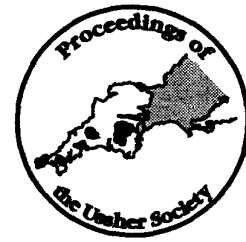


GEOCONSERVATION IN DEVON - THE DEVELOPING INFRASTRUCTURE

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The rich geological heritage of Devon, visible in extensive coastal and numerous inland sections has made the County one of the most important areas in Britain for geological teaching and research. Not surprisingly nearly 350 geological and geomorphological sites have to date been selected for conservation within the County both through national (Geological Conservaton Review) and local programmes (Devon RIGS Group). A number of important projects have been developed in the County to provide appropriate management regimes for these sites as well as to develop their full potential as an educational and even touristic resource. Amongst these projects, the English Nature Devon, Cornwall and Isles of Scilly Geological Interpretation Strategy provides an overall framework for all geoconservation and interpretive schemes throughout the region. Other programmes, including the Devon Roads and Geological Conservation Pilot Project represent important collaborations between local and national organisations. Of particular significance is the full integration of geoconservation and biological conservation in the recently published Devon Biodiversity Action Plan. The developing integration and interaction between these various projects represents one of the most sophisticated geoconservation systems in Britain and can be a model for other regions.

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INTRODUCTION

The county of Devon lies within the south-west peninsula of England. As such it enjoys some of the mildest and most pleasant climates to be found within the British Isles. With a dramatic and beautiful coastline, luxuriant countryside, picturesque villages and rugged upland moors, it has inevitably become one of the most important tourist destinations in Britain. This landscape is the expression of a rich and varied geological history and every year large numbers of geological groups use this resource for teaching, recreation and research.

Devon (or historically Devonshire) was the second largest administrative county in England, only North Yorkshire (northeast England) being larger. Recent reorganisation of local government structure in England has reduced the area of influence of the main Devon County Council with the creation of two unitary authorities, Plymouth and Torbay. Eight district authorities remain, namely East Devon, Exeter, South Hams, West Devon, Teignbridge, Mid Devon, Torridge and North Devon and the County Council delivers a number of services for these areas, including minerals planning, education and a range of environmental services (including some aspects of conservation). The new unitary authorities have now taken on these roles in their own areas.

The remaining district authorities have environmental responsibilities in terms of planning issues and may also have some dedicated conservation staff. In addition, two National Park Authorities, "namely Dartmoor and Exmoor overlap with district authorities (the latter also including parts of the neighbouring county of Somerset) but lead on planning and conservation issues within their park boundaries. Several landscape conservation areas designated as *Areas of Outstanding Natural Beauty* (AONBs) or *Heritage Coasts* are also present and again have dedicated conservation staff, based within local authority countryside management services.

National agencies such as English Nature, English Heritage, the Countryside Agency and the Environment Agency have a statutory role in environmental and conservation issues in the county on behalf of national government.

CONSERVATION FRAMEWORK

Legislative Background

The National Parks and Access to the Countryside Act (1949) first introduced to Britain the concept of National Parks, National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs), including provision for protecting sites of geological and 'physiographical' importance. The introduction of the Wildlife and Countryside Act (1981, amended 1985), however, established the present mechanisms of SSSI notification and protection. These include the requirement to notify owners and occupiers of land considered to be of special scientific interest and to provide them with a list operations requiring consultation with English Nature. Limestone Pavement Orders were also established to protect karstic surfaces at risk from exploitation for garden decoration and landscape design.

The Planning and Compensation Act (1991) improved Local Authority planning enforcement and development control powers and required all structure and local development plans to contain nature conservation policies. In practice these include policies specifically mentioning the need to identify and protect sites of geological and geomorphological importance at both national and local level. These sites include those of local importance for conservation, locally selected and protected through the planning system. For geoconservation, these sites are known collectively as Regionally Important Geological/Geomorphological Sites (RIGS) or in Devon, County Geological Sites (CGSs).

The Conservation (Natural Habitats, & c.) Regulations 1994 translated the European Community Habitats and Species Directive into UK law. Although not specifically designed for geoconservation, a number of the protected species and habitats are closely linked to or dependent on geomorphological processes or features (e.g. coastal cliffs and caves). Selected sites will be designated as Special Areas of Conservation (SACS).

Categories of legally conserved Earth Heritage Sites or Protected Areas in Devon

Sites of Special Scientific Interest (SSSIs). SSSIs form the main legislative framework for site protection and are notified by English

Nature, in accordance with the Wildlife and Countryside Act 1981. Although monitored by English Nature, the designated sites remain owned and managed by the original owner / occupier in accordance with a consultation system comprising a list of designated operations which cannot be carried out without prior consultation.

