Creating a Geodiversity Action Plan for Herefordshire

Geology and Landscape for the future

Consultation Document

HEREFORDSHIRE COUNCIL

Herefordshire & Worcestershire EARTH HERITAGE TRUST

WOOLHOPE NATURALISTS FIELD CLUB 1851

THE NATIONAL TRUST

MALVERN HILLS CONSERVATORS
MANAGING THE HILLS

Tarmac

BGS 1835 British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

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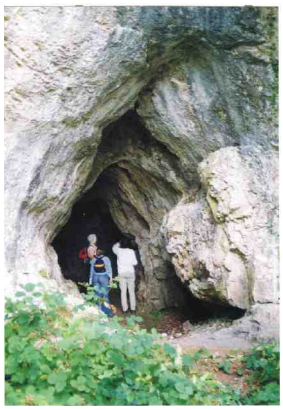
Contents

This project, supported by English Nature, aims to develop a Geodiversity Action Plan (GAP) for Herefordshire.

Cover pictures (in order)
The Lugg near Byton, Glacial Moraine at the Leasows, Silurian fossil bryozoan at Shucknall Hill, Fossil river channel in Old Red Sandstone on Bromyard Down, Tufa at the Biblins, Quartz Conglomerate on Little Doward Hill, Carboniferous Limestone at King Arthur's Cave.

Introduction to the consultation document



Carboniferous Limestone at King Arthur's Cave

What is Geodiversity?

Geodiversity or geological diversity is defined as the "variety of rocks, fossils, minerals, landforms and soils along with the natural processes which shape the landscape," (English Nature 2004). Herefordshire has excellent geodiversity or put another way is geologically diverse with examples of rocks and sediments ranging from Precambrian to Pleistocene and recent, which are important locally, regionally and nationally.

Herefordshire is an area with an outstanding geological and glacial history (See Appendix 1 for a brief summary of the geology), where the underlying rocks and soils are clearly reflected in the scenery, natural habitats, land use and settlement patterns. In Herefordshire there is a very strong link between biodiversity and the underlying geology.

The purpose of this document is to set out the proposed aims and objectives of the Geodiversity Action Plan (GAP) being developed for Herefordshire and to seek involvement of the local community, Herefordshire Council, parish councils, local businesses and organisations for its successful implementation. Herefordshire has a special natural environment, which this project seeks to record, conserve, explain and manage for future generations with the involvement of interested organisations and communities. Only by working together can we achieve the best results.

Do you enjoy the beautiful countryside of Herefordshire?

Would you like to learn more about how the landscape has evolved and how the rocks tell the story of the history of the earth?

Do you want to get involved?

The Benefits of Consultation

Providing greater opportunities for involvement can be seen to benefit the community, individuals and organisations by:

- Providing a means for the people of Herefordshire to express their views
- Providing an opportunity to influence the form of the plan and the future shape of conservation and understanding of geodiversity in Herefordshire
- Providing an opportunity for the people of Herefordshire to get actively involved in the geodiversity action plan and in all aspects of geodiversity

We will strive to give an opportunity for all members of the community to have a say in the process, which will influence the form of the GAP.
Please fill in the questionnaire on page 13 to have your say.

Geodiversity Action Plan for Herefordshire Introduction

Precambrian Malvern Hills (protected / conserved by the Malvern Hills Conservators) with Silurian limestone ridges to the west.

What is the Programme?

Herefordshire and Worcestershire Earth Heritage Trust is setting up a partnership to establish the aims and actions for a Geodiversity Action Plan for Herefordshire. This includes for example how to record and manage the geological features, both for the present and future, and how the public can learn more about and become involved with the conservation of the fascinating geological, glacial and landscape features of the area. It is anticipated that a geodiversity audit will take place in 2007 and that the GAP will be written in 2008.

Who are we?

The Geodiversity Partnership is a group of organisations that is committed to safeguarding the geology and landscape of Herefordshire. It will support programmes of site recording and protection and will promote the greater understanding of geodiversity amongst the general public and within schools and colleges.

For a GAP to work, Herefordshire needs an audit of all its geological and geomorphological features and datasets. These include the geological exposures, geological literature, museum collections of local specimens, details of datasets on the county's geological information and geological skills in the county.

Why produce an action plan?

