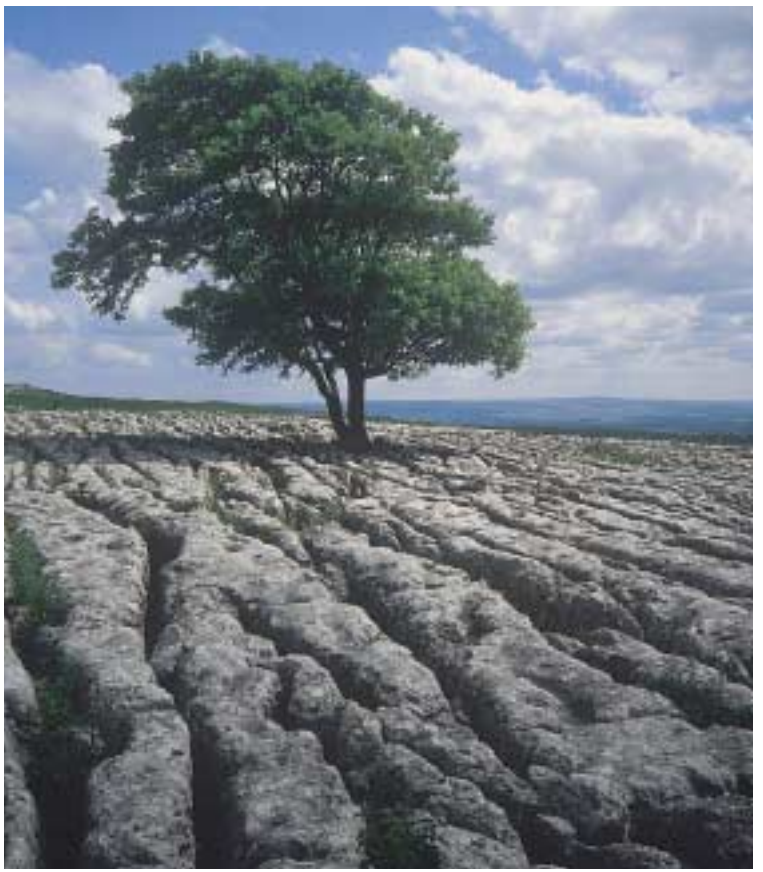
LIMESTONE PAVEMENT



OUR FRAGILE HERITAGE

David Woodfall, Woodfall Wild Images

Clints and grikes, Yorkshire Dales

When I try to imagine a faultless love
Or the life to come, what I hear is the murmur
Of underground streams, what I see is a limestone landscape

WH Auden, *In Praise of Limestone*

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Cover: *Malham Lings, Yorkshire Dales* **Photo:** Simon Webb, English Nature

This booklet was produced by the Limestone Pavement Action Group as part of the UK Biodiversity Action Plan for Limestone Pavement. Third Edition (February 2003). For contact details, see back cover.

The landscape of north western Britain and Ireland owes much of its spectacular appearance to the passage of glaciers during the last ice age.

The natural scarred beauty of this scenery is now vanishing through ignorance and misunderstanding.

Its future lies in your hands.

Simon Webb, English Nature

Great Asby Scar, Cumbria

JOURNEY THROUGH TIME

Britain and Ireland are home to the world's most important area of limestone pavement, a rare and endangered habitat.

The bare expanses of limestone, criss-crossed by deep fissures, date back to glacial times. Within Britain there are only 2900 hectares and as much as 97% has already been damaged.

The largest areas of pavement in the world are found on the Burren, in the Irish Republic. Extensive pavement also occurs in north west England (North Yorkshire, Cumbria and Lancashire) and County Fermanagh in Northern Ireland. Small pockets are also found on the limestone of Wales, Perthshire and the north west of Scotland. High altitude limestone platforms exist in the European Alps but these do not have the characteristic flora or delicate surface features of pavement in Britain and Ireland.

The formation of limestone pavement is complex. It arises from a series of events which makes it irreplaceable.

