

Objective 1: Audit and record all geodiversity resources

ACTION STATUS

Priority work/ongoing



Action underway



Action to be undertaken



ACTION

ACTION STATUS

Support the work of the Geological Records Centre and ensure data is maintained and updated.



Carry out an audit of knowledge, information, materials and skills relating to geodiversity within the county.



Carry out an audit of the geological, fluvial, glacial, soil and natural landscape features.



Identify and record all sources of locally important building stone, and seek to safeguard them within the planning system.



Assemble a rock, mineral and fossil reference collection of the county.



Publish the audit of geodiversity within five years.



Objective 1: Audit and record all geodiversity resources



Left: Studying exposures at Waresley Quarry, Hartlebury. Waresley Quarry is one of a number of quarries around Hartlebury that exposes the Triassic age (251-199 million years old) Mercia Mudstone Group. This rock is extracted from the quarries for brickmaking. Waresley Quarry has the best exposure anywhere in the county of veins of the mineral gypsum.

Below: Examining dipping rock, Lickey Hills. The Lickey Hills are composed of quartzite, a hard, resistant rock made almost entirely out of the mineral quartz. The rock layers, although laid down horizontally in a shallow sea, have been tilted due to ancient earth movements, so that they now dip at a steep angle. The geologist is measuring the angle of this dip.



More details about the actions and the annual targets set to achieve them can be found at:
www.EarthHeritageTrust.org and www.ukbap-reporting.org.uk

Objective 2: Increase awareness, understanding and appreciation of the county's geodiversity

ACTION STATUS

Priority work/ongoing

Action underway

Action to be undertaken

ACTION	ACTION STATUS
Carry out a programme of geodiversity lectures, walks, talks and fieldtrips for all. Undertake at least four events per year.	Priority work/ongoing
Improve online geodiversity information on the Earth Heritage Trust, West Midlands Geodiversity Partnership and Abberley and Malvern Hills Geopark websites.	Priority work/ongoing
Raise awareness of the Earth Heritage Trust activities through participation in at least five festivals, shows and events per year.	Priority work/ongoing
Identify local community groups and encourage their participation in geodiversity programmes, such as site conservation work.	Action underway
Run and enhance Rock and Fossil Roadshows (e.g. as part of the Annual Seed Festival in the Wyre Forest for 2009-10).	Action underway
Working with the owners, encourage the use of Worcestershire sites and specimens for educational purposes, such as the 'Champions' Project sites and museum collections.	Action underway
Work with universities to develop suitable geodiversity research projects within the county.	Action underway
Produce, maintain and publicise a list of all formal and informal geodiversity courses in the county.	Action to be undertaken
Promote educational opportunities by providing geodiversity information to schools and colleges, identifying safe and accessible sites for fieldtrips and producing education packs.	Action to be undertaken
Support the development of a permanent natural history display of the county.	Action to be undertaken

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Objective 2: Increase awareness, understanding and appreciation of the county's geodiversity



Left: Rock and Fossil Roadshow, Bewdley. Rock and Fossil Roadshows are organised for schools, family groups or festivals. Children (and adults alike!) enjoy a variety of activities, which explain geology and past environments. These include making a fossil cast, recreating an ancient underwater landscape and finding out about different types of rocks, fossils and minerals.

Below: Green Festival, Clent Hills. The Earth Heritage Trust is invited to take part in a number of events every year. These are used to promote the work of the organisation and to raise awareness of the wonderful and important geodiversity of the county.



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Objective 3: Ensure that geodiversity is identified and included in regional and local strategies, plans and policies

ACTION STATUS

Priority work/ongoing	
Action underway	
Action to be undertaken	

ACTION	ACTION STATUS
Create a mechanism for all Local Authorities to regularly update data on LGS/RIGS.	
Ensure that geodiversity is considered in planning decisions, by making sure that consultation mechanisms are in place.	
Ensure that geodiversity is included in all relevant regional and local strategies.	
Respond to Local Authorities and other bodies in order to influence consultations in favour of geodiversity conservation policies.	
Support and engage with other geodiversity and geoconservation organisations e.g. the British Geological Survey, the Geology Trusts, the West Midlands Geodiversity Partnership and UKRIGS.	
Provide input, where appropriate, to management plans of organisations such as AONBs, the Countryside Service, the Forestry Commission, Geoparks, the Malvern Hills Conservators and the National Trust.	
Ensure that geodiversity is included in and remains a conservation priority within new and future revisions of Supplementary Planning Documents.	

