

GEODIVERSITY

REVIEW OF PLANS, POLICIES, PROGRAMMES & SUSTAINABILITY OBJECTIVES

INTERNATIONAL
<p>Convention concerning the Protection of the World Cultural and Natural Heritage (UNESCO, 1972)</p>
<p>The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List, and sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them.</p> <p>Objectives</p> <ul style="list-style-type: none"> To ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural (monuments, groups of buildings, sites) and natural heritage (natural features, geological features/physiographical formations, natural sites). To encourage Parties to nominate sites within their national territories for inclusion on the World Heritage List and to establish management plans and set up reporting systems on the state of conservation of their World Heritage sites. <p>Targets None</p>
NATIONAL
<p>PPS 9 Biodiversity and Geological Conservation (ODPM, 2005)</p>
<p>PPS9 sets out planning policies on protection of biodiversity and geological conservation through the planning system.</p> <p>Objectives</p> <ul style="list-style-type: none"> 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 <p>Targets None</p>
REGIONAL
<p>Draft Regional Spatial Strategy (SWRA, 2006)</p>
<p>The RSS will supersede RPG10, looking forward to 2026. Its spatial and functional in approach goes beyond traditional land use planning to bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they can function.</p> <p>Objectives None, but the Draft RSS includes the following policies relevant to geodiversity:</p> <p>Policies SD3 The environment and natural resources. ENV1 Protecting and enhancing the Region's natural and historic environment.</p> <p>Targets</p> <ul style="list-style-type: none"> Seeking to reduce loss of assets through a sequential approach to protection and enhancement. Timescales for delivery/Targets: 'on-going' (Implementation Plan ENV1).
COUNTY
<p>Devon County Minerals Local Plan (DCC, 2004)</p>
<p>The Adopted Minerals Local Plan contains the County Council's detailed policies concerning the winning and working of minerals within the plan area. The Plan will remain 'saved' until at least September 2007 during preparation of the Minerals and Waste Development Framework.</p>

Objectives

To protect the quality and diversity of the County's earth science and nature conservation interest, historic environment, water environment and landscape character.

Policy MP3 – Sites of Special Scientific Interest and National Nature Reserves

Policy MP11 – Environmentally Sensitive Sites Not Having Statutory Designation

Policy MP41 – Development Control Considerations

Targets

None

The Nature of Devon: A Biodiversity Action Plan (Devon Biodiversity Partnership, 1998 revised 2005)

This document is Devon's response to the national biodiversity planning process and takes the objectives and targets of the UK Biodiversity Action Plan and translates and amplifies these within a local context. It is intended to provide a consensus on the priorities for conservation action within Devon.

Objectives

The Plan does not contain general objectives, but identifies 29 key habitats with associated species, together with eight key geological features, and provides 18 habitat action plans and 20 species action plans which each contain objectives. A further five action plans are provided for common themes, including Legislation and Development Planning. The following habitat action plans are of particular relevance to geodiversity:

- Caves, Karst and Mines
- Pits, Quarries and Cuttings
- Sea Cliff and Slope
- Rivers, Streams, Floodplains and Fluvial Processes

Targets

Each action plan's objectives include targets relevant to the habitat or species, with the following being particularly relevant to the Minerals Core Strategy:

- by 2005 to have a network of public trails which demonstrate the geology of Devon
- each District in Devon to have 12 publicly accessible sites demonstrating geological exposures with suitable interpretative information

LOCAL

Dorset and East Devon Coast World Heritage Site Management Plan, First Revision (World Heritage Site Steering Group, 2003)

The Site Management Plan has two aims:

- to demonstrate how the management required to protect and properly conserve the Site in the long-term will be implemented.
- to set out the local implications of World Heritage Site status, and identify appropriate policies and actions which will achieve benefits from the designation for the public understanding of the Site, and to the local economy.

Objectives include:

- to conserve the geology and geomorphology of the Site

Management policies are included for quarrying, marine aggregates and ports activity.

See Appendix 1: summary of adopted Development Plans in Devon.

See Appendix 2: summary of Community Strategies in Devon.

BASELINE INFORMATION

Devon's Geology

Devon can lay claim to having amongst the most varied geology of the English counties, with deposits ranging from Devonian outcrops at the southern tip of the County originating 395 million years ago to wind blown sands only 6,000 years old. The County's geology is responsible for its diverse and high quality landscape, the varying quality of its agricultural land and the pattern of human habitation.

