

# A Geodiversity Action Plan for Worcestershire Consultation Document

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Front cover from top left – fossil hunting, Malvern Hills. Worcester Cathedral.  
Standing Stones, Clent Hills. Malvern Hills from Castlemorton Common. Broadway  
Quarry, Bredon Hill.

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## **1. Introduction**

### **What is Geodiversity?**

The term geodiversity has evolved from the word biodiversity (the variety of the living world). It is thought of as complement to biodiversity, covering all aspects of the non-living world. It is defined as:

*The variety of rocks, minerals, fossils, drift, landforms and soils. It includes their processes and relationships to people, places and nature.*

Worcestershire is an area with an outstanding geodiversity spanning 680 million years of Earth History (see Appendix 1 for geology summary). The underlying rock and soil features are clearly reflected in the landscape, natural habitats, land-use and settlement patterns.

### **The purpose of this document**

The purpose of this document is to give a more detailed overview of the proposed Geodiversity Action Plan (GAP) for Worcestershire and to consult on the proposed aims, actions and targets. The success of the GAP lies in consulting the general public, individuals, landowners, organisations and businesses on the direction and shape of the Plan. Their input and guidance is central to establishing a successful on-going management process for geodiversity conservation and enhancement within Worcestershire. There will be a broad, holistic approach to the delivery of the Plan, with clear actions and targets needed to ensure the sustainability of the process.



Southstone Rock, Teme Valley; one of the largest tufa forming deposits in the country

Based on other GAPs, themes that should be included within the Plan are; influencing the Planning System, improving public awareness and education of geodiversity, promotion of geoconservation and geotourism and improved management of sites and record keeping. The involvement of a wide range of organisations and individuals in deciding the priorities of these for the county, is central to ensuring the successful implementation and delivery of the Plan. To this end, we would appreciate if you could fill in and return the questionnaire at the back of the document, to help guide us in what priorities you want.

### **Why produce an Action Plan?**

Geology (the study of the Earth) is of great importance, enabling us to understand the history of our planet, and the evolution of life. It underpins society by providing all the natural resources that we need, from the petrol in your car, to the metal that

makes your cutlery. Without the knowledge of geology, these resources would not be found and utilised. Society has and always will, rely on what is in the Earth.

For a country the size of the UK, we have some of the most diverse and magnificent geology in the world. Indeed Britain can claim to be the birthplace of geology and many areas are of international significance, both historically and scientifically. These include names of global divisions of Time (e.g. Silurian) and first descriptions of many fossils and minerals. These sites are important in telling us what happened in the past, and what may happen in the future.

Geodiversity influences landscape and settlement patterns. The distribution of soil types determines where we can grow our crops, farm our livestock and plant our forests. The distribution of rock types determines where we put our quarries, mine our coal, and extract our oil. Unique and special landscapes such as those of the Cotswold and Malvern Hills would not exist were it not for the rocks that underlie them. Indeed every landscape within the UK is the product of a complex relationship between the underlying geology and natural processes, which are little understood, let alone looked after.



Woodbury Quarry, Abberley Hills

However, despite the importance, geodiversity is often taken for granted or ignored. For this reason, raising awareness within the Planning System and with the general public must be a priority in enhancing, managing and conserving our limited natural resources (once a fossil dinosaur is destroyed, or a unique rock feature quarried, it cannot be replaced). In the short term this will provide a better understanding of habitat and species distribution and how to conserve them, as well as where potential new natural resources may be found. In the longer term it will enable a better understanding of global trends, climate change and fluctuating sea levels, to ensure better planning for the future. A key factor is the continued conservation and enhancement of current sites such as National Parks, Sites of Special Scientific Interest and Regionally Important Geological/Geomorphological Sites. However a more holistic and broad view needs to be applied to geoconservation, by linking in biodiversity and archaeology to the process, rather than treating them as individual topics.

As a result, Geodiversity Action Plans have been championed as a new and effective way of creating a framework in which to achieve effective geodiversity management and conservation. Previous plans have taken into account the needs of local and national government, landowners, organisations, official bodies and the general public. Geodiversity Action Plans have been developed in part from the model of Biodiversity Action Plans (BAPs). There is now an increased emphasis on planning for Geodiversity nationally, having been reflected by the Government in Planning Policy Statement 9 (PPS9) “Biodiversity and Geological Conservation”, in

which Geodiversity is clearly placed at the heart of planning policy. Some extracts from PPS9 and other relevant documents are given in Appendix 2.