Key:

- AONB Area of Outstanding Natural Beauty
- LGS Local Geological Site (formerly known as RIGS)
- RIGS Regionally Important Geological/Geomorphological Site
- UKRIGS The Association of UK RIGS Groups

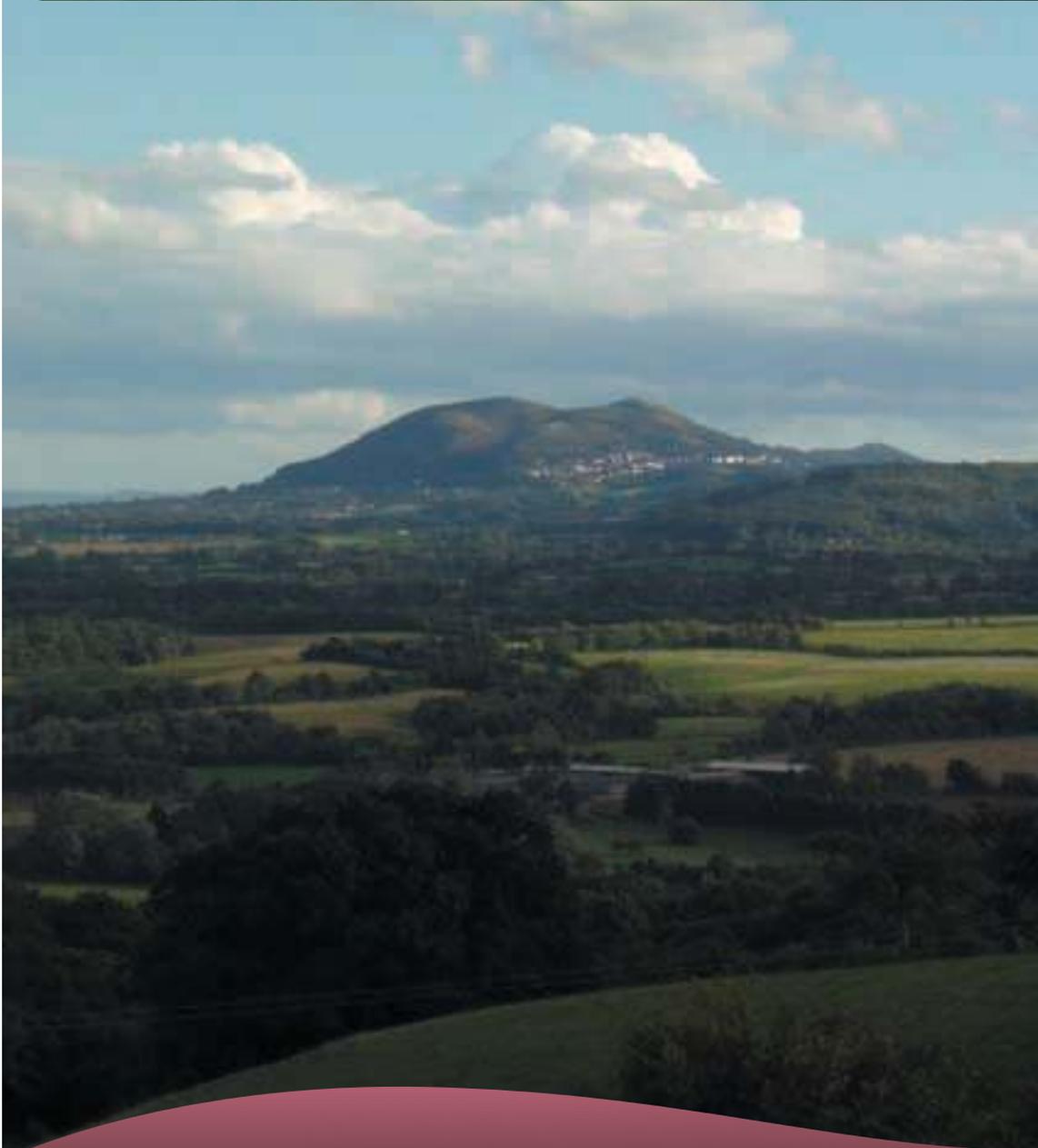
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Objective 3: Ensure that geodiversity is identified and included in regional and local strategies, plans and policies



Left: Looking towards Parsons' Folly, Bredon Hill. Bredon Hill marks the edge of the Cotswold

Hills Area of Outstanding Natural Beauty (AONB). An AONB is an area designated as 'a precious landscape whose distinctive character and natural beauty are so outstanding that it is in the nation's interest to safeguard them'. This natural beauty includes all geodiversity, biodiversity and human influences on the landscape.



Left: View of West Malvern and the Malvern Hills. The Malvern Hills are the dominant feature in the west of the county. They fall within the Malvern Hills AONB, which, despite being one of the smallest in the country, has a wide variety of landscapes. Each landscape has been shaped on the surface by biological and human influences, which in turn have been strongly influenced by the considerable diversity of rocks and soils occurring within the AONB.