Around 209 SSSIs are presently notified in Devon and over half of these (107) have a geological or geomorphological interest and several have multiple geological interests. A full list of SSSIs in Devon with a geological interest is included in the appendix.

National Nature Reserves (NNRs). Declared by English Nature (or a predecessor) and owned or leased and managed by that agency or another approved body, for instance a county Wildlife Trust, these sites represent some of the best and most fragile examples of Britain natural heritage. Of the seven NNRs in Devon, two have a significant geological interest, Slapton Ley, a coastal shingle bar and lagoon system and the Axmouth to Lyme Regis Undercliffs, containing important Triassic, Jurassic and Cretaceous sections and faunas and a famous landslip system.

Local Nature Reserves (LNRs). Declared by a local authority, with approval from English Nature, these sites must also be owned or leased by the authority or another approved body. Presently 4 of the 19 LNRs in Devon include a significant Earth heritage interest: Dawlish Warren (Exe estuary sand spit), Berry Head (Devonian limestones with caves), Sugar Loaf Hill and Saltern Cove (marine Devonian and Permian "red beds") and Salcombe to Kingsbridge (drowned estuary with Variscan structures in Start Complex metamorphic rocks).

Special Areas of Conservation (candidate or cSACs). Twelve cSACs are proposed in Devon, although formal notification is not yet completed. Features of European importance include vegetated sea cliffs, sand dunes and caves - geomorphological features or systems creating a rare and important biological habitat. SSSIs in Devon with geological interests which are also cSACs are indicated in the appendix.

Regionally Important Geological Sites (RIGS). These sites are selected by a voluntary group, the Devon RIGS Group (see below). The selected sites are notified to the relevant planning authority and protected through local development plans and policies and also voluntary agreements. In Devon these sites are known as County Geological Sites (CGSs).

National Parks. Two National Parks are established in Devon, namely Dartmoor and Exmoor - the latter including part of the neighbouring county of Somerset. Although not a site designation, landscape protection and conservation policies of their administrative authorities can significantly contribute to the protection of Earth Heritage features.

Areas of Outstanding Natural Beauty (AONBs) and Heritage Coasts. As with National Parks, these areas do not specifically protect geological sites, but landscape protection policies and an active countryside service do provide opportunities for conservation which are absent elsewhere. Devon includes five AONBs (South Devon, North Devon, East Devon, Tamar Valley, part, and Blackdown Hills, part) and three Heritage Coasts (North Devon, South Devon and East Devon).

There are also analogous local designations recognised by Devon County Council (DCC 1996), with associated planning policies to protect their character, namely Areas of Great Landscape Value (AGLVs) and Coastal Preservation Areas (CPAs)

World Heritage Site (proposal). The coast of East Devon and Dorset includes a Jurassic sequence and contiguous Triassic and Cretaceous deposits of international importance. A group led by Dorset County Council is presently compiling a detailed submission

to UNESCO with the hope that formal confirmation of World Heritage status will ensue (Dorset County Council 1997).

SELECTING SITES FOR CONSERVATION

Site Selection

The first national list of Earth Heritage sites considered worthy of protection was produced by the Geological Sub-Committee of the Society for the Promotion of Nature Reserves in 1945. A significant number of these early sites were in Devon, and the list formed the basis for notification of the first suite of geoconservation sites in the county as SSSIs under the 1949 Act. By 1970, 23 of these sites had been notified, as reviewed in Britain's first published regional guide to protected Earth Heritage sites (Macfadyen, 1970).

These early sites were mainly classic historical localities, but in 1977 the then Nature Conservancy Council (English Nature's predecessor with a GB-wide remit) initiated the Geological Conservation Review (GCR) to provide the first systematic review of the coverage of Earth Heritage SSSIs (Ellis et al. 1996). As a result of this appraisal, around 3,000 sites were selected nationally within 97 subject 'blocks' corresponding to geological time periods or subjects and topics in other fields of geology and geomorphology. These "GCR sites" formed the basis on which all designation and redesignation of SSSIs was carried out under the 1981 Act. In practice, several overlapping GCR interests could be combined in a single SSSI.

Descriptions of the scientific interest and context of all GCR sites are being published as a series of volumes, with seven which include Devon sites already published (Benton and Spencer, 1995, Campbell et al. 1998, Cleal and Thomas 1995, 1996, Floyd et al. 1993, Gregory, 1997, Waltham et al. 1997).