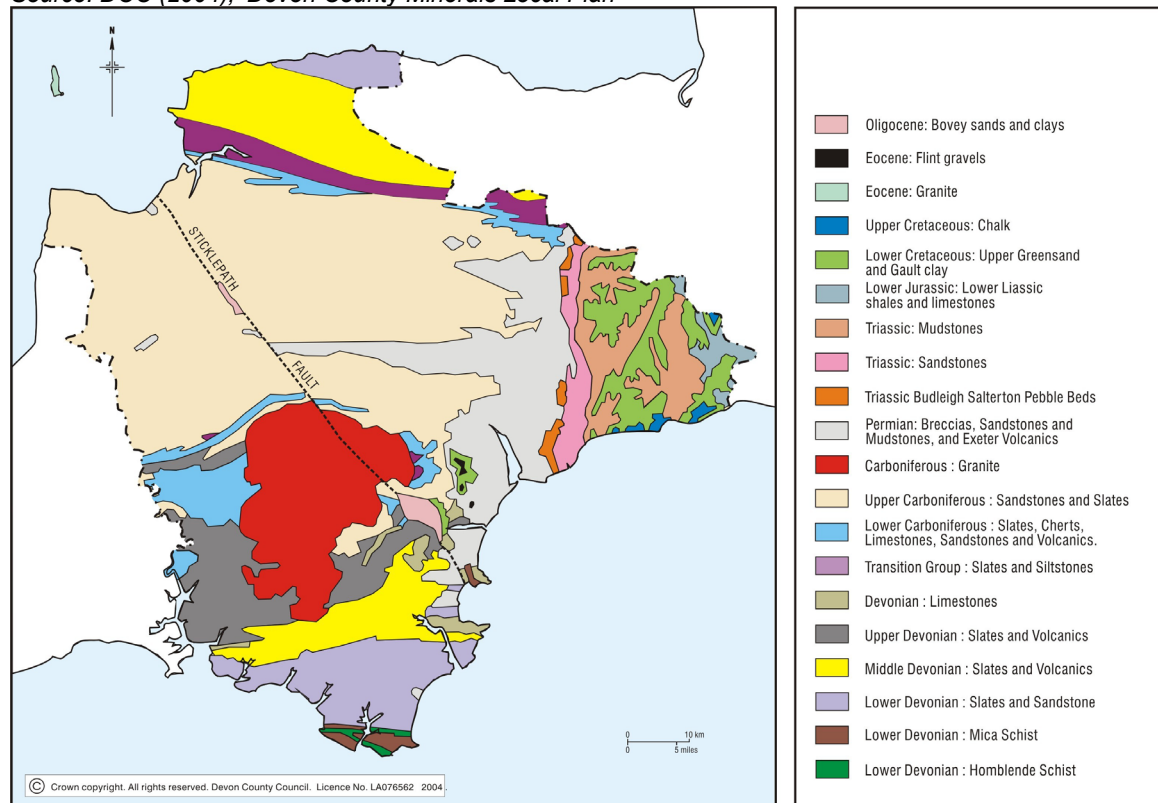
The oldest group of rocks in Devon are of Carboniferous and Devonian age (395 to 280 million years old), which outcrop from coast to coast across the western two-

thirds of the County. The Carboniferous Culm Measure sandstones, clays, shales and thin limestones have the largest area of outcrop in Devon and the alternating sequences create the undulating lowlands in the centre of the County. Projecting to the north and south of the Culm Measures are the Devonian slates, grits and sandstones that form a hilly landscape characterised in the north by the uplands of Exmoor.

In the extreme south of the County, around Start Point and Bolt Head, the Devonian schists and slates have been eroded by the sea to form high cliffs. The eastern third of Devon is made up of a succession of younger rocks of Permo-Triassic, Jurassic, Cretaceous and recent age (280 to 0.5 million years old) with the red Permian sandstones, Triassic sandstones and marls creating the red soils that are typical of this part of Devon. Chalk and greensand outcrop in the valleys of the Axe and Sid. Superimposed upon this solid geology are varying thicknesses of recent sand and gravel deposits which occur throughout the County. The plan below shows the present-day geology of the County.

The Geology of Devon

Source: DCC (2004), 'Devon County Minerals Local Plan'



Key Geological Features in Devon

The Devon Biodiversity Action Plan identifies the following key geological features in Devon, together with the main types of site which exhibit the particular key features, and comments on the importance of these features in the County.