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Objective 4: Provide guidance and support to those dealing with geodiversity, e.g. local authorities, landowners, organisations and individuals

ACTION STATUS

Priority work/ongoing	
Action underway	
Action to be undertaken	

ACTION	ACTION STATUS
Contact and inform landowners regarding LGS/RIGS and other important geodiversity features in their area.	
Obtain resources to assist in the reporting on National Indicator 197.	
Provide advice and engage with planners, landowners, etc. in relation to geodiversity.	
Assist the County Council in the production of relevant Technical Research Papers and any future relevant environmental documents.	
Produce a Code of Conduct for visiting public and privately owned geodiversity sites.	
Discuss the potential for Service Level Agreements between Local Authorities and the Earth Heritage Trust, in order to supply geodiversity information to assist in policy decision making on the natural environment.	
Produce a geodiversity alerts map for the county.	
Provide workshops on the natural environment (which includes biodiversity and geodiversity) for planners and council elected members.	

Key:

- AONB Area of Outstanding Natural Beauty
- LGS Local Geological Site (formerly known as RIGS)
- RIGS Regionally Important Geological/Geomorphological Site

Objective 4: Provide guidance and support to those dealing with geodiversity, e.g. local authorities, landowners, organisations and individuals

Right: Southstone Rock, Teme Valley. This impressive cliff face and former hermitage is made out of tufa. The deposit forms when groundwater, saturated with calcium carbonate, comes to the surface as a spring. On contact with the air, the calcium carbonate precipitates out. Various plants and creatures become trapped in this rapidly forming deposit. This has enabled scientists to date the formation of the oldest parts of the cliff to 6700 years ago.

Below: Dowles Brook, Wyre Forest. Dowles Brook flows through a steep-side valley in the middle of the Wyre Forest, cutting down into Carboniferous age (359-299 million years old) rock. An initial study to classify Worcestershire's rivers has identified the brook as one of the most natural watercourses in the county, i.e. there is little human modification along its course.



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Objective 5: Protect, conserve and enhance geodiversity resources

ACTION STATUS

Priority work/ongoing



Action underway



Action to be undertaken



ACTION	ACTION STATUS
Develop a programme for the regular condition monitoring of LGS/RIGS.	Priority work/ongoing
Identify, survey and designate potential LGS/RIGS, including those recorded in 2008.	Priority work/ongoing
Where possible, work with landowners to develop and implement management strategies for LGS/RIGS.	Priority work/ongoing
Seek opportunities to enhance geodiversity sites and resources through project work, e.g. the 'Champions' Project.	Action underway
Work with quarry operators to include geological and biological conservation in quarry restoration plans.	Action underway
Assist in the monitoring and management of all geological SSSIs within the county, to help achieve the 95% Public Service Agreement by 2010.	Action to be undertaken
Encourage the creation of new geodiversity resources, e.g. the retention of features during road improvements and site developments.	Action to be undertaken

Key:

- LGS Local Geological Site (formerly known as RIGS)
- RIGS Regionally Important Geological/Geomorphological Site
- SSSI Site of Special Scientific Interest

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Objective 5: Protect, conserve and enhance geodiversity resources

GEODIVERSITY ACTION PLAN Worcestershire



Left: **Burcot Lane Cutting SSSI**. The road cutting reveals the unconformable contact between the Triassic age (251-199 million years old) Bromsgrove Sandstone and Wildmoor Sandstone Formations. Work undertaken in 2001-02 removed vegetation which had covered the cutting. This enabled a nationally protected feature to be exposed once more.

Below: **Woodbury Quarry SSSI**. This huge quarry shows a continuous sequence through Ludlow rocks, which form part of the Silurian Period (444-416 million years old). During this time, Worcestershire was under a warm, tropical sea. Fluctuations in sea level allowed for the deposition of layers of siltstone, mudstone and limestone. These layers have since been tilted to vertical and even overturned, creating spectacular vertical columns of rock, rich in fossilised sea creatures.



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Objective 6: Further the opportunities for business involvement in geotourism and geodiversity

ACTION STATUS

Priority work/ongoing	
Action underway	
Action to be undertaken	

ACTION	ACTION STATUS
Support the work of the Abberley and Malvern Hills Geopark in order to promote geodiversity.	
Continue to promote geology and landscape trail guides and other geodiversity literature to visitors through magazine articles and online information.	
Ensure that geodiversity information is more widely available at visitor attractions such as the Arrow Valley Countryside Centre, museums, National Trust properties and the West Midlands Safari Park.	
Identify businesses (such as quarry operators) with an interest in geodiversity, in order to involve them in the GAP.	
Promote the Geopark Way (through such events as the Malvern Walking Festival 2009) and develop an annual Geopark Day event, in order to increase sustainable geotourism.	
Carry out a feasibility study for the use of Broadway Quarry as an outdoor classroom/visitor facility.	

