Limestone Landscapes — a geodiversity audit and action plan for the Durham Magnesian Limestone Plateau

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Foreword

Along the coast of Durham from Shields to Hartlepool, the uppermost bed frequently consists of a species of breccia, the cement of which is a marl-like substance consisting chiefly of magnesian carbonate of lime, and with this breccia wide chasms or interruptions in the cliff are filled. The next strata are thin and slaty, but lower down the stratification becomes less distinct. The colour of this rock is then light hair brown, the texture crystalline and cellular, from which latter cause it strongly resists the stroke of the hammer. N J Winch — March 1814

The unique and superbly exposed rocks known collectively as the Magnesian Limestone have been studied for more than 190 years and the names of some of the early workers Geinitz, Murchison, Phillips, Sedgwick, and Sorby — would

grace any geological hall of fame. Despite this formidable assault, and the efforts of a host of later workers, the Magnesian Limestone still retains many of its secrets. The connection between the distribution of the indigenous plants of Durham and the geological structure of the county was recognised and described by the naturalist John Winch in 1830. Even before this time the rocks of the Magnesian Limestone were being quarried for building and to burn for use as agricultural lime. The Romans quarried the Magnesian Limestone to build the Roman Arbeia Fort at South Shields.

This report is the published product of a study by the British Geological Survey (BGS), commissioned by Durham County Council on behalf of the Limestone Landscapes Partnership of North East England as a contribution to the establishment of a landscape-scale action plan for the management of the Magnesian Limestone Plateau.

A great deal has been done by individual districts, Durham Council and Natural England in the recognition and designation of sites with a geological interest. Indeed the region has been at the forefront of biodiversity and geological conservation in Britain. This study provides an excellent opportunity to review these achievements, but more importantly to make suggestions for the enhancement, and incorporation of geodiversity into the community in a manner appropriate for a new century. Where possible, sites should not be the preserve of just the scientist, but available for wider access in a responsible manner. In the 21st century it is recognised that access to the natural environment improves health and wellbeing and that local communities can obtain major social and economic benefit through good management of the natural environment in both rural and urban settings.

Today, rather than just preserving our geological sites in isolation, we wish to provide opportunities for communities to take ownership of the natural heritage on their doorstep as well as encouraging those from outside to understand and appreciate it. This study will have succeeded if it helps to engender enjoyment and local pride in the natural heritage and to spread knowledge about the world class geodiversity of the area and how it has influenced the landscape and people of the region.

Acknowledgements

The encouragement of Sue Mullinger of Durham County Council in the preparation of this report is gratefully acknowledged. The assistance provided by Mike Sutcliffe of Natural England in providing details of geological sites of special scientific interest and the information provided by Beth Andrews on RIGS sites within the area have greatly aided the study. Mrs Gillian Lawrence is thanked for her appreciation of the importance of visiting sites displaying geological interpretation whilst on holiday in South Africa.

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Summary

This study of geodiversity has been carried out with the needs of the Limestone Landscapes Partnership in mind. It describes the most important features of geodiversity in the area and brings together details of existing geodioversity sites. It also discusses geodiversity interest at other nature sites, suggests links between them, provides pointers to the most important literature and ancillary information and aims to give inspiration for development and integration at all levels.

This study concludes that, for the most part, a selection should be made from those sites that already hold some form of nature or community designation, or are candidates for such designation. Such a selection should enable a very good representation of the world class geodiversity of the area to be conserved, presented, utilised and interpreted. It is felt that it would be most appropriate for a combination approach of mainly enhancing existing geological sites while developing some others where the geological interest is not the main reason for designation, for example the 'places to visit' featured in the MAGical Meadows booklet or other local nature reserves.

The report presents opportunities for development and interpretation of sites, for their integration, and for increased access by the local community and visitors, including people with disabilities.

The categorisation of sites in this study should be refined at the next stage of the process by incorporating information from complementary specialist reports and by discussion with stakeholder, professional and community organisations. The recommendations for the geodiversity action plan are intended to provide a stimulus to progress, but will, similarly, benefit from further consultation before implementation. It is essential that the final action plan is accepted and owned by those who will be responsible for its implementation.

References

Geological System	Previous Name	Current Name	Maximum thickness	English Zechstein Cycle
Upper Permian	Rotten Marl	Rotten Marl Formation	10m	EZ3
	Upper Magnesian Limestone	Seaham Formation	33 m	
		Roker Formation (including Concretionary Limestone)	200 m (116 m)	EZ2
	Middle Magnesian Limestone	Hartlepool Anhydrite	As a residue	EZ1
		Ford Formation (including the Reef)	116 m	
	Lower Magnesian Limestone	Raisby Formation	76 m	
	Marl Slate	Marl Slate Formation	6 m	
Lower Permian	Yellow Sands and breccias	Yellow Sands Formation	60 m?	

(Table 1) The Classification of the Magnesian Limestone.

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