5 NON-MONTANE ROCK HABITATS

1 Limestone pavements

1.1 Massive, tabular exposures of limestone with deeply fissured and water-sculptured surfaces are almost confined to the Carboniferous formation in West Yorkshire and southern Cumbria. There are small occurrences in both North and South Wales and fragments on the Dalradian and Durness Limestones in the Highlands. Limestone pavements are often associated with cliffs and screes, and the open plant communities of all these rock habitats typically intergrade with grassland, scrub and woodland. Their biological character varies especially according to altitude, geographical position and rock type. Pavements above 300 m altitude have a sub-montane rather than a lowland character, and a few high-lying examples and those in the Highlands are almost montane in their flora. The clint and grike structure of limestone pavements typically has a rich flora of flowering plants, ferns, bryophytes and lichens, including a woodland element associated with the shade of the crevices.

1.2 Limestone pavements have been extensively damaged during the last 40 years, mainly by the wholesale removal of weathered surface stone for garden rockeries and other ornamental purposes (Ward & Evans 1976). Some important sites have been ruined and very few examples of any size have completely escaped such disturbance. Accessibility to grazing stock is also a factor producing local variation and sometimes deterioration. These features are of considerable physiographic interest, and many are regarded as having SSSI quality according to the criteria of the NCC's Geological Conservation Review. Limestone pavements are not re-creatable and are a good example of a fragile and threatened habitat. The best examples have a considerable international value.

1.3 Selection requirements

The botanical importance of limestone pavements lies in their species assemblages and populations, as much as in readily identifiable communities, but it is difficult to dissociate the significance of their physical structure in assessing nature conservation value. Specific guidance on the selection of limestone pavements is already available to NCC staff, in the form of a nine-volume internal report on all the main occurrences of these features in Britain (Ward & Evans 1975). This makes detailed recommendations on SSSI requirements, using a three-tier grading system based on a floristic index which reflects species abundance and rarity (summarised in Table 11, which shows those species characteristic of the various groups of pavements). This approach takes account of the major directions of variation according to altitude, geographical position and rock type. While it should be regarded as definitive guidance, the report deals with the more solid outcrops of clint and grike structure; there is also a need to represent the more dissected pavements and transitions showing well-marked association with limestone grassland, limestone heath, calcicolous scrub and woodland. Specific guidance is difficult, but each pavement should be examined for its context as a component in a habitat mosaic (see B, 6). Botanical interest should be assessed independently (see C.11 and C.12). The invertebrate interest of limestone pavements is incompletely known, and there may be a need for reassessment of borderline examples as knowledge accumulates.

2 Basic rock outcrops

2.1 In scattered locations, there are localised outcrops of basic rocks, mostly igneous materials such as dolerite and basalt, which give cliffs, screes and unstable slopes with base-rich soils. They are usually somewhat calcareous, though less so than limestone, and some outcrops of serpentine produce magnesium-rich soils, with or without a calcareous influence. At altitudes below about 400 m and in low rainfall areas these basic outcrops often carry a distinctive lowland or, at most, sub-montane plant assemblage, and some of them have considerable botanical importance as localities for rare or local species. The associated slopes often carry a basiphilous grassland, becoming acidic in more leached situations.

2.2 Selection requirements

Some of the most important of these outcrops qualify on nationally rare and scarce species criteria (see C.11, 3), e.g. Craig Breidden, Stanner Rocks and Arthur's Seat. Others, such as the Northumbrian Whinsill outcrops, have to be assessed on more general botanical character. The guiding principle should be, within each AOS, to select the best examples (biggest and most varied in open communities and any associated grassland or scrub) needed to represent the range of variation in botanical composition.

3 Acidic rock outcrops

3.1 These are probably the least important type, since their flora is usually composed of widespread calcifuge species which are plentiful in other habitats. In a few localities, however, there are low-lying acidic outcrops of considerable interest for their ferns, lichens and bryophytes (e.g. species of the moss genus Grimmia).

3.2 Selection requirements

Examples should be selected only if they are regarded as important by specialists in the plant groups concerned.

4 Ravines and gorges

4.1 Lowland river glens which have cut rocky gorges with cliffs are often of considerable interest botanically, especially for herbaceous plants, ferns, bryophytes and lichens. They can vary from acidic to calcareous within the same site, so the flora may be quite diverse. Many examples are wooded, at least in part, and this enhances shade for moisture-loving species and provides additional habitat for arboreal species. The invertebrates are often of considerable interest. Rocky stream and waterfall habitats often contribute to the overall ecological diversity and are especially important for bryophytes.