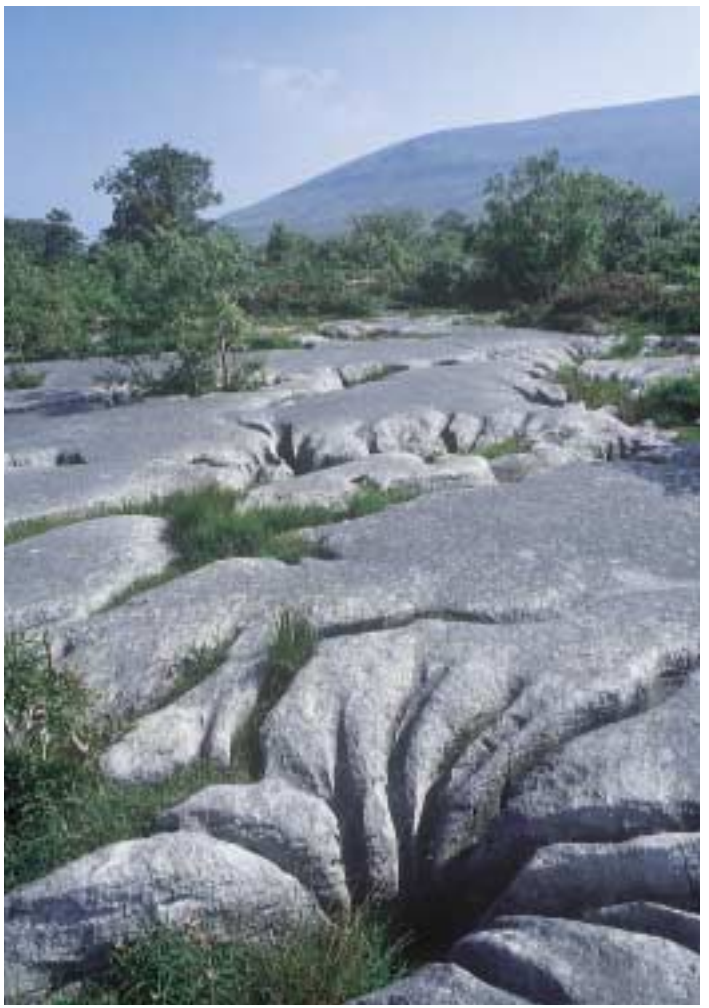
The pavements in England, Wales and Ireland were formed on Carboniferous limestone, laid down 300 million years ago. The Scottish pavements were formed on the even more ancient Dalradian and Durness limestones.

Around 10,000 years ago the limestone was laid bare by the erosive action of ice sheets. This ice age scouring created the level and gently sloping platforms we see today. Since then erosion has been an on-going process beneath the soil, which has itself subsequently weathered away. The process continued with the limestone under attack by acids in rain and ground water, leading to the enlargement of joints and fractures.

The characteristic deep fissures are called *grikes,* the limestone blocks are *clints* and the gutter-like channels on the clints which drain into the grikes are *runnels.*

The diversity of appearance which is found in different areas of pavement reflects not only the composition and structure of the bedrock but also the direction and strength of the glacial scour.

Limestone pavement is of great geological importance as a record of the last ice age and we can see our climate and landscape evolution over the past 10,000 years reflected in its form.



Peter Wakely, English Nature

Scar Close, Yorkshire Dales

THE LIVING LANDSCAPE

In addition to its geomorphological interest, limestone pavement is also an important habitat.

The deeper grikes provide sheltered, moist conditions and are favoured by a range of plants more commonly associated with woodland. These include Herb-Robert, Hart's-tongue Fern, Guelder-rose, Bloody Crane's-bill, Dog's Mercury and Maidenhair Spleenwort. Rarer species include Rigid Buckler-fern, Angular Solomons-seal, Downy Currant, Baneberry, Dark-red Helleborine and Limestone Fern.

In Britain, limestone pavement is home to 16 rare or threatened plant species. Rigid Buckler-fern is almost exclusively confined to limestone pavement and a significant proportion of Britains' Baneberry population is found on pavement in Yorkshire.

The Burren, in Ireland, is famed for its unique mixture of wild plants. This is a natural consequence of climate change over the past 15,000 years. Mountain Avens, for example, has survived in the Burren since the end of the last ice age - it is one of the so-called "arctic-alpine" species. The Maidenhair Fern, on the other hand, cannot tolerate frost and could not have survived in the Burren when it was icebound. More than 700 different flowering plants and ferns, ranging from tiny annuals to shrubs and trees, have been recorded in the Burren. This represents about three-quarters of the Irish native flora.