KEY GEOLOGICAL FEATURES - DEVON BIODIVERSITY ACTION PLAN (2005)*

Geological Feature	Type of Site	Comment
Mineralisation	Mines and tunnels Unique mineral sites Mine dumps Disused quarries, pits & cuttings Coastal and river cliffs Inland outcrops and stream sections	South West England is both nationally and internationally important for the variety and rarity of minerals to be found, including several world type-locations. The minerals were formed when mineral rich vapours and fluids were released during the emplacement of the granites. Copper, tin and china clay have all played an important part in the industrial and economic history of the area. A variety of site types are notable for minerals including natural and man-made exposure sites and integrity sites associated with mine dumps and unique locations.
Quaternary Features	Static (fossil) geomorphological sites Unique fossil sites	Although Devon was not directly covered by the Quaternary ice sheets, glaciers did reach as far south as the north coast leaving behind a unique sequence of glacial deposits and erratics. Elsewhere, the County was dominated by periglacial conditions that are now represented by granite tors and interglacial raised beach and cave deposits which yield fascinating animal and cave-man remains. These Quaternary features are very largely represented within static (fossil) geomorphological sites with unique fossil sites generally associated with caves.
Coastal Geomorphology	Active process geomorphological sites	The coast of Devon is both nationally and internationally important for its coastal features including sand dune and shingle systems, cliffs and shore platforms. Many of these features are unique within England. Present day coastal geomorphology is represented within active process geomorphological sites.
Marine Devonian Rocks	Disused quarries, pits & cuttings Active quarries & pits Coastal and river cliffs Foreshore exposures	Devon is the type locality for the Devonian System. The strata in Devon and Cornwall were the only ones in England to be deposited under marine conditions c.400m years ago. These rocks yield shallow and deep water fossils as well as coral reefs as at Plymouth and Torquay. The strata of the Marine Devonian are represented within a range of exposure sites, particularly along the coast.
Variscan Structures	Disused quarries, pits & cuttings Active quarries & pits Coastal and river cliffs	Devon and Cornwall are of European importance for the exposures of rocks dramatically folded and faulted during the Variscan Orogeny or mountain building period some 300m years ago. The results of this major earth movement event are represented within a range of major exposure sites, but can be seen particularly well in the spectacularly folded strata in the cliffs of North Devon.

(Source: Devon BAP, General Contents, Section E, Table 3)

KEY GEOLOGICAL FEATURES - DEVON BIODIVERSITY ACTION PLAN (2005)*

Geological Feature	Type of Site	Comment
Igneous Rocks of South West England	Disused quarries, pits & cuttings Active quarries & pits Inland outcrops & stream sections	A long period of igneous and volcanic activity culminating in the intrusion of the Cornubian granite some 290 - 270 m years ago produced a suite of igneous rocks without equal in England. The granite moors and tors of Dartmoor characterise the area. Their granite emplacement in Devon was preceded in places by the extrusion of pillow lavas from submarine volcanoes.
Ball clays of Tertiary Age	Active quarries and pits	Devon has two faulted basins of early Tertiary sediments (clays, sands and lignite) near Bovey Tracey and Petrockstowe which are virtually unique in Britain. They produce pottery clays (ball clays) of international significance. These clays have been produced by the weathering of granite, slates and shales in a sub-tropical Tertiary climate. These ball clays represent one element of the 'Palaeogene' GCR block.
Lyme Bay Coast (Lyme Regis to Start Point)	Coastal and river cliffs Foreshore exposures Static (fossil) geomorphological sites Active process geomorphological sites Unique fossil sites	This stretch of coastline is of international importance for its marine Jurassic succession and fossils, marine Cretaceous rocks and marine Devonian success and has the largest and most important landslip (mass movement) areas on the British coast. It also contains the nationally important Permo-Triassic succession and reptilian fossils. Part of this site is now included within the Dorset and East Devon World Heritage Site – 'the Jurassic Coast'.

(Source: Devon BAP, General Contents, Section E, Table 3)

Geological Sites in Devon

A number of sites of geological importance in Devon are designated as Sites of Special Scientific Interest (SSSIs). Including Plymouth and Torbay, 72 sites are notified for their geological interest and a further 34 for a combination of wildlife and geological interest.

In 2001 the Dorset and East Devon Coast (between Old Harry Rocks in Dorset and Orcombe Point, Exmouth in Devon was designated as the Dorset and East Devon Coast World Heritage Site (more commonly termed “The Jurassic Coast”) by virtue of its geological interest. In addition, the Cornwall and West Devon Mining Landscape became a World Heritage Site in 2006. This designation covers mining landscapes dating from 1700 to 1914. The site is made up of ten distinct areas (including the Tamar Valley and Tavistock) where the physical remains of mining from this period are best represented. The Site includes the mines themselves, the remains of the early infrastructure and the surviving evidence of its social and economic consequences, including distinctive settlement patterns.

A major initiative to identify and describe the most important geological sites in Britain began in 1977 with the launching of the Geological Conservation Review (GCR). The GCR was designed to identify those sites of national and international importance needed to show all the key scientific elements of the Earth heritage of Britain. The GCR provides a public record of the features of interest and importance at localities already notified or being considered for notification as SSSIs. These ‘GCR sites’ form the basis of statutory geological and geomorphological site conservation in Britain. The results of the Geological Conservation Review programme are being published in a series of 45 volumes, the Geological Conservation Review Series. Publication will be completed in 2007. Devon County Council includes 125 GCR sites.

