
West Lothian geodiversity

Volumes 1–3

Geology and Landscape North Programme Commissioned Report CR/06/008N

Geology and Landscape North Programme Volume 1 — Report by H F Barron, M A E Browne and A Finlayson

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Foreword

Increasing pressure on land and the environment demands a greater awareness and understanding of the dynamics of our natural world in order to deliver a sustainable environment for the future. Biodiversity and the need for the Government to recognise, audit and plan for habitat and ecology is widely accepted and enshrined in UK legislation. However the importance of the complementary concept of Geodiversity is only now gaining recognition, despite providing the foundations for habitats and species.

Geodiversity has a vital role in all aspects of the natural heritage and impacts on many sectors in economic development and historical and cultural heritage. For example, in the development of sustainable eco or geo-tourism (North West Highlands and other UK UNESCO Global Geoparks), Strategic Environmental Assessment, local authority structure and mineral plans, building stone resources, education and art.

Nationally important geological sites have been assessed and are protected by statutory measures, but there is little systematic inventory and evaluation of local sites or development of management measures for these sites.

A first step in addressing these issues is to conduct geodiversity audits. This report documents the first geodiversity audit of a local authority area conducted in Scotland and provides a foundation for developing a West Lothian Geodiversity Action Plan (WLGAP).

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Summary

For its size, Scotland has the most varied geology, natural landscapes and landforms of any country on the planet. This variety, or geodiversity, has resulted in the dramatically different landscapes we see in Scotland today. Although not as striking as some of the iconic landscapes in other parts of Scotland, West Lothian's Carboniferous bedrock and cover of glacial deposits nevertheless exhibit a large variety of rock types, structures, fossils, processes, soils and landforms set within a varied landscape.

This report describes a geodiversity audit of West Lothian — the first to be conducted in Scotland. It was undertaken as a means of informing the framing of recommendations and action points designed to guide the sustainable management, planning, conservation and interpretation of all aspects of the Earth heritage of West Lothian. The audit was not intended to be comprehensive survey of all potential geodiversity sites in West Lothian, but rather an evaluation of a representative selection of sites and features of geological and landscape importance. The audit was conducted by the British Geological Survey (BGS) in partnership with West Lothian Council (WLC), Scottish Natural Heritage (SNH) and Lothian and Borders RIGS Group (LaBRIGS).

A database of 204 potential geodiversity sites for the West Lothian area was compiled from the geological literature, BGS staff expertise and information from LaBRIGS Group. This database was used to target sites for geodiversity field auditing, which took place between August and December 2005.

Information on soils was obtained from the Macaulay 1:25,000 digital soil data and the joint WLC and SNH document on Soil sustainability in West Lothian. Data on designated sites was obtained from SNH, JNCC and Lothian Wildlife Information Centre; habitats and landscape data from WLC; archaeology from Historic Scotland and West of Scotland Archaeology Service.

During the field work, 86 sites were visited and information recorded on site ownership, access, fragility, geological merit, potential use and relevance to other interests, at local, regional, national and international level. This information was then entered in the BGS GeoDiversitY database, designed specifically for geodiversity auditing. Details of a further 36 sites which were not visited, but are potentially significant, were also added, giving a total of 122 sites and features of potential geological and landscape importance in West Lothian.

From this list of 122 sites, 51 were selected as being representative of particular geodiversity features in the context of West Lothian and are classed as West Lothian Geodiversity Sites (WLGs). Of these 51 sites, four are currently protected nationally as SSSIs and six protected locally as RIGS. The new WLGs expand this list of important sites to provide much better geodiversity coverage at the local level.

A draft West Lothian Geodiversity Action Plan (WLGAP) is presented. The main objectives of this plan are: to 'embed' geodiversity into future planning, management and interpretation policies; to recommend strategies for continued monitoring of WLGs; and to increase overall awareness, understanding and appreciation of West Lothian's geodiversity.



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SCOTTISH EXECUTIVE



(Front cover)