Rare residents of pavement include a tiny whorl snail found in mossy vegetation on low level pavement. A range of butterflies and moths use the limestone flora associated with pavement. These include the threatened High Brown and Pearl Bordered Fritillaries, and the Burren Green (a moth which is locally abundant in the Burren, but unknown elsewhere in Ireland or Britain). The wheatear and wren may also make their homes in limestone pavement; the wren's scientific name of Troglodytes - a cave dweller - being consistent with it frequenting rocky recesses.

David Woodfall, Woodfall Wild Images

Hart's-tongue fern, Gait Barrows, Lancashire

Rob Petley-Jones, English Nature

Guelder Rose

OUR FRAGILE HERITAGE

Limestone Pavement took thousands of years to form but can be destroyed in hours.

Once gone it is lost forever.

Simon Webb, English Nature

Destruction of limestone pavement, Yorkshire Dales

Limestone pavement, which is also known as water-worn limestone, has been used in garden rockeries since the last century. However, it is only in the last forty years that damage has become more widespread and extensive areas have been relentlessly stripped with the aid of machinery.

To many gardening enthusiasts, a rockery is still regarded as one of the most desirable features in any garden. Unfortunately, it is this continuing use of water-worn limestone in rockeries which threatens the very existence of limestone pavements and the special plants which live in them. Gardeners are often oblivious to the significance of its origins and the fact that one of the world's finest habitats is being destroyed. Alternatives such as sandstone, granite, slate or deep quarried limestone are readily available - and more environmentally acceptable.

Considerable damage has been done to the limestone pavements of the Burren in recent times as a result of a new craze among visitors for building miniature monuments. The damage is being caused primarily on the shattered limestone pavement of the Burren, where smaller pieces of limestone are used in the building process. In some cases, larger pieces of limestone have been deliberately shattered to provide building materials. Where stone can not readily be collected from the pavement, there are many examples of it having been taken indiscriminately from surrounding stone walls, so that the walls, which may date from ancient times, have also come under attack.

Shannon Development Photo Library

Pavement and Terraces, Burren National Park

A BRIGHTER FUTURE

Whilst accepting that past damage cannot be undone, the good news is that the future for limestone pavement looks brighter than it has done for many years, thanks to increased legal protection and campaigning by environmental groups.

The most important pavements in Britain and Ireland have been designated as Special Areas of Conservation (SAC) under the EC Habitats Directive. The British and Irish Governments are required to protect and restore pavement within these SACs.

In England, all areas of limestone pavement are protected by Limestone Pavement Orders. These Orders make it illegal to remove stone or damage pavement. In the rest of Britain and Ireland many pavements receive no legal protection.

Recent research into the trade in water-worn limestone has highlighted the fact that increased protection in England has put Irish pavements under greater pressure. The amount of stone being removed in the UK is falling and, as a result, increasing amounts of pavement stone are being removed in the Irish Republic. The research also showed that illegal removal of limestone pavement is still occurring in both the UK and Ireland.

Approximately 40,000 hectares of the Burren have been designated as SAC. This area includes limestone pavement, orchid-rich grassland and turloughs. Although regulations have been drawn up to control damaging developments or inappropriate changes of land use, the commercial potential of limestone continues to be exploited at the expense of natural habitats.

A survey of all pavement in England and Wales revealed that only 3% of sites remained undamaged. The continuing pattern of damage has showed that legislative protection for limestone pavement is inadequate, on its own, to ensure long-term protection. Environmental organisations responded to this concern by establishing the Limestone Pavement Action Group in 1994.

Its remit is to campaign for the long-term protection of limestone pavement and to increase public awareness of its significance and the needs for its preservation. In 1995 the campaign was officially launched by the late Geoff Hamilton, presenter of BBC's Gardeners World programme.

The campaign has had considerable success, including the revocation of the last two planning permissions to extract limestone pavement in England, the support of many gardening, horticultural and landscaping associations, and the backing of prominent figures in the political world.