Herefordshire's unique and beautiful natural environment is a precious heritage for us all. Important sites with recorded examples of ancient fossils have been lost because of lack of awareness of their importance. Rock sections on which pioneering work was done are no longer visible. Herefordshire already has a Biodiversity Action Plan (BAP). Biodiversity and geology are closely linked, with the underlying geology influencing the landscapes, habitats and distribution of species. The Natural Areas delineated on the County Landscape Character Assessment map show an amazing affinity with those of the geological map.

Geology and geomorphology play a very important role in the study of a region's archaeology. Many archaeological sites depend directly on a region's geology or geomorphology. For example, sites occur on flood plains close to a river, the flat land being easier to work and construct homes on, and the river providing a source of

water, food (fish) and means of transportation. Other sites may have been near to rock outcrops that provided a source of building stone or a defensive site. The geology can also be used to great effect in the study and identification of artefacts. This can tell the archaeologist whether the source is local or from outside the area and highlight the transportation of material either locally or from some distance away. The geology can also be helpful in the study of pottery, by identifying areas where clay used to make the pots may have been worked.

The Government has placed geodiversity at the heart of planning policy in the recently published Planning Policy Statement 9 'Biodiversity and Geological Conservation'. (See Appendix 2 for the relevant sections). English Nature also supports Geodiversity Action Plans, developed in part from the model of the Biodiversity Action Plan.

With such a rich geological resource in the county and new planning guidance, the time is ripe for Herefordshire to create a GAP to complement the BAP.

Key Features of the Geodiversity Action Plan for Herefordshire

1. Consultation will be as wide as possible. A wide range of partners will help to design the Plan and local communities are invited to contribute.
2. The area covered by the GAP is defined by the county boundary of Herefordshire.
3. H&W EHT is the lead partner co-ordinating the project.
4. Expertise and knowledge of the geology will be used effectively to set worthwhile and measurable geoconservation objectives and targets.
5. The GAP will be linked to existing activities, strategies and networks in Herefordshire which may affect the success, direction and future development of the GAP process.
6. Funding will be sought to provide the necessary resources for the GAP.
7. A clear purpose will be defined by setting out a list of aims.
8. A structured delivery plan will define measurable objectives and targets using expertise and knowledge of the geology.
9. There will be an audit of the geological resources, local knowledge and partner skills. The audit will be regularly updated.
10. The Plan will be managed to ensure implementation, with monitoring and review of objectives and targets.
11. Effective communication amongst Partners and with the wider community of Herefordshire will be established.
12. An underpinning philosophy of sustainability will be needed to ensure the continuation of the GAP.
13. The GAP will have an underpinning philosophy of developing access to geoconservation education and will encourage geotourism.
14. Close working with the county/local councils, essential to the success of the plan in ensuring that the geological features of the county are properly conserved will be established.

Proposed Aim

To care for Herefordshire's environment and quality of life by conserving, enhancing and managing the county's diverse geological heritage for the benefit of all.

Proposed Objectives of the Geodiversity Action Plan for Herefordshire

1. To audit local geodiversity resources, geological datasets and skills in Herefordshire.
2. To ensure that geodiversity is included in Herefordshire strategies, plans and policies and that the GAP fits existing policies.
3. To protect, conserve and enhance, the geological and geomorphological resources (geodiversity), in Herefordshire.
4. To augment or upgrade the county's Regionally Important Geological and Geomorphological Sites (RIGS), Important Local Geology Sites and dataset by surveying and recording as many geological sites within the county as possible.
5. To increase overall awareness, understanding and appreciation, of the geodiversity of the county of Herefordshire.
6. To provide guidance to planning authorities, landowners and other individuals and organisations on sustainable management of geodiversity.
7. To promote and develop geological education and geotourism at all levels in the county of Herefordshire.
8. To work with landowners and other partners to manage the existing geodiversity and when the opportunity arises to create new features.
9. To ensure that the GAP is relevant today and remains so in the long term through regular consultation and review.
10. To sustain the momentum of geoconservation through the GAP recommendations and ensure long term sustainability.
11. To be aware of, and be prepared for and responsive to new issues as and when they arise.