Biodiversity and Geodiversity are closely linked, with the underlying geology influencing habitats and distribution of species. In addition, the Natural Area maps created by English Nature show a strong affinity to those of geological maps. It is clear that co-operation to ensure the enhancement of nature conservation is needed. With Worcestershire already implementing a Biodiversity Action Plan, the aim would be to work closely amongst the partners in this process, to integrate the actions and to ensure that no conflict arose from our joint interests to conserve the environment.

Geodiversity and Archaeology have important links too. Settlements are sited depending on the landscape and its resources, with a wealth of archaeological finds and environmental evidence being sourced from quarrying activities. Identification of materials used to make artefacts and construct buildings are key to identifying trade routes and community interactions in the past. In a more modern sense, industrial archaeology sites and communities are located on the basis of the geodiversity resource, (e.g. the coal mining communities of the Black Country).

Worcestershire has a special natural environment, which this project seeks to conserve and enhance for future generations. Only through a successful Partnership, with sustainability at its core, will this Plan be successful.

### The Geodiversity Partnership

The Worcestershire Geodiversity Partnership is a group of organisations, landowners and individuals that are committed to safeguarding and managing the resources beneath our feet. It will design, write and deliver the Plan, and ensure that it is shaped to meet the needs of the people of the county. The following lists those already committed to the Partnership:

Abberley and Malvern Hills Geopark  
British Geological Survey  
Ecoscape Ecology Ltd  
Herefordshire and Worcestershire Earth Heritage Trust  
Malvern Hills Conservators  
National Trust  
Worcestershire Historic Environment and Archaeology Service



Gullet Quarry – a key location in understanding the formation of the Malvern Hills

## **2. Proposals**

### **Proposed Key Features**

The following is a list of the key features and themes that should play a part in the shaping of the GAP:

- The area covering the Action Plan will be the county boundary of Worcestershire.
- A wide range of stakeholders, including local government, landowners, non-government organisations and the public will help to design and implement the Plan.
- Consultation will be as wide as possible.
- Effective use will be made of expertise and knowledge of the geodiversity to set far reaching, yet obtainable actions and targets.
- The Plan will be linked to existing activities and networks, such as the Worcestershire Biodiversity Partnership.
- An underpinning philosophy of sustainability will be needed to ensure the continuation of the Plan in the future.

### **Proposed Aim of the GAP**

*To make a positive contribution to the enrichment of Worcestershire's environment and quality of life by managing, conserving, educating and enhancing the county's geodiversity for the benefit of all.*



Geoconservation work in the Malvern Hills

### **Proposed Actions of the GAP**

1. Carry out a full audit of all the geodiversity features, literature, datasets and skills within the county.
2. Increase overall public and private awareness, understanding and appreciation of the county's geodiversity.
3. Ensure geodiversity is identified and included in regional and local authority strategies, plans and policies.
4. Provide guidance to planning authorities, landowners and other individuals and organisations on sustainable management practices when dealing with potential and existing geoconservation sites.
5. Augment/update the county's Regionally Important Geological/Geomorphological Sites (RIGS) and other protected sites database.
6. Encourage and expand geotourism at all levels within the county and beyond through bodies such as the Abberley and Malvern Hills Geopark, whilst at the same time respecting the objectives of local management plans.
7. Promote and develop geological education through education packs, museum collections, and renovation of sites for fieldtrips.
8. Increase community and business involvement in geoconservation.
9. Establish appropriate mechanisms to secure the continuity, sustainability and effectiveness of the GAP process in Worcestershire.

## Proposed Targets of the GAP

1. Obtain funding for the actions within the first year of the launch of the GAP.
2. Increase the number of RIGS in Worcestershire to 100 from 59 within 5 years.
3. Develop a sustainable education and awareness programme within 3 years.
4. Establish a geotourism programme within 2 years.
5. Review the condition of all existing RIGS within 2 years.
6. Develop a programme of annual partnership meetings and public workshops.
7. Review the GAP after 5 years.