HOW YOU CAN HELP

The future of limestone pavement is in **your** hands. When water-worn limestone is no longer sought by gardeners and landscapers, limestone pavement will no longer be threatened.

You can help safeguard our world-class heritage, not only by ensuring that you never buy water-worn limestone, but also by informing the Limestone Pavement Action Group if you see:

- Water-worn limestone for sale. It may be sold as Westmorland stone, Irish Limestone or Cumbrian stone,
- Water-worn limestone being used in rockeries or landscaping schemes,
- Damage occurring, or evidence of recent damage to any limestone pavement.

Simon Webb, English Nature

Stockpile of water-worn limestone

With **your** help we can stamp out this destructive trade forever.

SUGGESTED FURTHER READING

GOLDIE, H.S. (1983) Human Influence on Landforms: The case of limestone pavements. *New directions in karst.* Paterson K, and Sweeting M.M. (eds).
NELSON, E.C. and WALSH, W.F. (1997) The Burren: a companion to the wild flowers of an Irish limestone wilderness. Published for The Conservancy of the Burren by Samton Ltd. Dublin.
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WEBB, S. and GLADING, P. (1998) The Ecology and Conservation of Limestone Pavement in Britain. *British Wildlife,* December 1998, 103 - 113.
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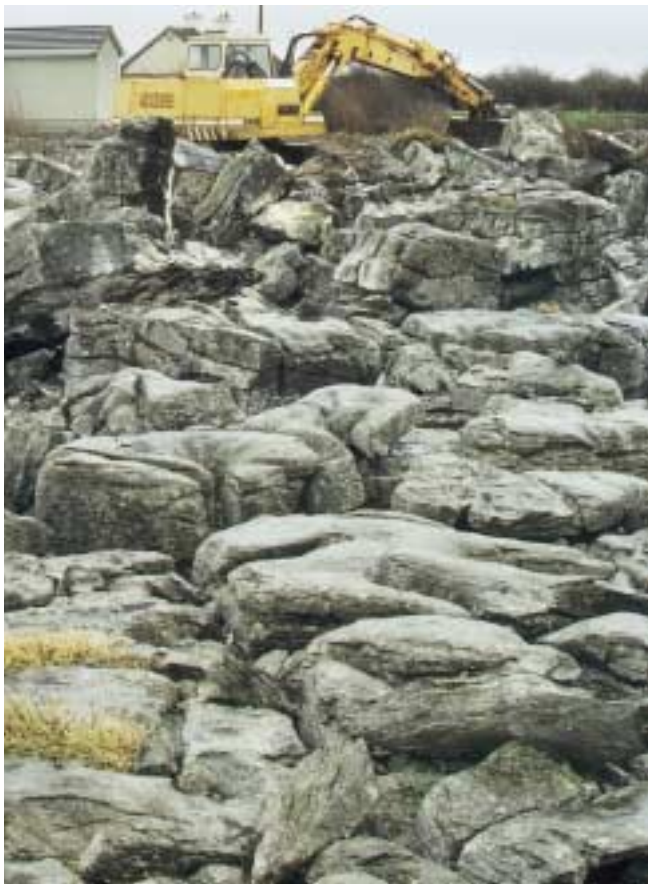

Limestone pavement extraction, Ireland

Traffic International, Cambridge

Where flinty clints are scraped bone-bare
A whale's ribs glint in the sun

Norman Nicholson, *The Seven Rocks*

Remember - there is NO water-worn limestone for sale in garden centres that is not destroying an important part of the natural heritage of the British Isles

Geoff Hamilton

Updates on the limestone pavement campaign and further information about limestone pavements can be found on our website:
www.limestone-pavements.org.uk

Limestone Pavement Action Group
c/o Cumbria Wildlife Trust, Plumgarths, Crook Road, Kendal, Cumbria LA8 8LX
Tel 01539 816300
e-mail: mail@cumbriawildlifetrust.org.uk

Further information about limestone pavements in the Burren can be found at
www.burrenbeo.com and **www.theburren.ie**

David Woodfall, Woodfall Wild Images

Bloody Crane's-bill, the Burren

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ENGLISH NATURE

The Countryside Agency

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THE wildlife TRUSTS

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SCOTTISH NATURAL HERITAGE

The Burren

friends OF THE LAKE DISTRICT

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