



## Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper<sup>1</sup>, Biodiversity 2020<sup>2</sup> and the European Landscape Convention<sup>3</sup>, we are revising profiles for England's 159 National Character Areas (NCAs). These are areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

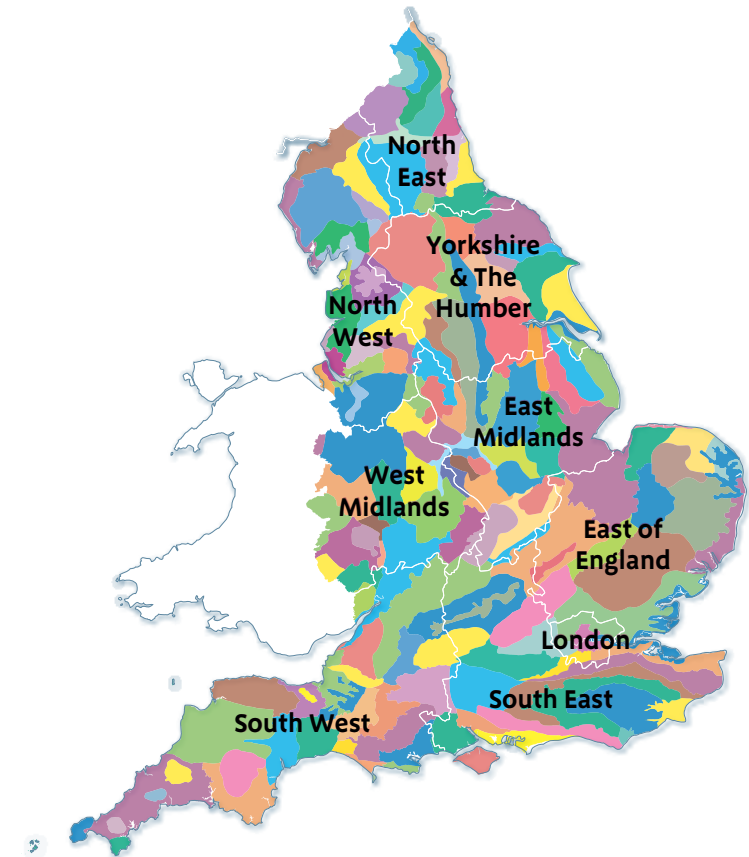
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage broader partnership working through Local Nature Partnerships. The profiles will also help to inform choices about how land is managed and can change.

Each profile includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future.

NCA profiles are working documents which draw on current evidence and knowledge. We will aim to refresh and update them periodically as new information becomes available to us.

We would like to hear how useful the NCA profiles are to you. You can contact the NCA team by emailing [ncaprofiles@naturalengland.org.uk](mailto:ncaprofiles@naturalengland.org.uk)

## National Character Areas map



<sup>1</sup> The Natural Choice: Securing the Value of Nature, Defra (2011; URL: [www.official-documents.gov.uk/document/cm80/8082/8082.pdf](http://www.official-documents.gov.uk/document/cm80/8082/8082.pdf))

<sup>2</sup> Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: [www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf](http://www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf))

<sup>3</sup> European Landscape Convention, Council of Europe (2000; URL: <http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm>)

## Summary

The Southern Magnesian Limestone National Character Area (NCA) is mainly defined by the underlying Permian Zechstein Group, formerly known as the Magnesian Limestone. It creates a very long and thin NCA that stretches from Thornborough in the north down through north Derbyshire to the outskirts of Nottingham further south. The limestone creates a ridge, or narrow belt of elevated land, running north–south through the NCA, forming a prominent landscape feature. The geology has influenced many aspects of the landscape, from use of its limestone resource as a local building material to the specialised limestone grasslands associated with limestone areas.

The presence of the ridge, and the drift deposits covering much of it, has produced light, fertile soils that have attracted settlement for more than 13,000 years. The important archaeological evidence and mammal fossils found at Creswell Crags and the impressive barrows and henge monuments at Thornborough Henges (three intact henges) are nationally important geological and archaeological features that provide a historic link to the story of human settlement and society within the area and beyond. Opportunities to maintain the landscape setting of these important sites and increase access to and engagement with them need to continue to be secured.