Rocks formed in an ancient desert exposed in the River Sever at Bewdley

## **Appendix 1 - Geology**

Worcestershire contains a wide variety of rock types covering 600 million years of Earth history. There are 4 National Nature Reserves (NNR) with two of them, Bredon Hill and the Wyre Forest, having particularly fine geology. There are 9 geological Sites of Special Scientific Interest (SSSI) and 59 Regionally Important Geological Sites (RIGS). In addition, the area of the county west of Kidderminster and Worcester is within the Abberley and Malvern Hills Global Geopark.

The Landscape of Worcestershire strongly reflects its geological makeup. The oldest rocks in the County are the much-altered Pre-Cambrian (pre-542 million years ago) igneous and volcanic rocks that form the Malvern Hills. These hard rocks have probably formed an area of upstanding relief for many millions of years, having been pushed up from some 3.5km below the surface.

Rocks of the Silurian Period (443-416 million years ago) in the county are world renowned, and many standard geological names have their roots within the West Midlands e.g. Ludlow and Wenlock. In the Abberley and Malvern Hills area limestones and mudstones were deposited in a shallow shelf sea and where exposed, yield many fossilised brachiopods and trilobites.

Sandstones and mudstones of the Devonian Period (416-359 million years ago) outcrop in the Teme Valley. They were formed in a hot semi-arid desert environment. West of Kidderminster, red mudstones from the upper part of the Carboniferous Coal Measures and the Wyre Forest Coalfield are found. During the deposition of the Coal Measures, England lay approximately on the equator, with the coal forming as the result of the decay of vegetation that accumulated in marshes.

Easily eroded mudstones and sandstones of Triassic (251-199 million years ago) and Jurassic (199-145 million years ago) Period floor the broad floodplain of the Severn and the Vale of Evesham. The Triassic rocks were laid down on a broad desert plain. In the early Triassic, this plain was crossed by large river systems, emanating from northern France. These sandstones of the Sherwood Sandstone Group have been quarried and used as a traditional building stone in much of the area, particularly around Bromsgrove and Kidderminster. They also form an important aquifer. The succeeding Triassic mudstones of the Mercia Mudstone Group crop out in the eastern part of the county and were laid down in a desert, dominated by dust and periodic flash floods. These rocks are overlain in the extreme east by Jurassic mudstones and thin limestones of the Lias Group deposited in a warm, shallow, tropical sea. These rocks give rise to the lower lying land adjacent to the escarpment formed by the harder Middle Jurassic limestones of the Cotswolds. Bredon Hill represents an outlying fragment of the Cotswolds and is capped by Middle Jurassic Limestones of the Inferior Oolitic Group.

More recently, Pleistocene (1.81-0.01 million years ago) sediments deposited by Ice Sheets and meltwater over the past 500,000 years, cover the land surface and take the form of terraces along the major river systems. More recent Holocene (10,000 years ago to present day) deposits occur in river valleys as river terrace deposits and alluvium. Soils are the product of the complex processes of weathering, erosion and biological interaction with the rock, sediment, river terraces and alluvium.



## **Appendix 2 – Statements regarding Geodiversity**

The following excerpts are statements from Government publications which are of relevance to Geodiversity and Action Plans.

### **A) Planning Policy Statement 9; Biodiversity and Geological Conservation**

*The Government's Objectives* (page 2) are:

**“To promote sustainable development by ensuring that biological and geological diversity are conserved** and enhanced as an integral part of social, environmental and economic development, so that policies and decisions about the development and use of land integrate biodiversity and geological diversity with other considerations”.

**“To conserve, enhance and restore the diversity of England’s wildlife and geology** by sustaining, and where possible improving, the quality and extent of natural habitat and geological and geomorphological sites; the natural physical processes on which they depend; and the populations of naturally occurring species which they support”.

*Local Development Frameworks* (page 4) should:

i)“indicate the location of designated sites of importance for biodiversity and geodiversity, making clear distinctions between the hierarchy of international, national, regional and locally designated sites.”

### **B) Planning for Biodiversity and Geological Conservation - A Guide to Good Practice**

*Part 2 - Information and evidence* (page 18):

“PPS9 states that regional planning bodies should liaise with the British Geological Survey and, where appropriate, local Regionally Important Geological/geomorphological Site (RIGS) groups on geodiversity issues. Where they have been produced, it would be good practice to use Local Geodiversity Action Plans (LGAPs) as a framework upon which to audit, conserve, manage and promote characteristic geological, geomorphological and soils resources...”