Old Red Sandstone cliffs at Wilton Bluff, Ross-on-Wye

This is what we will do

1. Set out to obtain funding for the project within the first year of the GAP.
2. Carry out an audit of sites, museum collections and skills in Herefordshire.
3. Review the condition of existing RIGS / Local Geology sites within 2 years.
4. Increase the number of RIGS / Local Geology Sites in Herefordshire to 250 within 5 years.
5. Develop a sustainable education and awareness programme within 2 years.
6. Establish a geotourism programme within 2 years.
7. Define and put into operation a 10 year geoconservation programme.
8. Develop a programme of annual partnership and public workshops in the first year.
9. Review the GAP after 5 years.
10. Undertake a review of existing policy documents to determine whether geodiversity is rightly appreciated / conserved / safeguarded within Herefordshire.
11. Ensure the provision of specialist advice to planners, etc. in relation to planning issues that may have a negative impact on local geodiversity.
12. Work with planners and other relevant departments to ensure that all valuable geodiversity resources are enhanced to maximum effect and new ones created where the opportunity arises.

Consultees

The following have been consulted.

Organisations
Abberley and Malvern Hills Geopark British Geological Survey Country Landowners Association Commission for the Protection of Rural England Duchy of Cornwall Environment Agency Forestry Commission Farming and Wildlife Advisory Group HALC Hereford (Herefordshire Association of Local Councils) Herefordshire Archaeology Service Herefordshire Biodiversity Partnership Hereford Environmental Education Forum Herefordshire Heritage Service Hereford Nature Trust Herefordshire Tourism Herefordshire and Worcestershire Earth Heritage Trust Herefordshire Council Johnston Roadstone Malvern Hills Area of Outstanding Natural Beauty Malvern Hills Conservators National Trust Natural England National Farmers' Union RMC Tarmac Ltd Woodland Trust Woolhope Naturalists' Field Club, main club and geological section Worcestershire Geodiversity Partnership Wye Valley AONB
Interest Groups
Landowners Members of the Public Quarry Owners Schools and Colleges

APPENDIX 1

Profile of Herefordshire

Herefordshire is a predominantly rural county of 840 square miles, 2180 square kilometres, with beautiful unspoilt countryside and spectacular scenery. The central part is lowland with higher land around the margins. These include the Malvern Hills in the east rising to over 400 metres above sea level and the Black Mountains in the south west to more than 700 metres. Four main rivers flow through the county, the Wye and its tributaries, the Lugg, the Arrow and the Frome.

In 2004, Herefordshire had a population of 177,800. It is the most sparsely populated unitary authority in England and only two other English counties have lower population densities. In general Herefordshire's population has an older age structure than England and Wales as a whole. There is a net out migration of young adults. The population of over 60s is expected to grow more rapidly than the total population.

Herefordshire Geology

Herefordshire contains a wide variety of rock types from a great range of the earth's history. There are 21 geological Sites of Special Scientific Interest in Herefordshire and a further 11 biological SSSIs also include excellent geology, although the protection measures afforded to these biological sites is for their biology. There are 37 Geological Conservation Review Sites and 87 Regionally Important Geological Sites / Important Local Geology Sites. Herefordshire includes parts of two Areas of Outstanding Natural Beauty, Wye Valley AONB and Malvern Hills AONB. The area to the east of the Rivers Frome and Leadon is within the boundaries of the Abberley and Malvern Hills Geopark, because of its outstanding geological heritage.

The differing landscapes of Herefordshire clearly reflect the underlying geology, which in turn is a reflection of the changes in climate and geography and the position of the area as a result of plate tectonic movements over many hundreds of millions of years. In the east is the prominent ridge of the Malvern Hills. This is underlain by Precambrian rocks, about 600 million years old, which are very resistant to erosion. These rocks were formed from molten magma which cooled deep in the earth's crust and was pushed up along a line of weakness. There is also a small area of ancient volcanic rocks.

In the Lower Palaeozoic, (Cambrian to Silurian approximately 500-400 million years ago) sediments were laid down in warm tropical seas. These rocks include limestones and siltstones, rich in fossils, which are found in the hills to the west of the Malverns, in the Ledbury area, Woolhope Dome, Shucknall Hill, and the hills of north west Herefordshire. At this time the Herefordshire area was off the continent of Avalonia, south of the equator.