In addition, the Regionally Important Geological Sites (RIGS) initiative promoted by Natural England has led to the Devon RIGS Group identifying appropriate sites within Devon. Survey work is ongoing, but there are currently around 135 sites, known as County Geological Sites, within the MWDF area. These sites include operational and closed quarries and mines, together with a range of other locations such as road cuttings, cliffs and natural outcrops.

Geodiversity Audit

In 2003-04 a geodiversity audit of 16 active aggregate quarries in Devon was carried out, and the project overview and reports for individual quarries are available on the County Council’s website (see Sources and Further Information below). Active aggregate quarries have been shown to offer a valuable geodiversity resource which is continually developing. The main report concludes that positive geodiversity opportunities resulting from active aggregate quarrying need to be properly recognised in the minerals planning process. Within Devon, broad educational opportunities relating to wider aspects of geodiversity should be developed (e.g. with support from the Aggregates Levy Sustainability Fund).

SOURCES AND FURTHER INFORMATION

Devon Biodiversity Partnership (2005) 'The Nature of Devon: A Biodiversity Plan' (www.devon.gov.uk/devon_biodiversity_action_plan.htm)

Devon RIGS Group, Devon RIGS sites (www.devonrigs.org.uk/dissites.html)

David Roche GeoConsulting (January 2004) 'Geodiversity Audit of Active Aggregate Quarries in Devon' Report No. 2237/30 PO (www.devon.gov.uk/audit_of_active_aggregate_quarries.htm)

TRENDS

- Loss of geological features through mineral development over time, but also exposure of new resources.

DATA GAPS

- There are no readily available figures of the area of land in Devon comprising pits, quarries and cuttings. Quantification of gains and losses in pits, quarries and cuttings is not easily achieved. This data shortage is compounded by the very large number of small disused quarries scattered widely throughout the Devon - in some areas at least one quarry recorded per square kilometre.

IMPACTS OF MINERAL DEVELOPMENT ON GEODIVERSITY

Adverse Impacts	Opportunities
Loss of existing geological and geomorphological features, such as caves and karst features, due to mineral working	Creation of new geological exposures and exposure of cave and karst features, and their retention following restoration of site
Obscuring of existing geological exposures by landfilling or backfilling with mineral waste	Access to mineral site for study during working and following restoration, and access to information on mineral sites
	Funding of geodiversity projects through the Aggregates Levy Sustainability Fund

(Derived from the publications listed in Appendix 4 and adjusted following consultation with 'specialist' Devon County Council Staff together with the Environment Agency)

IMPLICATIONS FOR MINERALS PLANNING AND ITS SA

Key Issues from the Review of Plans, Policies, Programmes and Sustainability Objectives

- The Minerals Core Strategy should promote the geodiversity objectives of the World Heritage Sites and BAP habitat action plans.
- Geoconservation should be given significant weight and its interconnection with the biodiversity conservation taken into account.

- Mineral resources should be safeguarded from sterilisation.

Key Issues from the Baseline Information

- Devon has a rich geological resource, recognised by a range of designations (World Heritage Sites, SSSIs and RIGS). This resource should be protected and, where possible, enhanced (e.g. through sensitive restoration). Audits have confirmed that a wide range of geodiversity is revealed in the active aggregate quarries in Devon.
- Pits, quarries and cuttings deserve particular conservation attention because important sites and their associated wildlife are at risk from potentially harmful activities or management regimes. Harmful practices include the disposal of waste (both large scale domestic and agricultural tipping), insensitive restoration and landscaping of worked out quarries and simply neglect.

THE DEVELOPMENT OF SA OBJECTIVES AND BROAD SA INDICATORS

The key geodiversity issues for minerals planning, identified from the above reviews, have informed the development of draft SA Objectives and broad SA Indicators for the SA Framework. In addition, the selection of these objectives and indicators has been guided by the objectives of the Strategic Sustainability Appraisal (SSA) of the emerging Regional Spatial Strategy and relevant Community Strategy for Devon (2004) challenges.

The suggested SA Objectives and broad SA Indicators for geodiversity are shown in the table below:

Suggested SA Objectives and broad SA Indicators

RSS SSA Detailed Objectives	Community Strategy for Devon challenges	Suggested SA Objectives for the appraisal of the Minerals Core Strategy	Suggested broad SA Indicators. “Will the plan/policy...”
[Not covered specifically]	[Not covered specifically]	To maintain and enhance geodiversity resources.	Provide for the retention and management of geodiversity resources?
			Allow for access to geodiversity resources for study?