(Cover photograph) Five Sisters Bing, West Calder

Dataset	Figure No.	Format	Supplier	Licence req. for BGS use	Licence fee
Earth science					
1:50k Digital Geology (DIGMapGB-50)	2, 4	ESRI shape files	BGS	No	No
Geological Conservation Review sites (GCR)	9	Web table	JNCC	No	No
Sites of Special Scientific Interest (SSSI)	9	ESRI shape files	SNH	Yes	No
1:25k soil classification	5, 6	ESRI shape files	Macaulay	Yes	Yes
Regionally Important Geological and Geomorphological Sites (RIGS)	9	Excel table	LaBRIGS	No	No
Topography and landscape					
NEXTMap Britain DSM from radar altimetry	10	Raster images	Intermap	Yes	Yes
1:250k, 1:50k, 1:25k, 1:10k topography, National Grid, Admin Meridian		Raster and vector	OS	Yes, PGA	Yes
Landscape Character Assessment	11	ESRI shape files	SNH	Yes	No
Habitats, ecology and biodiversity					
Country Parks, Historic gardens and Designed Landscapes	12	ESRI shape files	SNH	Yes	No
Areas of Great Landscape Value	9	ESRI shape files	WLC	No	No
Habitat mapping		ESRI shape files	WLC	No	No
Special Protection Areas (SPAs)	12	ESRI shape files	JNCC	No	No
Special Areas of Conservation (cSACs)	12	ESRI shape files	JNCC	No	No
Ramsar sites	12	ESRI shape files	JNCC	No	No
Sites of Special Scientific Interest (SSSI)	12	ESRI shape files	SNH	Yes	No
National Nature Reserves (NNR)	12	ESRI shape files	SNH	Yes	No
Ancient and semi-natural woodland inventory	12	ESRI shape files	SNH	Yes	No
Raised and intermediate bog inventories	12	ESRI shape files	SNH	Yes	No
Great Crested Newt Sites (Scotland)	12	ESRI shape files	SNH	Yes	No
Listed Wildlife Sites & Wildlife Sites (1993)	12	ESRI shape files	LWIC	Yes	Yes
Archaeology					
Sites and Monument Records	13	ESRI shape files	WOSAS	No	No
Scheduled Ancient Monuments	13	ESRI shape files	Historic Scotland	Yes	No

(Table 1) Digital datasets used in the project GIS.

LOCAL GEODIVERSITY ACTION PLAN (LGAP) ASSESSMENT OF GEOLOGICAL SITES - RANKING CRITERIA			
RARITY	The abundance or significance of the feature of the site in the global context. <i>Is the rarity such that the feature is one of only a few in the world, in the UK or in the regional area or is it one of many examples and only of reference or educational significance (because it is on the doorstep)?</i>	10 8 6 4 2 0	WORLD UK REGIONAL LOCAL (LGAP) EDUCATIONAL / REFERENCE NOT PRESENT / RELEVANT
QUALITY	The extent to which a feature is typical or demonstrates 'text-book' features. <i>World class specimen or cruddy example?</i>	10 8 6 4 2 0	WORLD CLASS UK REGIONAL LOCAL (LGAP) EDUCATIONAL / REFERENCE NOT PRESENT / RELEVANT
LITERATURE & DATA	The detail of written literature or material collections relating to the feature.	10 8 6 4 2 0	DETAILED STUDIES INTERPRETATIONS DESCRIPTIONS COLLECTED MATERIAL REFERENCED NO DATA
EDUCATIONAL VALUE	The value of the site feature for educational fieldwork (including school, degree and adult education courses). Including 'relief sites' that may relieve pressure on other popular sites. <i>Is it visited by UK-wide groups or local schools only?</i>	10 8 6 4 2 0	UK EDUCATIONAL REGIONAL LGAP AREA SCHOOLS / HE LOCAL (WALKING DIST.) GROUPS LITTLE VALUE NO VALUE
COMMUNITY VALUE	The value of the site to local people as a local amenity including historical or cultural associations outside the geological significance. 'Local' is defined as within walking or 10 min drive distance. <i>Is the feature of the site used daily as common ground or rarely visited by the local community?</i>	10 8 6 4 2 0	DAILY LOCAL USE WEEKLY USE MONTHLY USE YEARLY USE INFREQUENT USE NO LOCAL USE

(Table 2) Ranking criteria for BGS geodiversity audits.

Site No.	Site Name	Geological Site	Site Type	Site Status	Site Category	Site Description	Site Location	Site Coordinates	Site Area	Site Elevation	Site Features	Site Significance	Site Management	Site Access	Site Visitation	Site Education	Site Community	Site Rarity	Site Quality	Site Literature & Data	Site Educational Value	Site Community Value	Site Total Score
1
2
...
20

(Table 3) West Lothian Geodiversity Sites (WLGs) and explanation of abbreviations.