Avalonia moved northwards in geological time and collided with North America, pushing up a mountain chain. These mountains were eroded and the sediments laid down on a barren, semi-arid land surface are the Old Red Sandstone mudstones and sandstones of the central part of Herefordshire. Rare fossils in these Old Red Sandstone rocks include primitive plants and fish. They are significant because this was a time of great change. Before this period of geological time, all the life was

restricted to the oceans, but in the late Silurian Period, the first land plants were developing and once there was food on land, animals could live there. Following the Old Red Sandstone times the sea again flooded the land and in the Carboniferous Period, (360-300 million years ago) limestones were laid down in warm clear seas. These are seen in the Wye Gorge in the south of the county. They are followed by the Coal Measures seen in the Forest of Dean, formed when equatorial rain forests flourished.

In more recent times, during the Pleistocene, (1.8 million to 12,000 years ago) ice sheets covered the area. Herefordshire was completely overrun by ice in the Anglian glaciation and at the margins of the ice during the last (Devensian) glaciation and much of central Herefordshire is covered by deposits which document the advance and retreat of this ice sheet. In Holocene times, the most recent sediments were laid down in river valleys as river terrace deposits and alluvium.

APPENDIX 2

Planning Policy Statement 9 - Biodiversity and Geological Conservation
Relevant excerpts.

Page 2 The Government's Objectives for planning 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.

Page 3 National Planning Policies
KEY PRINCIPLES include-

1. Regional planning bodies and local planning authorities should adhere to the following key principles to ensure that the potential impacts of planning decisions on biodiversity and geological conservation are fully considered.

(i) Development plan policies and planning decisions should be based on up-to-date information about the environmental characteristics of their areas. These characteristics should include the relevant biodiversity and geological resources of the area. In reviewing environmental characteristics local authorities should assess the potential to sustain and enhance those resources.

(ii) Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests.

(i) Plan policies on the form and location of development should take a strategic approach to the conservation, enhancement and restoration of biodiversity and geology, and recognise the contributions that sites, areas and features, both individually and in combination, make to conserving these resources.

(ii) Plan policies should promote opportunities for the incorporation of beneficial biodiversity and geological features within the design of the concept.

Page 4
REGIONAL SPATIAL STRATEGIES

2. Regional planning bodies should liaise closely with regional biodiversity fora or equivalent bodies, English Nature or its successors and the Environment Agency to identify the current regional and sub-regional distribution of priority habitats and species, internationally and nationally designated areas, and broad areas for habitat restoration and re-creation. Regional planning bodies should also liaise with the British Geological Survey and, where appropriate, local Regionally Important Geological/Geomorphological Sites groups on geodiversity issues.

9. Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a

fundamental role to play in meeting overall national biodiversity targets: contributing to the quality of life and the well-being of the community; and in supporting research and education.

Planning for Biodiversity and Geological Conservation – A guide to Good Practice

Part 2 – Information and evidence (p18):

PPS9 states that regional planning bodies should liaise with the British Geological Survey and, where appropriate, local Regionally Important Geological/Geomorphological Sites (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 on which to audit, conserve, manage and promote characteristic geological, geomorphological and soils resources.

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 government's overall strategy for biodiversity and geological conservation."

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 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."

APPENDIX 3

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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 countrywide and national BAP.

Geodiversity – The natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landforms, processes) and soil features. It includes their assemblages, relationships, interpretations and systems.

Geodiversity Action Plan (GAP) – The audit of resources 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 a significant geological heritage with a coherent and strong management structure to promote conservation a sustainable economic development, usually through geotourism. Global geoparks are endorsed by UNESCO.

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

Natural Areas – Division of England into 120 areas that have similar geodiversity and biodiversity traits, along with similar land use 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.

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

GAP Questionnaire

We would appreciate it if you would answer the following questions and return the questionnaire to the address below by 15th February.

1) How do you feel the public should 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, in what format would you prefer to receive them?

Hard copy (paper)	
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?

Paper form to complete		Electronic form (website)	
letter		Electronic form to return by e-mail	
Other (please state)			

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

4) What issues are of most importance to you and your group?

5) Do you have any comments on the features, objectives and actions of the plan?

6) Do you know of any geological sites within your remit/area/land? (They may be recognised sites or small exposures/features that are locally known.)

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

8) Any other comments

9) Would you like to volunteer to be involved in this project? (If yes, please state in what capacity and put your contact details in the box below):

Name:
Organisation/responsibility:
Address:

Telephone no:
E-mail address:

Thank you for taking the time to fill in this form. Please return the questionnaire by 15th February 2007.

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