The Devon RIGS Group was formed in 1991 combining the experience of both professional and amateur earth scientists active in the region. Of particular significance has been an association with the British Geological Survey, the universities of Exeter and Plymouth, Devon County Council, the Environment Agency, Devon Wildlife Trust, local authorities and various local and regional societies. After an initial county-wide assessment, completed in 1995 (Taylor and Grainger, 1995, 1997), detailed district by district assessments are being undertaken, with surveys now complete in Teignbridge, South Hams, East Devon and the Dartmoor National Park. To date around 155 sites have been selected, and notification to all site owners is underway.

Site coverage

Devonian. Devon is the only county in Britain to lend its name to a geological period and many of the original localities on which the faunal characteristics of the system were established still exist today. The Devonian geology of Devon has been reviewed by Selwood and Durrance (1982) with some site descriptions in Cleal and Thomas (1995) and Floyd et al. (1993).

GCR selection of sites of Devonian age is included in the following subject blocks: Marine Devonian (MAR DEV), 34 sites; Non-Marine Devonian (NMAR DEV), 1 site; Silurian-Devonian Chordata (SIL-DEV CH), 1 site; Palaeozoic Palaeobotany (PAZ PALBOT), 1 site; Igneous Rocks of South West England (IG SW E), 3 sites; and Variscan Structures of South West England (VAR STR SW), 5 sites. CGS selection presently includes 64 sites of Devonian age including a range of features of stratigraphical, palaeontological and tectonic interest.

Carboniferous. The development of a major shale-sandstone turbidite sequence in the Upper Carboniferous reflects the onset of flysh-type sedimentation and the earliest influences of the Variscan (or Hercynian) Orogeny. The Carboniferous geology of the county is reviewed by Thomas (1982) with some site descriptions in Cleal

and Thomas (1996). GCR selection for Carboniferous rocks included the following GCR blocks: Dinantian of Devon and Cornwall (DIN DV/CW), 7 sites; Namurian of England and Wales (NAM E/WL), 2 sites; Westphalian (WPH), 3 sites; Igneous Rocks of South West England (IG SW E), 4 sites; and Variscan Structures of South West England (VAR STR SW), 5 sites. CGS selection presently includes 16 sites of Carboniferous age including a range of features of stratigraphical, palaeontological and tectonic interest.

Variscan igneous activity and mineralisation. The latest Carboniferous and earliest Permian saw the peak of Variscan tectonic activity with the intrusion of the south-west granite batholith, whose eastern extremity forms Dartmoor. Associated contact metamorphism and hydrothermal activity producing rich mineral assemblages, with some Devon records being unique in Britain. There is also evidence of later phases of mineralisation, but for convenience most mineralogical sites are included here. Key reviews include Selwood, Freshney and Durrance (1982), Hawkes (1982), Beer and Scrivener (1982) and Floyd et al. (1993).

GCR selection was within the following blocks: Igneous Rocks of South West England (IG SW E), 5 sites; Mineralogy of South West England (MIN SW E), 8 sites; and Variscan Structures of South

West England (VAR STR SW), 10 sites in total (representing those already noted) above. CGS selection presently includes 18 sites for mineralisation and 1 for general tectonic features (excluding the Devonian and Carboniferous sites previously noted).

Permian. The Permian and Triassic of Devon are dominated by the red desert deposits of the "New Red Sandstone", including breccias and sandstones with associated basic volcanism in eastern central Devon (Laming, 1982). GCR site selection lies within the Permian-Triassic (PER-TRI; 7 sites) and Igneous Rocks of South West England (IG SW E; 4 sites) subject blocks. 20 CGS have been selected for Permian sediments and volcanic rocks.

Triassic. "New Red Sandstone" deposition continued into the Triassic. The sequence is generally unfossiliferous but a very rare, typical early late Triassic reptile fauna, has been recorded. The highest part of the Triassic sequence includes the marine deposits of the Penarth Group ("Rhaetic") (Hart, 1982). GCR selection of Triassic rocks and faunas lies within the Permian-Triassic (PER TRI; 1 site), Rhaetician (RHT; 2 sites) and Permian-Triassic Reptilia (PER-TRI RP; 2 sites) blocks. 6 GCS sites have been selected.