Key:

GAP Geodiversity Action Plan

Objective 6: Further the opportunities for business involvement in geotourism and geodiversity



Left: Ball Mill workings, Grimley. Sands and gravels, deposited by the River Severn 45,000-30,000 years ago, are being dug from this area. Studies of older workings at Grimley and elsewhere have led to a better understanding of the evolution of the River Severn over the last 100,000 years. Indeed, research suggests that a very similar biodiversity and landscape to that of the present day existed some 40,000 years ago. However, temperatures were colder than today.

Below: Broadway Quarry, Broadway Hill. Jurassic age (199-145 million years old) limestone is being extracted for aggregate and building stone at this site. The workings have revealed a number of interesting features, including the best and most complete exposure of a particular rock unit (the Harford Member) anywhere on the Cotswolds. Consequently, an exposure of this rock unit will be retained as part of the restoration of the quarry.



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Objective 7: Improve and sustain the links between geodiversity, biodiversity, archaeology and landscape

ACTION STATUS

Priority work/ongoing	
Action underway	
Action to be undertaken	

ACTION	ACTION STATUS
Develop partnership working with the biodiversity and historic environment sectors (e.g. Wildlife Trust, Biodiversity Partnership, Historic Environment and Archaeology Service). To include joint conservation work, walks, talks and other collaborative projects.	
As appropriate, give guidance and advice on the geodiversity of local nature reserves and archaeological sites.	
Ensure that the GAP is entered onto BARS, in order to record progress and encourage the integration of the BAP and GAP.	
Audit the county's Special Wildlife Sites for their geodiversity interest.	
Contribute to the Landscape Character Roadshow.	
Encourage the use of local stone in new constructions and in the repair of existing structures, by informing and influencing current and future planning policy.	
Hold a conference on making the links between Geodiversity and the Historic Environment.	
Improve the way in which the geological, biological and historic environment record centres share information, through creating a memorandum of understanding.	
Provide geodiversity input to the County Landscapes for Living Map.	

Key:

- BAP Biodiversity Action Plan
- BARS Biodiversity Action Reporting System
- GAP Geodiversity Action Plan

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Objective 7: Improve and sustain the links between geodiversity, biodiversity, archaeology and landscape



Above: Worcester Cathedral. The cathedral was originally built of stone dug from Carboniferous age (359-299 million years old) rocks in the north of the county. It has been repaired with a variety of stone throughout the years. Both local stone and stone from other parts of the country have been used in the various phases of restoration. This has created an interesting mosaic of colours on both the exterior and interior of the building. Identification of building stones and their sources is an important consideration in the conservation and restoration of historic buildings.

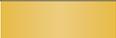
Left: Foxglove growing on bare rock. The distribution of habitats and species is strongly dependant on the underlying geology and soil. For example sandstones give rise to sandy soil. With careful management, areas of heathland can be created and maintained on this type of soil. Limestone rock gives rise to areas of lime-loving flora. Understanding the distribution of certain rocks and soils will enable rare and endangered habitats to be created or successfully restored.

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Objective 8: Secure the continuity, sustainability and effectiveness of the GAP process and geoconservation in Worcestershire

ACTION STATUS

Priority work/ongoing	
Action underway	
Action to be undertaken	

ACTION	ACTION STATUS
Identify sources of funding for all the GAP actions.	
Obtain funding for the Geological Records Centre.	
Create a regular reporting procedure for the GAP.	
Encourage ownership of the GAP by all stakeholders.	
Identify new stakeholders in the GAP.	
Organise a yearly event for key stakeholders.	
Review the GAP after five years.	
With assistance from key stakeholders, identify priority actions within the first year of the GAP.	

Key:

GAP Geodiversity Action Plan

Objective 8: Secure the continuity, sustainability and effectiveness of the GAP process and geoconservation in Worcestershire



Above: **Gullet Quarry, Malvern Hills.** The quarry exposes 700 million year old rocks, formed deep inside the Earth. Due to their hard nature, these granitic rocks have been extensively quarried along the entire length of the Hills, both for roadstone and as a local building stone.

Below: **View across to Abberley Clock Tower.** In the distance stands the Bromyard Plateau, which is underlain by sandstones of Devonian age (416-359 million years old). In the foreground, the village of Abberley sits on sandstone rocks of Carboniferous age (359-299 million years old) whilst the Abberley Hills are made up of Silurian age (444-416 million years old) siltstones and limestones.



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