Objective	Action	Lead	Key Partners	Timescale
1 Geodiversity audit	1. Desk study of potential geodiversity resources.	BGS	LaBRGS	Completed May 2005
	2. Conduct field audit of selected sites.	BGS		Completed Dec. 2005
	3. Compile geodiversity database & GIS layers.	BGS		Completed March 2006
	4. Compile detailed geodiversity report including key list of geodiversity sites (WLGs).	BGS		Completed March 2006
	5. Supply GeoDiversity database, GIS layers and report to WLC and SNH.	BGS	BGS, SNH	March/April 2006
	6. Keep GeoDiversity database and GIS up to date with new data and additional site information.	WLC	LaBRGS, SNH, BGS	Ongoing
	7. Publish WLC geodiversity report.	WLC	BGS, SNH, LaBRGS	Autumn 2006
	8. Attempt to gain access to major estates geodiversity sites.	WLC	SNH, LaBRGS, Estates, BGS	2006-2007
	9. Visit potential geodiversity sites identified in desk study, but not visited in main 2005 audit.	LaBRGS	BGS, WLC, SNH	2006-2008
2 Monitor condition of WLGs, SSSIs and RIGS and seek to improve where necessary, and secure long-term future	1. Note site condition from Fragility and Fragility Notes fields in GeoDiversity database.	WLC	SNH, LaBRGS	2006
	2. Establish a site monitoring system and secure the resources to implement it and follow up with appropriate management or restoration action	WLC, LaBRGS	SNH, BGS	Next Local Plan review cycle
	3. Seek to retain RIGS status for existing sites and consider listing additional RIGS from WLGs list.	LaBRGS	WLC, SNH, BGS	2006-2010
	4. Consider what protection WLGs status should provide	WLC	SNH, LaBRGS	2006
	5. Implement a policy towards soil sustainability, soil management procedures within Development Control process, and consider developing a soil action plan	WLC	SNH	2006-2010?
3 Greater collaborative working	1. Prepare guidance on the interpretation of the geodiversity audit for development management purposes	WLC	LaBRGS, SNH	2007
	2. Plan the integration and implementation of the GAP with the next review of the LBAP.	WLC, LBAP partnership	LaBRGS, SNH	2010
	3. Seek broader local membership for the West Lothian Geodiversity Partnership (?) within LaBRGS Group	LaBRGS	WLC, SNH etc	2006-7
	4. Work with landowners to develop/list further RIGS in West Lothian	LaBRGS, WLC	landowners	2006-9
	5. Work with landowners to help manage the geodiversity resource at further RIGS in West Lothian	LaBRGS, WLC	landowners	2006-9
	6. With WLC, work to place RIGS in planning context for next Local Plan Review	WLC, LaBRGS	SNH, BGS	2006-2010?
4 Raise awareness of geodiversity	1. Promote geodiversity and WLGs in publications, plans and strategies	WLC	SNH, BGS	Ongoing
	2. Write/publish at least one new RIGS leaflet per year	LaBRGS	AVHC, WLC	Ongoing
	3. If required, provide basic geological training to rangers and seek funding for this purpose	BGS	WLC, SNH	2007 -
	4. Identify needs for new RIGS posters and seek funds	LaBRGS	AVHC, WLC	2007
	5. Attend Annual Environment Fair at AVHC	LaBRGS	BGS	2006-2010
	6. Consult ranger services to identify interpretive leaflet support needs and seek funding if required	LaBRGS-	WLC, SNH	2007
Objective	Action	Lead	Key Partners	Timescale
5 Education and lifelong learning	Seek funding for education development project and project officer	LaBRGS, UKRGG, SESEF	SNH, BGS, WLC	2006-7
	Assess RIGS in terms of School National Curriculum and develop teaching materials at appropriate levels for selected sites	LaBRGS, UKRGG, SESEF, SAGT, ESTA	SNH, BGS, WLC	2007-8
	Write and publish landscape leaflet based upon Union Canal tourist potential	LaBRGS, @WS	WLC, AVHC	2007
	Collaborate with Central Scotland Forestry Trust in River Avon Walkway Trail project	CSF, WLC, FCS, LaBRGS	SNH, BGS, landowners	2006-7
	Collaborate with Pentlands Hills Ranger Service in geodiversity project in Pentlands Hills	MLC, WLC, CEC, LaBRGS	BGS, landowners	2006-7
	Collaborate with all West Lothian Ranger services (including Hopetoun House and NTS) in further geodiversity projects	WLC, LaBRGS	BGS, landowners	ongoing

(Table 4) Draft West Lothian Geodiversity Action Plan (WLGAP). SESEF–Scottish Earth Science Education Forum, SAGT–Scottish Association of Geography Teachers, ESTA– Earth Science Teachers Association, British Waterways Scotland, CEC–City of Edinburgh Council, MLC–Midlothian Council FCS–Forestry Commission Scotland, CSF–Central Scotland Forestry Trust.