seaside town.

**Exploration industry
sponsorship**

The Petroleum Exploration Society of Great Britain (PESGB) has provided valued support for the work of county-based geoconservation groups. The UK oil and gas industry helped fund the Earth Science Education Unit at Keele University enabling teachers access to training in order to address the geological content of the National Curriculum. The Anglo American Group Foundation and Statoil sponsor the Geologists' Association's children's club, Rockwatch.

**Landscape Partnerships,
Heritage Lottery Fund**

This partnership programme is focused on conserving distinctive landscapes across the UK bring together a mix of cultural and natural heritage interests. Geodiversity is important in many of these partnerships, for example, the Cheshire Saltscapes Partnership linked to the area's salt industry and the Limestone Landscapes Partnership in Durham which focuses on the influence of the Permian Magnesian Limestone



Climbing net 'mountain' at Paignton Geoplay Park, Devon. ©English Riviera Global Geopark.



Orchids growing at Marsden Old Quarry Nature Reserve, Tyne and Wear. ©Lesley Dunlop.

Support for the Charter

The following organisations support the Charter and its vision and will work towards relevant actions:

Other organisations and individuals are encouraged to bring their support to the Charter and further information can be found on the English Geodiversity Forum website at....

The English Geodiversity Forum

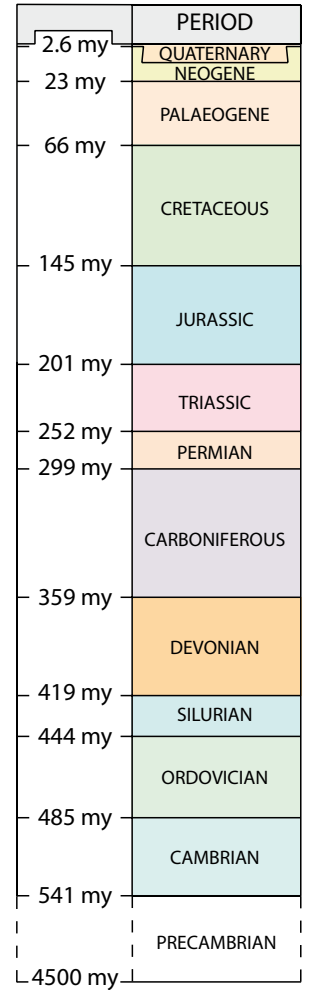
The English Geodiversity Forum was established in 2013. It promotes England's geodiversity, seeking to widen the profile of, and support for, geodiversity and its influence on national and local policies. The English Geodiversity Forum has drawn up this Geodiversity Charter for England and supports its vision and actions and encourages all to support the charter.

The English Geodiversity Forum is a collective voice for geodiversity across England. It aims to achieve this through:

1. Supporting and assisting the delivery of geodiversity action through mechanisms such as the Geodiversity Charter and the UKGAP.
2. Promoting and sharing good practice in relation to geodiversity and geoconservation.
3. Raising awareness and understanding of geodiversity.
4. Advocating the inclusion of geodiversity in local, national and international policies.

The Forum is open to all organisations and individuals who are interested in promoting England's geodiversity and sharing experience and good practice.

Acknowledgements: to be added . .



Geological time scale, my = million years.



Aerial view of the White Horse of Uffington (found at 'White Horse Hill' shown on the back cover) an ancient chalk figure carved into the hills of Oxfordshire. ©National Trust.

Back cover: Extract from William Smith's 1815 map—the first geological map of Britain. White Horse Hill is in the south east corner. ©Jonathan Larwood.