Jurassic. Although only developed in the south eastern most

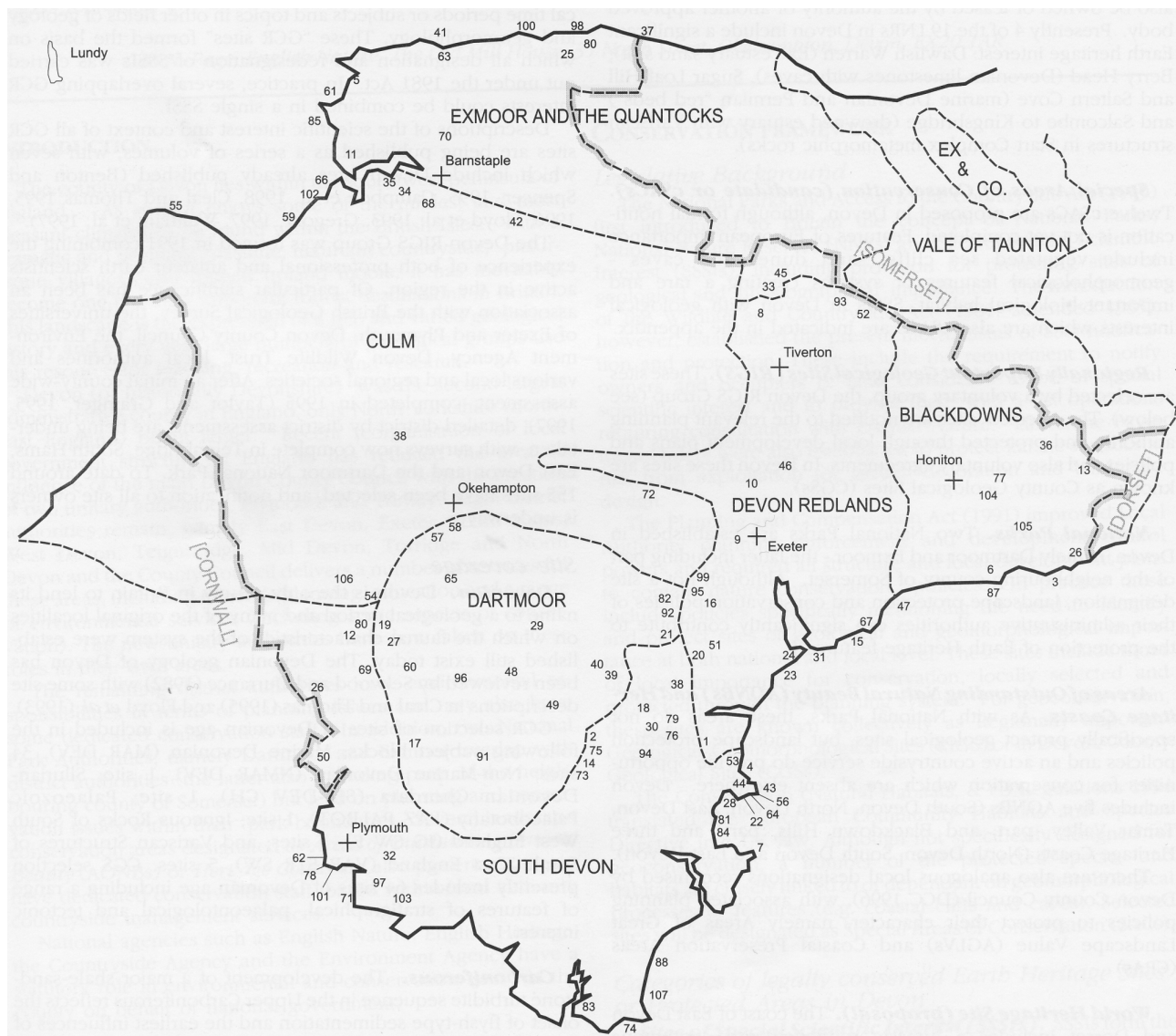


Figure 1: Natural Areas in Devon, showing the distribution of the 105 SSSIs with a geological interest.

corner of Devon, the Jurassic alternating mudrock/limestone facies of the "Blue Lias" (Lower Lias) yields ammonite faunas of international importance for correlation. Many of these faunas historically credited to Lyme Regis in Dorset in fact come from just over the county boundary in Devon. The Lias of the area is also famous for the spectacular remains of giant marine reptiles and well preserved fish that it has yielded (Hart, 1982; Page 1995; Benton and Spencer 1995).

Site selection by the GCR is within the following blocks: Hettangian-Pliensbachian (HET PBN), 1 site (pt); Mesozoic-Tertiary Fish/Amphibia (MZ-TR F/A.), 1 site (pt); and Jurassic-Cretaceous Reptilia (JUR-CRE RP), 1 site (pt). CGS selection includes 1 site.