### **C) Local Sites – Guidance on their Identification, Selection and Management (DEFRA 2006)**

*Introduction* (page 3). Local Sites should promote:

“Local sites systems that sit in their rightful place within the governments’ overall strategy for biodiversity and geological conservation.”

“Appropriate dialogue and involvement across the range of relevant stakeholders.”

“The operation of clearly understood processes and criteria for the selection of sites;”

“The maintenance of a suite of sites that remains relevant at any point in time;”

“Local Sites systems operated in a transparent way that can be communicated with confidence to all parties from landowners to developers.”

Part 1: *Background and Context* (page 4) define what a Local Site System is:

“The series of non-statutory Local Sites seeks to ensure, in the public interest, the conservation, maintenance and enhancement of species, habitats, geological and geomorphological features of substantive nature conservation value. Local Site systems should select all areas of substantive value including both the most important and the most distinctive species, habitats, geological and geomorphological features within a national, regional and local context. Sites within the series may also have an important role in contributing to the public enjoyment of nature conservation.”

## **Glossary**

**Biodiversity** (biological diversity) - The variety of all living things, the habitats in which they live and the interactions between them.

**Biodiversity Action Plan (BAP)** - The audit of biological diversity and the implementation of management strategies to conserve and protect habitats and species. There is a countywide, regional and national BAP.

**Drift** – Sediment laid down by, or in association with the activity of glacial ice.

**Geoconservation** - The act of conserving and managing the geodiversity resource.

**Geodiversity** - The variety of rocks, minerals, fossils, drift, landforms and soils. It includes their processes and relationships to people, places and nature.

**Geodiversity Action Plan (GAP)** – An audit of the resource and setting out of actions and targets for the conservation, enhancement and management of Geodiversity.

**Geology** – The study of the formation, structure and evolution of the Earth.

**Geomorphology** – The study of landforms, their origin, evolution and the processes that shape them.

**Geopark** - A designated area of significant geological heritage with a coherent and strong management structure to promote conservation and sustainable economic development, (usually through geotourism). Global Geoparks are endorsed by UNESCO.

**Geotourism** - Tourism that sustains or enhances the geographical character of a place - its environment, heritage, aesthetics, culture, and the well-being of its residents.

**National Nature Reserve** - Internationally important areas of wildlife habitat and/or geological features, which are managed and protected by Natural England.

**Natural Areas** - England is divided into 120 areas that have similar geodiversity and biodiversity traits, along with similar landuse and settlement patterns.

**Planning Policy Statements (PPS)** - Government policy advice to local authorities and others on planning and the operation of the planning system. The statements must be incorporated into local planning policy.

**Regionally Important Geological/Geomorphological Site (RIGS)** - Non-statutory status for a site with regional or local importance. They are determined for scientific, educational, historical or aesthetic reasons. DEFRA has recently termed these areas “Local Sites”.

**Site of Special Scientific Interest (SSSI)** – Legally protected site or area of national or international importance for wildlife and/or geology.

## Questionnaire

It would be appreciated if you would answer the following questions and return them to the address below by the 16<sup>th</sup> February 2007.

1) How should the public be kept informed about progress made in the development of the GAP? (please list in order of importance; 1, 2, 3, etc.)

Letter		E-mail		Newsletter		Website	
Press release		Radio		Advertisements		Other (please state)	

2) When documents are prepared for consultation/reference in what format would you prefer to receive them?

Hard copy (paper version)	
Electronic copy (via e-mail)	
Electronic copy to view and download (from Website)	
CD Rom	
Other (please state)	

3) Having been consulted, which of the following is your preferred means of responding?

Standard form (Paper version)		Electronic form (website)	
Letter		E-mail	
Other (please state)			

Please answer the following questions in the boxes provided. Continue onto another sheet if necessary.

4) What issues are of most importance to you and/or your organisation?

5) Do you have any comments on the features, actions or targets of the Plan?

6) Do you know of any special sites/outcrops/landforms within your remit/land/area? (they may be recognised sites, or small exposures/features that are only locally known).

7) Do you know of other individuals or groups who would like to be partners or consultees in the Plan?

8) Any other comments?

Thank you for taking the time to fill in this form. Please fill in your details and return the questionnaire by the 16<sup>th</sup> February 2007 to the address below.

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Organisation/responsibility:  
Address:

  
  

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