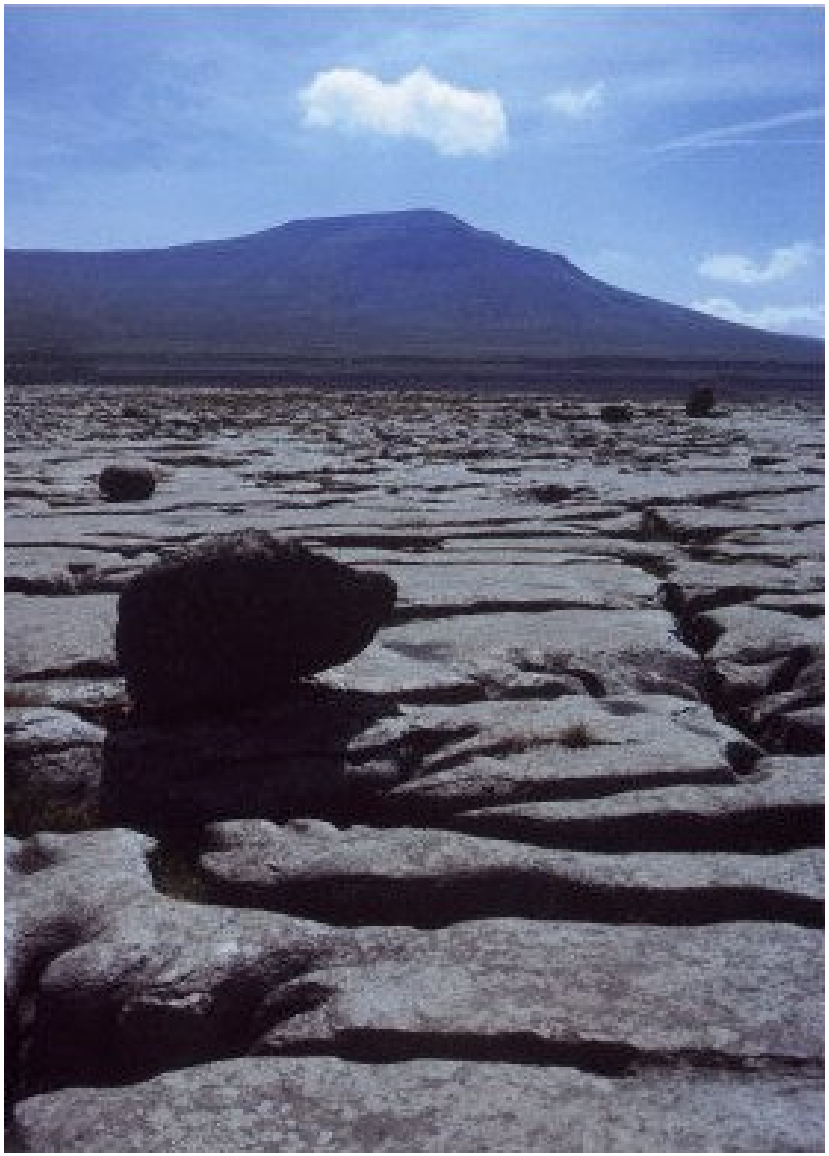
MANAGING OUR FRAGILE HERITAGE

LIMESTONE PAVEMENT



Simon Webb, English Nature

Classic pavement landscape, Scales Moor, Yorkshire

Cover photos: Peter Wakely, English Nature; David Woodfall, Woodfall Wild Images, Simon Webb, English Natue

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Limestone pavement is one of Britain's rarest and most treasured natural landscape features. 'Managing Our Fragile Heritage' provides guidance to help decision makers and managers to maintain or improve the conservation value of limestone pavement and its rich diversity of wild flowers and ferns. Limestone pavement enriches the wealth of wildlife found in the British Isles, its protection and management and is an aim of the UK Biodiversity Action Plan.