4.2 Selection requirements

Some of these sites are dealt with under Woodlands (C.2), but, where the interest is in lower plants (see C.12) or in the case of treeless sites, they may need to be dealt with separately. All examples regarded as important by specialists in the species groups concerned should be selected, except in the Highlands, where examples covering the range of variation should be chosen, since the total number of sites is so large. Assessment should be made partly under the terms of C.11 and C.12.

5 References

WARD, S.D., & EVANS, D.F. 1975. A botanical survey and conservation assessment of British limestone pavements. 10 vols. Bangor, Institute of Terrestrial Ecology (unpublished).

WARD, S.D., & EVANS, D.F. 1976. Conservation assessment of British limestone pavements based on floristic criteria. Biological Conservation, 9, 217-233.

Table 11 Geographical variation in the main floristic features of limestone pavements

Geographical position	South Wales	North Wales	Morecambe Bay	Hutton Roof	North Yorkshire
Components	Feol Fawr Castell-y-Geifr Ystradfellte Cader Fawr	Great Orme Pen y Bont Cefn Meirindog Clwydian Hills Eglwyseg	Ulverston Group Hampsfield Fell Whitbarrow Underlaid Wood Hale Fell Gaitbarrows Warton Crag	Farleton Fell Holmepark Fell Newbiggin Crags Clawthorpe Fell Lancelot Clark Storth Dalton Crags Hutton Roof Crags	Kingsdale Whernside Feizor Penyghent Langcliffe Scar Beckermond Scar Ingleborough Malham - Arncliffe Coniston
Rock type	Carboniferous Limestone	Carboniferous Limestone	Carboniferous Limestone	Carboniferous Limestone	Carboniferous Limestone
Altitudinal range (feet)	1200–1750	200–1200	50–700	250–850	800–1650
Species					
A: Rare: widely scattered, locally abundant or abundant					
Actaea spicata					*
Carex digitata/ornithopoda			*		
Dryas octopetala					
Dryopteris villarii			*	*	*
Epipactis atrorubens			*	*	
Hypericum montanum			*		
Polygonatum odoratum			*		
Salix myrsinites					
Thelypteris robertiana		*	*	*	*
B: Uncommon: widely scattered, locally abundant or abundant					
Arabis hirsuta	*				*
Arum maculatum			*	*	*
Asplenium viride	*				*
Calamagrostis epigejos					
Centaurium erythraea			*		
Ceterach officinarum			*		
Circaea lutetiana			*	*	*
Cirsium heterophyllum					*
Clematis vitalba		*			
Cochlearia officinalis					
Convallaria majalis	*		*	*	*
Crepis paludosa					*
Cystopteris fragilis	*	*	*		*
Eupatorium cannabinum			*		
Galeobdolon luteum	*	*			
Galium boreale					
Geranium lucidum			*		*
G. sanguineum		*	*		*
G. sylvaticum					*
Inula conyza			*		
Juniperus communis			*	*	*
Melica nutans			*	*	*
M. uniflora		*	*	*	
Mycelis muralis	*	*	*	*	*
Myosotis sylvatica				*	
Polystichum aculeatum			*	*	*
P. lonchitis					
Prunus padus					*
Rhamnus catharticus			*		
Rosa pimpinellifolia			*		
Rubus saxatilis					*
Saxifraga hypnoides					
Taxus baccata		*	*	*	
Thalictrum minus		*	*		*
Trollius europaeus					
Viola hirta			*		
C: Common: abundant					
Acer pseudoplatanus			*	*	
Asplenium ruta-muraria		*	*	*	*
A. trichomanes		*	*	*	*
Brachypodium sylvaticum			*	*	
Corylus avellana			*	*	*
Crataegus monogyna		*	*	*	
Dryopteris filix-mas					*
Fraxinus excelsior		*	*	*	*
Geranium robertianum	*	*	*	*	*
Hedera helix		*	*	*	
Mercurialis perennis		*	*	*	*
Oxalis acetosella			*	*	
Phyllitis scolopendrium		*	*	*	*
Primula vulgaris					
Prunus spinosa		*	*		
Rubus fruticosus agg.		*	*	*	
Teucrium scorodonia		*	*	*	*
Viola riviniana		*			*

Note: Categories A, B and C are based on national distribution. The second statement of abundance refers to frequency within one or more pavements of the geographical group. Some species have a wider distribution than the table indicates, but at a lower abundance.

North Yorkshire	North Cumbria	Perthshire	North-West Highlands
Wold Fell Cam Houses Simon Fell Greensett Cowgill Wold Cam High Road	Blindcrake Clints Great Asby The Clouds Hillbeck Intake	Schiehallion	Skyke (Torin Strath Suardail Ghlaschnoic Inchnadamph Durness

Carboniferous (Yoredale Series)	Carboniferous Limestone	Dalradian Limestone	Durness Limestone
1725-2075	800-1500	1000-1100	0-1250