Cretaceous. The Cretaceous sequence transgresses unconformably the earlier Mesozoic and Palaeozoic deposits of the county, ultimately resting on Devonian limestones near Newton Abbot. The sequence is dominated by the sands of the Upper Greensand with Upper Cretaceous chalk and associated deposits in eastern most areas. Rich marine faunas are present at certain levels (Hart, 1982).

GCR site selection includes the Aptian-Albian (APT-ALB; 2 sites) and Cenomanian-Maastrichtian (CEN MAA; 4 sites) blocks. CGS selection includes 10 Upper Greensand and 1 Chalk site.

Palaeogene and Neogene (or "Tertiary"). The Tertiary of Devon includes a range of fluvial, lacustrine and pedogenic deposits, formed under tropical terrestrial conditions.

A unique and isolated mass of Eocene granite with associated basic dykes, forms the island of Lundy, off the coast of north-west Devon. Its affinities lie with the Tertiary igneous province of north-west Scotland and certainly not with the Variscan igneous rocks exposed elsewhere in south west England (Edwards and Freshney, 1982; Dangerfield in Durrance and Laming 1982).

Tertiary site selection is within the Palaeogene (PGN) GCR block (4 sites). CGS selection includes 12 sites.

Quaternary. As Devon lay largely south of the maximum extent of the Pleistocene ice sheets, it includes a well preserved range of interglacial and periglacial deposits and landforms, the latter being very well developed on Dartmoor. Fluvial, ?glaciomarine, raised beach and cave deposits (some with rich mammalian faunas) are also present (Campbell *et al.* 1998).

Continuing geomorphological process has produced a range of classic coastal and fluvial features (e.g. in Gregory, 1997), including, in south eastern Devon, some of the largest active landslide systems in Europe.

GCR selection for stratigraphical and fossil landform sites largely lies within the Pleistocene/Quaternary of South West England (PN/QA SW E; 16 sites), Caves (CAV; 2 sites) and Pleistocene Vertebrata (PCN VTB; 2 sites) blocks and for active processes and landforms within the Coastal Geomorphology of England (CST GME EG; 8 sites), Mass Movement (MAS; 1 site) and Fluvial Geomorphology of England (FLU GME EG; 4 sites) blocks. CGS selection includes 26 sites.

INITIATIVES

With the conserved site framework well on the way to full establishment in Devon, there are now many opportunities to build on this resource and develop proactive site utilisation and management strategies. The following projects and initiatives are now underway in Devon:

1. Devon, Cornwall and Isles of Scilly Geological Interpretation Strategy (English Nature, Devon, Cornwall and Isles of Scilly Team). South-west England with its rich and varied geological and geomorphological heritage offers excellent opportunities for interpretation and educational use. To date, however, the

development of schemes has been somewhat haphazard and lacking in any strategic overview. The aim of this project is to develop a strategy to focus the work of English Nature and other organisations, increase public awareness, identify opportunities for educational use and, where appropriate, target resources for site management.

The project report (Sargeant, 1998), includes a detailed review of existing facilities, together with recommendations for future projects and suggested timetables. An accompanying three volume set provides an extremely valuable compilation of all available interpretive publications focussing on the geological heritage of the region and forms an important resource for future work. Publication and distribution of the strategy volume as an English Nature Research Report is planned. Implementation has, however, already commenced, with support being provided during 1998 for a number of interpretive and educational projects throughout the region.

2. Devon Roads and Geological Conservation Project (Devon County Council and English Nature, Environmental Impacts Team). This joint project has been developed as a national pilot to investigate and demonstrate how earth heritage conservation might be promoted through the development and management of the roads network at a local level. The project is the practical application of the principles derived from a national roads and geological conservation initiative developed centrally by English Nature's headquarters in Peterborough. The project has three main themes: 1. Conserving geological sites on Devon's roads, 2. Interpreting Devon's geology through the road network, and 3. Promoting geological conservation in road development.

The results of the project, compiled by the Earth Resources Centre (University of Exeter), will be published as a technical document and distributed to local authority and other organisations who have a direct involvement in maintaining and developing the county roads network or are involved in countryside management of areas where geological sites associated with the roads network have potential for further development (Dean *et al.* 1998). Implementation of the project will also include site management and interpretive provision at selected geological sites associated with the roads network in Devon (Macadam *et al.* 1998).