Simon Webb, English Nature

Wood Anemone

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BETWEEN A ROCKERY AND A HARD PLACE

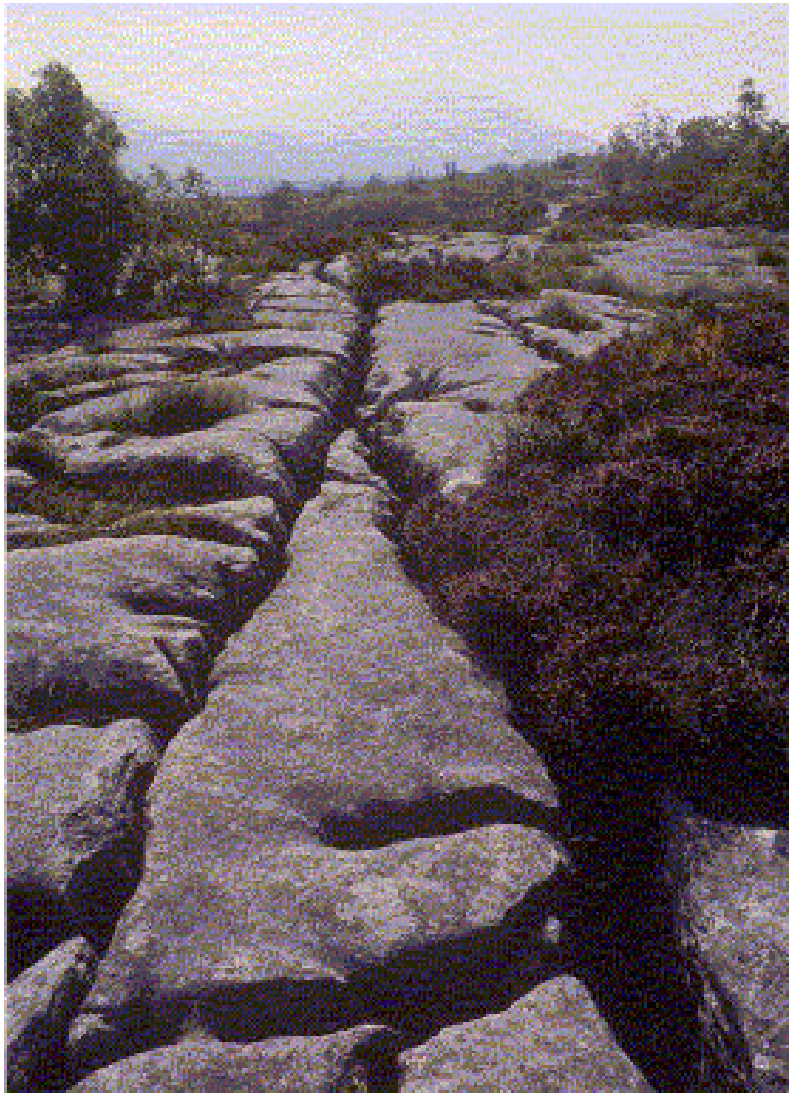
The British Isles are home to the world's most important area of limestone pavement, a rare and endangered habitat and landscape feature. Within Britain and Northern Ireland there are only 3000 hectares and much of this has already been damaged. It is largely restricted to the north west of England, but small pockets are found in Wales, Scotland and Northern Ireland. Limestone pavement is also found in the Republic of Ireland, notably in the Burren, County Clare and County Galway.

The formation of limestone pavement took place under exceptional circumstances. Deposition of limestones began over 300 million years ago in warm, shallow seas. Much later, the rock surface was laid bare by glacial scouring during the ice ages. For the last 10,00 years, post-glacial erosion and weathering have enlarged the joints and fractures in the rocks.

The resulting characteristic features are deep fissures called grikes, limestone blocks known as clints and gutter-like channels on the clints that drain into the grikes called runnels. Within these grikes and runnels there is a unique micro-climate which supports a distinctive assemblage of plant species, some of which are rare or threatened in Britain.

The destruction of limestone pavement has mainly been caused by the extraction of clints for use in garden rockeries. This destruction commenced in the 1870s and still occurs despite considerable protection afforded by Limestone Pavement Orders. Once destroyed, pavement is gone forever. These issues are highlighted in 'Limestone Pavement, Our Fragile Heritage' (Limestone Pavement Action Group 1997).

