
Karst features

Karst features are those formed over soluble rocks such as limestone, dolomite or gypsum, and are characterised by sinkholes, caves and underground drainage. The name derives from the massive limestone country of Yugoslavia where a great variety of distinctive landforms have been produced by solution processes.

Currently protected sites of Karst Features within the AONB SSSIs

SSSI Name/GCR Name/Grid Ref.

Fairy Holes Cave Fairy Holes Cave [NY 936 356]

Moorhouse & Cross Fell Knock Fell Caverns [NY 720 307]

God's Bridge God's Bridge [NY 957 126]

In addition, the areas of limestone pavement known as Helbeck Scars, near Brough, is a proposed GCR site and may be scheduled as a SSSI.

RIGS and Durham County geological sites

There are currently no karst features designated as RIGS or Durham County geological sites in the AONB.

Other representative sites in the area

Bollihope Burn [NY 988 353] — Sink holes or dolines

Carrshield [NY 803 475] — Sink holes or dolines

Clarghyll, Alston [NY 725 490] — Sink holes or dolines

Ayle Burn Cavern, Alston [NY 728 497] — Cave

Palliard to Banks Gate, Stainmore [NY 864 135]–[NY 845 149] — Limestone Pavement

Helbeck Scars, Brough [NY 765 196]–[NY 795 160] — Limestone Pavement

Widdybank Fell, Upper Teesdale [NY 820 300] — Limestone Pavement

Karst features in Great Britain

Karst features in Great Britain include limestone pavements, cave systems, stalactitic and stalagmitic deposits, tufa and calcareous spring deposits, sink holes or dolines, and dry valleys.

Karst features are found in areas of rock which are readily soluble in ordinary rainwater. In Great Britain these are normally limestones. Excellent karst features are therefore to be found in areas of extensive limestone outcrops. Notable examples include the outcrops of Carboniferous limestones in North and South Wales, the Mendips, Derbyshire, South Cumbria and the Yorkshire Dales. Good karst features are developed on comparatively small outcrops of Cambrian limestones in North West Scotland and the Isle of Skye.

Karst features give important evidence of the processes involved in the active dissolution of soluble rocks, in the comparatively recent geological past. Caves systems may contain sediments which yield evidence of their former occupation by a variety of animals, including early man.

Karst features may also form in such soluble rocks as gypsum. Although gypsum karst is known in a number of places in Great Britain, including the Vale of Eden, none is present within the AONB.

Karst features in the AONB

Although limestones are important components of the succession of Carboniferous rocks within the AONB, they are mostly comparatively thin and separated from one another by substantial thicknesses of insoluble rocks such as shales and sandstones. Thick limestones are present locally only along parts of the North Pennine escarpment, particularly in the south of the area.

Karst features present within the AONB include sink holes or dolines, caves, natural bridges, limestone pavement, tufa and stalagmitic deposits.

The outcrops of many of the area's limestones are associated with lines of sink holes or dolines which, in areas with a moderate covering of superficial deposits, may provide valuable clues to the presence of limestone. Particularly good examples may be seen marking the top of the Great Limestone at numerous places in the Alston area, in West Allendale and in parts of Weardale and Teesdale. Springs, or lines of springs, occur close to the base of many limestone outcrops.

The few cave systems known in the North Pennines are relatively small and do not match the spectacular systems of the Yorkshire Dales. The area's best known caves include those at Harehope Quarry and Fairy Holes, in Weardale, Knock Fell Caverns on the North Pennine escarpment, the Teesdale (or Moking Hurth) Cave near Langdon Beck and Ayle Burn Cave near Alston. The Teesdale Cave is known to have yielded mammalian bones.

Knock Fell Caverns have been designated as a GCR site as the finest example in Britain of a joint-guided phreatic maze cave, with more than 4500m of passages within a single limestone in an area of less than 3ha.

The Fairy Holes Cave, also designated as a GCR site, is the finest and longest of the linear caves developed within the simple drainage pattern typical of the thin Yoredale limestones, which are characteristic of the North Pennines.

Areas of limestone pavement are very limited within the AONB, though good examples are present on the limestone outcrops of the North Pennine escarpment north of Brough and on the Great Limestone outcrop between Banks Gate and Palliard, east of North Stainmore. Areas of metamorphosed Melmerby Scar Limestone ('sugar limestone') occur on Widdybank Fell, Teesdale, where free of soil cover, locally exhibit rounded surfaces and widening of joints reminiscent of limestone pavement.

The AONB contains Britain's finest example of a natural limestone bridge, at God's Bridge near Bowes.

Small areas of tufa are forming adjacent to a lime-rich spring in Greenfoot Quarry, Stanhope. Small stalactite and stalagmite formations occur in many of the area's caves.

Limestone pavement, Stainmore. © Elizabeth Pickett/NPAP

Impact on the landscape

Karst features are locally conspicuous elements in the landscape, though they are of very limited extent. Most prominent are the areas of limestone pavement on the escarpment near Brough and near North Stainmore. Lines of sink holes, which are commonly associated with most limestone outcrops, are conspicuous locally. The comparatively small number of caves are significant, though concealed, landscape features.

Impact on biodiversity

Caves provide important specialised wildlife habitats. These include important bat roosts. The Fairy Holes Cave is said to support a unique fish population. Limestone pavement and limestone grasslands are important and scarce plant habitats.

Lime-rich spring water locally has a strong influence on plant communities.

Economic use

Karst features appear to have been of little economic use locally, though it is possible that very small amounts of waterworn limestone from limestone pavements may have been recovered for ornamental garden use. Limestone pavement is today a nationally protected habitat / feature the extraction of which is no longer permitted.

Wider importance

Although karst features in the North Pennines are less prominent and generally much less well developed than in the nearby limestone country of South Cumbria and the Yorkshire Dales, the AONB hosts several extremely important features.

The importance of such sites as Knock Fell Caverns and Fairy Holes cave have been noted above. God's Bridge is regarded as Britain's finest example of a natural limestone bridge.

Conservation issues

Portions of the Fairy Holes Cave system have been removed during limestone extraction at Eastgate Quarry. The quarry has now closed and the cave entrance is secured.

Filling of sink holes or dolines with farm, or other wastes may locally threaten to damage or obliterate examples of these features, though this is not currently seen as a serious threat.

Limestone pavement is vulnerable to illegal extraction.

God's Bridge, a natural limestone bridge over the River Greta. © Elizabeth Pickett/NPAP

Selected references

Johnson and Dunham, 1963; Trotter and Hollingworth, 1932; Waltham, Simms, Farrant and Goldie, 1997

Figures

(Figure 54) Limestone pavement, Stainmore. © Elizabeth Pickett/NPAP.

(Figure 55) God's Bridge, a natural limestone bridge over the River Greta. © Elizabeth Pickett/NPAP.

[Full references](#)



Limestone pavement, Stainmore. © Elizabeth Pickett/NPAP



God's Bridge, a natural limestone bridge over the River Greta. © Elizabeth Pickett/NPAP.