3. County Geological Sites Project - Phase II Compilation of an Educational Access Register for County Geological Sites (Devon County Council). The initial register formed Phase II of the Devon County Geological Site selection program and aimed to identify those sites with a clear potential for educational use through the compilation and distribution of an educational access register. Included sites have safe, permitted access and exhibit features which can be readily linked to the teaching of geology, geography and science within the National Curriculum framework, or are particularly suitable for fieldwork and research purposes for higher education. Each site report includes a location map, a brief description highlighting the main features of interest, photographs and diagrams as appropriate and suggested educational exercises. All the information is held digitally.

The register includes 36 CGSs and 42 SSSIs and options currently being considered to disseminate the register include distribution as a CD Rom and release on Devon County Council's Internet Web Site.

4. Natural Areas (English Nature). The character of an area is the result of interactions between the landforms, rocks and soils and the habitats and species that they sustain, combined with human considerations such as land use characteristics and historical heritage (Duff, 1995). By combining these factors it is possible to recognise a series of areas throughout England with a specific and unique natural character. These "Natural Areas" can provide the framework for developing local objectives and strategies for geoconservation and biological conservation, especially through integration.

Six terrestrial Natural Areas are recognised in Devon, and each

each has a very specific geological character. They are Exmoor (Devonian slates and sandstones), the Culm (Carboniferous shales and interbedded sandstones), Dartmoor (granite and metamorphic aureole), South Devon (mainly Devonian slates with, locally, limestones), Devon Redlands (Permian and Triassic "red rocks"), Blackdowns (hills capped with Cretaceous Upper Greensand and locally Chalk).

For each Natural Area a "profile" document has been produced which provides a full description of its nature conservation character. Objectives are set to help direct conservation work in a strategic manner. These objectives frequently include the development of educational facilities. As a review and "blueprint" for further work, these documents (available from English Nature) represent the future of integrated conservation in England.

5. Devon Biodiversity Action Plan (Devon Biodiversity Partnership, including Devon Wildlife Trust, English Nature and Devon County Council). Taking the principle of integrated conservation further, Biodiversity Action Plans for key habitats, species and other features of nature conservation importance which are present in the county now include full consideration of geoconservation sites and issues (Devon Biodiversity Partnership 1998). Significant geological content is present in the following sections: Caves, Karst and Mines; Sea Cliff and Slope; Pits, Quarries and Cuttings. Other sections referring to Earth Heritage features and processes include: Cities, Towns and Villages; Rivers, Streams, Floodplains and Fluvial Processes; Estuaries; Rocky Foreshore.

Each Action Plan, developed through consultation with a range of organisations, presents a review of issues, threats, and presents positive initiatives (the latter including the Ussher Society in the Quarries and Caves plan!) and sets objectives and targets for future work. The provision of interpretative and educational facilities is also a key part of each action plan. This document will guide all future local and national governmental policy and action for Nature Conservation in the County.

6. Dartmoor Biodiversity Action Plan (Dartmoor National Park Authority, English Nature). The Dartmoor BAP will develop similar themes to the county BAP, but will be of more direct application to the national park. Geoconservation is again integrated with biological conservation (in the Habitat Action Plan for "Rock outcrops (including tors and clitter slopes), quarries, caves, mines and buildings") and education is an important theme. Completion in 1999 is envisaged.

BAPS will also be produced for a number of other local authority areas and there is consequently significant opportunity to develop further geoconservation initiatives

7. Dartmoor National Park Authority Educational Programs (Dartmoor National Park Authority). The national park employs education and interpretation specialists and manages a major visitor centre on the moor itself at Princetown - the High Moorland Centre. A developing program of provision of documentation and interpretation for earth heritage sites is envisaged, reflecting the increasing profile of the subject in the region. One site in particular, Meldon Aplite Quarries, features as part of the development of a European Commission project, GRECEL (Geoconservation Research and Education; Coordination at European Level) as a model for the development of geoconservation orientated environmental education (Page, 1998). The GRECEL Project is supported by the EU Socrates Program, Comenius action 3.1.

8. The Dorset and East Devon Coast World Heritage Proposal (Dorset County Council, Devon County Council). The project group has produced a Statement of Intent justifying the area for inclusion in the World Heritage Site list (Dorset County Council 1997). The proposal reached consultation within governmental organisations in late 1998, and was to be included in the UK "Tentative List of Future Nominations" in 1999. Should submission

to UNESCO be completed and World Heritage status awarded, there are extensive plans to develop the interpretive and educational potential of the region and visitor provision.