Pavements are also affected by a lack of appropriate management, with overgrazing being a frequent problem. A strategy to assist with protection and future management is set out in the UK Biodiversity Action Plant for limestone pavement. This booklet forms part of that Action Plan



Peter Wakely, English Nature

Well managed pavement with vegetation growing on to the clint tops.
Scar Close, Yorkshre

MANAGING LIMESTONE PAVEMENT

British Limestone pavements vary in their appearance, their geological features and in the flora they support. The differences reflect the geological structure of the rock, their formation during the ice ages, climate, altitude and the more recent impact of man.

Limestone pavement may be split broadly into three types: open, wooded and scrubby.

Open pavements have bare clints with vegetation largely confined to the grikes, although they may have scattered trees. Wooded pavements have vegetation and mosses cloaking the clint tops and a more continuous tree cover. Clearings within the wooded pavements are frequent. Scrubby pavements form part of a continuum between open and wooded pavement.

All three types are of nature conservation value: specific guidance on their management can be founf in the following pages.

Limestone pavements are an impressive and beautiful natural resource, To look after them it is essential they are managed to maintain or where necessary, enhance their diversity of plants and animals. This involves:

- ensuring pavament is not removed or damaged
- avoiding all fertilise application on or around pavement
- avoiding the use of asulam herbicide for bracken control in pavement areas as this will kill rare ferns in the grikes
- avoiding supplementary feeding on limestone pavement
- grazing with appropriate animals and at suitable stocking levels according to the type of pavement
- controlling rabbit populations
- observing and recording change

Simon Webb, English Nature

Bloody Crane's-bill is being lost due to overgrazing

MANAGING OPEN PAVEMENT

Recognising open pavement

Open pavement has flowering plants and ferns largely confined to the grikes. There is a distinct visual contrast between the smooth white clints and the deep dark grikes. Any trees and shrubs present may be stunted by grazing as well as by restricted space for root growth and impoverished soil conditions. These factors create dwarfed and bonsai-like trees.

Pavements are 'open' in landscape terms with their large expanses of bare rock and because they are open to grazing, being set amidst sheep and cattle pastures. Open pavement usually grades into limestone pasture or heathland.

Simon Webb, English Nature

Typical open pavement, Farleton Fell, Cumbria

Features of a well-managed open pavement

- a scattering of native trees and shrubs
- flourinshing native wild flowers and ferns growing beyond the grikes and onto the clint tops with successful seed or spore production (especially grazing-intolerant species such as bloody cranes-bill, meadow rue and baneberry)
- an abundance of vegetation to shelter butterflies, spiders, snails and other invertebrates
- transitions from pavement vegetation to other valuable habitats such as scrub, woodland, heath and - species-rich grassland

How to manage pavement

- Restoration management

  Rehabilitation of heavily grazed pavements by total stock exclusion, for a limited period of five to ten years, may be the most effecting way of giving the nature conservation interest of these pavements a much-needed boost. This is likely to require temporary fencing, and a photographic review at the outset and after five or ten years to provide a simple record of the success of the restoration.

  Where numbers of rabbits are significant and their grazing is restricting the abundance and variety of plants, rabbit control may be necessary

- Maintenance grazing

  Where pavements are considered to be in good condition a maintenance management regime should be implemented. Cattle are the preferred grazers because they are reluctant to venture on to the pavement, but the pattern of land use may favour the continuation of sheep grazing, The optimum long-term stocking level to maintain the interest of open pavement is less than 1 ewe per hectare (or cattle equivalent based on 5 ewes = 1 cow).

MANAGING WOODED PAVEMENT

Recognising wooded pavement

Wooded pavement has a closed canopy of trees and shrubs. Views tend to be restricted by a dense cover of trees. Clints are cloaked with dense, green mosses.

Clearings or glades with bare clints may occur. In the ansence of browsing stick, the lower branches of yews and junipers clothes the clints with a broad skirt of foliage. Whilst not open to grazing by domestic stock, wooded pavements may nevertheless be grazed or browsed by deer. Wooded pavement usually grades into woodland, scrub or limestone grassland.