THE WAY FORWARD - DEVELOPING FACILITIES FOR GEOCONSERVATION TRAINING AND TEACHING

Site selection and conservation projects have identified an Earth Heritage resource in Devon which is second to none in Britain. As well as ensuring the sustainable conservation of the full range of Earth heritage sites and features in the county of scientific and educational importance, certain projects also aim to develop this resource into a facility of primary importance for environmental education in England. There is also a great potential for regional economic benefit by developing "geotourism", the financial returns from which could help sustain the conservation of Devon's rich geological heritage into the next millennium.

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APPENDIX: SSSI's WITH AN EARTH HERITAGE INTEREST IN DEVON (GCR and any associated biological interest (=B/ cSAC), NNR or LNR indicated; abbreviations are explained in the main text)

1. Aller Sand Pit: PGN [SX880695]; 2. Ashburton Road Cuttings: VAR STR SW [SX747681-SX754693]; 3. Axmouth to Lyme Regis Undercliffs: WIN (x 2), HET PBN (pt), MZ-TR FI/A (pt), JUR-CRE RP (pt), MAS, B, cSAC, NNR [SY256896-SY323913]; 4. Babbacombe Cliffs: MAR DEV, PER-TRI [SX928662-SX930655]; 5. Barricane Beach: MAR DEV [SS453443]; 6. Beer Quarry and Caves: PN/QA SW E, B, cSAC [SY215896 & SY215893]; 7. Berry Head to Sharkham Point: PER-TRI, B, cSAC, LNR [SX937568-SX937546]; 8. Bickleigh Wood Quarry: NAM E/WL [SS943179]; 9. Bonhay Road Cutting: NAM E/WL [SX914926]; 10. Brampford Speke: FLU GME EG [SX930986]; 11. Braunton Burrows: CST GME EG, B, cSAC [SS430350]; 12. Brent Tor: IGN SW E [SX471804]; 13. Broom Gravel Pits: PN/QA SW E [ST326020 & ST327024]; 14. Buckfastleigh Caves: CAV, PCN VTB, B, cSAC [SX742665]; 15. Budleigh Salterton Cliffs: PER-TRI, CST GME EG [SY060815]; 16. Buller's Hill Quarry: PGN [SX882847]; 17. Burrator Quarry: IGN SW E [SX549677].

18. Chipley Quarries: MAR DEV, IGN SW E [SX808721]; 19. Cholwell Brook: VAR STR SW [SX511813-SX509808]; 20. Chudleigh Caves and Woods: PN/QA SW E, B, cSAC [SX872788-SX859779]; 21. Crockham Quarry: IGN SW E [SX848808]; 22. Daddyhole: MAR DEV, B [SX927628]; 23. Dawlish Cliffs: PER-TRI (x 2) [SX960759-SX981782]; 24. Dawlish Warren: CST GME EG, B, LNR [SX985795]; 25. Dean Steep: MAR DEV [SS708478]; 26. Devon Great Consols: MIN SW ENG [SX431735]; 27. Devon United Mine: MIN SW ENG [SX521795]; 28. Dyer's Quarry: MAR DEV [SX922628]; 29. East Dartmoor: IGN SW E, B [SX695815]; 30. East Oggwell Quarry: MAR DEV [SX839706]; 31. Exe Estuary: PER-TRI, B [SX980845]; 32. Faraday Road: MAR DEV [SX498542]; 33. Five Oaks, Bampton: DIN DV/CW [SS950221]; 34. Fremington Claypit: PN/QA SW E [SS530315]; 35. Fremington Quay Cliffs: MAR DEV, DIN DV/CW, PN/QA SW E [SS517340-SS512332]; 36. Furley Chalk Pit: CEN MAA [ST276042].

37. Glenthorne: NMAR DEV [SS799496]; 38. Hannaborough Quarry: IGN SW E [SS529029]; 39. Haytor and Smallacombe Iron Mines: MIN SW ENG, B, cSAC [SX773772, SX772770, SX777766]; 40. Haytor Rocks and Quarries: IGN SW E [SX757770]; 41. Hele, Samson's and Combe Martin Bays: MAR DEV (x2), VAR STR SW [SS536479-SS547485 & SS567476-SS582480]; 42. High Down Quarry: MIN SW ENG [SS652290]; 43. Hope's Nose to Walls Hill: MAR DEV (x2), MIN SW ENG, PN/QA SW E, B [SX932654- SX944628]; 44. Kent's Cavern: PN/QA SW E [SX934641]; 45. Kersdown Quarry: DIN DV/CW [SS963222]; 46. Killerton: IGN SW E [SS973007]; 47. Ladram Bay to Sidmouth: PER-TRI RP, CST GME EG [SY096847-SY106860 & SY122868]; 48. Laughter Quarry: PN/ QA SW E [SX657763]; 49. Leusdon Common: IGN SW E [SX705729]; 50. Lockridge Mine: MIN SW ENG [SX438663]; 51. Lower Dunscombe Farm Quarry: MAR DEV [SX886790]; 52. Lower Whipcott: DIN DV/CW [ST069186]; 53. Lummaton Quarry: MAR DEV [SX912665]; 54. Lydford Gorge: MAR DEV, VAR STR SW, FLU GME EG, B [SX503838].

55. Marsland to Clovelly: VAR STR SW (x 3), CST GME EG, WPH (x 2), B, cSAC [SS212175-SS315254]; 56. Meadfoot Sea Road: MAR DEV [SX934633]; 57. Meldon Aplite Quarry: IGN SW E, MIN SW ENG (x 2) [SX566919]; 58. Meldon Quarry: VAR STR SW [SX570927]; 59. Mermaid's Pool to Rowdens Gut: WPH [SS403266]; 60. Merrivale: PN/QA SW E [SX540760]; 61. Mill Rock: SIL-DEV CH [SS455431]; 62. Mount Wise: MAR DEV [SX456541]; 63. Napp's Cave: CAV [SS563475]; 64. New Cut, Torquay: MAR DEV [SX935658]; 65. North Dartmoor: PN/QA SW E, B, cSAC [SX580850]; 66. Northam Burrows: CST GME EG, B [SS445305]; 67. Otter Estuary: PER-TRI RP, B [SY073830].

68. Park Gate Quarry: DIN DV/CW [SS56297]; 69. Pitts Cleave: IGN SW E [SX501761]; 70. Plaistow Quarry: MAR DEV, PAZ PALBOT [SS568372]; 71. Plymouth Sound, Shores and Cliffs: VAR STR SW (x2), B, cSAC [SX442488-SX448513]; 72. Posbury Clump: IGN SW E [SX815977]; 73. Potters Wood: CAV, B [SX735652]; 74. Prandle Point and Start Point: IGN SW E, PN/QA SW E, B [SX741371-SX819381]; 75. Pridhamsleigh Caves: CAV, B [SX749679].

76. Ransley Quarry: MAR DEV [SX844701]; 77. Reed's Farm Pit: CEN MAA [ST213003]; 78. Richmond Walk: MAR DEV [SX460543]; 79. River Lemon Valley Woods: MAR DEV (x 2), B [SX837710]; 80. River Lyn: FLU GME EG [SS700442]; 81. Roundham Head: PERTRI [SX898601]; 82. Ryecroft Quarry: IGN SW E [SX843847]; 83. Salcombe to Kingsbridge Estuary: VAR STR SW, B, LNR [SX746406]; 84. Saltern Cove: MAR DEV, PER-TRI, B, LNR [SX895585]; 85. Saunton to Baggly Coast: MAR DEV (x2), PN/QA SW E, B [SS447408-SS446376]; 86. Shapwick Grange Quarry: APT-ALB [SY313918]; 87. Sidmouth to Beer Coast: APT-ALB, CEN MAA, B, cSAC [SY130873-SY235895]; 88. Slapton Ley: CST GME EG, B, NNR [SX826441]; 89. Southacre Clay Pit: PGN [SX854754]; 90. South Brentor Quarry: MAR DEV [SX480805]; 91. South Dartmoor: PN/QA SW E, B, cSAC [SX630690]; 92. Spara Bridge: DIN DV/CW [SX841845]; 93. Stout's Cottage: DIN DV/CW [ST049192].

94. Torbryan Caves: PCN VTB [SX815675]; 95. Tower Wood Quarry: PGN [SX877857]; 96. Two Bridges Quarry: PN/QA SW E [SX609751]; 97. Wallsend Industrial Estate: MAR DEV [SX493537]; 98. Watersmeet: MAR DEV [SS744486]; 99. Webborton Cross Quarry: IGN SW E [SX8768728]; 100. West Exmoor Coast and Woods: MAR DEV (x3), PN/QA SW E, B [SS653492]; 101. Western King: MAR DEV, B [SX462533]; 102. Westward Ho! Cliffs: PN/QA SW E [SS420291-S5434296]; 103. Wheal Emily: MIN SW ENG [SX541498]; 104. Wilmington Quarry: CEN MAA [SY209997]; 105. River Axe: FLU GME EG, B [ST325023] to [SY259927]; 106. Coryton Quarry: VAR STR SW [SX466894]; 107. Hallsands to Beesands: VAR STR SW, CST GME EG [SX819381 - SX819401].