Simon Webb, English Nature

Mossy clints under a woodland canopy, North Lancashire

Features of a well-managed wooded pavement

- open glades and woodland edged to encourage butterflies and other invertebrates
- clearings created by thinning or rotational coppicing
-

a diversity in the age and type of trees giving a variety in vegetation height and structure
- wild flowers and ferns setting seed and flourishing
- transitions from pavement vegetation to other valuable habitats such as scrub, woodland, heath and species rich grassland
- yew groves, juniper scrub and hazel coppice
- areas of mossy clints, importance for invertebrates

How to manage wooded pavement

- Where currently practised, coppice or woodland management should be maintained and should be reintroduced where it has lapsed

  The introduction of coppicing to sites where it was not previously practised may improve the nature conservation value of wooded pavement. Maintaining areas of high forest within a site will provide diversity

- Where pavements are managed as high forest, heavy thinning and selective felling should be used in rotation to open up the canopy and create glades. Where present, rides should be maintained or widened. Coppice coups, rides and clearings will also help develop transitions to other habitats.

- Juniper and yew should be retained and not felled or coppiced

- Non-native conifers, beech and self-sown sycamore should be removed from pavements because they have an adverse effect on the underlying flora though shading, acidification and smothering, resulting from needle or leaf fall

- Deer control and fencing of coppice regrowth may be required on some wooded pavements particularly where they are managed as coppice.

MANAGING SCRUBBY PAVEMENTS

Recognising scrubby pavements

Wooded and open pavement reflect opposite ends of a continuum; scrubby pavement may have features of either, or both open and wooded pavement. Scrubby species typically include hazel and juniper reaching a height of around ten feet

Views through this type of pavement are limited and progress is likely to be impeded. A mixture of features is typical with bare grey rock and deep black grikes. 'Trees with skirts' and shrubs are commonly found. Mossy clints are normally restricted to small patches. Scrubby pavements can grade into open or wooded pavement.

Peter Wakely, English Nature

Scrubby pavement with areas of wooded pavement, Cringlebarrow, Lancashire

Simon Webb, English Nature

Scrubby pavement with open clearings, Hutton Roof Crags, Cumbria

Features of a well-managed scrubby pavement

- mosaic of scrub, grassland and wooded pavement
- transitions between open and wooded pavement (these graduations are botanically the richest)
- abundant juniper and hazel stands

How to manage scrubby pavement

- Scrubby pavement, especially that dominated by hazel or juniper, is valuable in its own right and conservation objectives should aim to retain it rather than change it into wooded or open pavement

- Invasive species such as blackthorn, cotoneaster, gorse or bramble should be removed where they are shading out pavement flora

- If woodland cover is encroaching, coppice management should be considered.

SUPPORTS AND PAYMENTS

Ideal management of pavements may be financed by the following payment schemes

- Management of limestone pavement within a Site of Special Scientific Interest (SSSI) or Area of Special Scientific Interest (ASSI) can be funded through a Wildlife Enhancement Scheme or management agreement. Contact English Nature, Scottish Natural Heritage or Countryside Council for Wales. For advice on management grant availability in Northern Ireland contact Environment and Heritage Service

- Management of wooded limestone pavement can be funded through the Woodland Grant Schemes. Contact Forestry Authority

- Management of grazed or open limestone pavement can receive payments through the Environmentally Sensitive Areas and Countryside Stewardship Schemes (contact Department for Environment, Food and Rural Affairs), and from Countryside Council for Wales through the Tir Gofal, the Welsh Agri-Environment Scheme.

Peter Wakely, English Nature

Active coppice management is favoured on wooded pavement

CONTACTS

For further guidance on limestone pavement management, payment and support schemes, please contact:

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English Nature

Pearl-bordered fritillary which thrives on coppiced pavement

Further information about limestone pavement can be found on the Limestone Pavement Action Group Website:
www.limestone-pavements.org.uk

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Simon Webb, English Nature

With favourable management, rare ferns and flowers flourish

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The information within this booklet is a summary of the guidance in the Upland Management Handbook (English Nature 1999).

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