The NCA comprises of open, rolling arable farmland enclosed by hedgerows, with plantation woodlands, historic estate properties and parkland. The localised networks of grasslands and semi-natural habitats have become fragmented, and many species face challenges moving through the NCA. In places, rivers and dry valleys dissect the plateau from west to east, creating wetland habitats. Impacts on this agricultural landscape include limestone, coal and some sand and gravel extraction, associated infrastructure and tips; many of which have now been restored. The pace of settlement and industrial development expansion has been greater in the north than in the south, but the landscape still retains its essential rural character.

Sustainable food production is important in this largely rural area, to maintain the quality of the fertile soils and reduce erosion. The farmed landscape also contributes to the tranquillity of this NCA, and is valued as a contrast to the more urban, industrialised areas to the west and where major road infrastructure crosses the NCA. Parkland trees and plantations associated with country estates give a well-wooded feel in some areas of the NCA. There are more wooded areas within the NCA now than were recorded at the time of *Domesday Book*.

Click map to enlarge; click again to reduce.

Managing and maintaining these key landscape characteristics will be important in retaining the 'essence' of the Southern Magnesian Limestone NCA. There is a need to promote sustainable agriculture and appropriate hedgerow and woodland management and planting. Appropriate habitat enhancement and links are fundamental to this, along with guiding suitable development and appropriate mitigation of the impacts of changes to the landscape.



The three henges at Thornborough are of national importance and form part of a complex Neolithic and bronze-age ceremonial landscape.

## Statements of Environmental Opportunity

- **SEO 1:** Protect the underlying geology and range of historic landscape features, including the extensive Palaeolithic, Neolithic and bronze-age monuments, as part of the wider landscape and the evidence and time-depth of the area's historic evolution. Increase opportunities to improve access to, understanding of and enjoyment of historic features within the landscape, as well as their links to biodiversity and underpinning geodiversity.
- **SEO 2:** Protect and manage existing semi-natural habitats, including grasslands, wetlands and woodlands; and increase the area of semi-natural habitats, restore and create new areas, and create networks and links between habitats, to make their ecology more resilient and to afford increased movement of species.
- **SEO 3:** Protect the overall rural landscape and maintain its highly tranquil quality, managing the arable landscape to ensure the continued production of quality crops while also enhancing landscape features such as field boundaries and improving biodiversity, soil quality, reduction of soil erosion, water quality and flood risk management.
- **SEO 4:** Promote the successful incorporation of any future major land use changes, directing them where they can enhance the existing landscape and seeking optimum design to obtain the greatest net benefits, such as to minimise visual impact on the wider landscape, incorporating green infrastructure and creating new access to enhance recreational opportunity for people to experience wildlife.

## Description

### Physical and functional links to other National Character Areas

The Southern Magnesian Limestone is a very long, narrow National Character Area (NCA) stretching from Nottinghamshire in the south through north Derbyshire to North Yorkshire in the north. The limestone ridge runs roughly north to south and this elevation provides visual links to and from the lower-lying land to both the west and the east.

Several major rivers cut through the ridge – the Ure, Nidd and Wharfe flow east from the Pennine Dales Fringe NCA, while the Aire and Don flow in from the west from the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA, all eventually joining the Humber to the east. The naturally desired routes of the Rother and the Erewash are both blocked by the ridge, meaning that they run further north and south respectively before finding their way through. These river corridors provide important ecological connectivity, as well as communications routes and, in the past, locations for key defensive structures. Water draining from the Coal Measures influences the plant communities of semi-natural habitats along the west and south edges.

In the past there have been significant economic links between the fertile farmland on the ridge and the industrial areas to the west.



Limestone has traditionally been used as a building material throughout the NCA providing a link to the local geology.

## Key characteristics

- Underlying limestone creates an elevated ridge with smoothly rolling landform; river valleys cut through the ridge, in places following dramatic gorges. There are also some dry valleys.
- Fertile, intensively farmed arable land, with large fields bounded by clipped hawthorn hedges, creating a generally large-scale, open landscape.
- Semi-natural habitats, strongly associated with underlying limestone geology, include lowland calcareous grassland and limestone scrub on the free-draining upland and gorges with wetland habitats associated with localised springs and watercourses, but all tend to be small and fragmented.
- Large number of abbeys, country houses and estates with designed gardens and parklands, woodlands, plantations and game coverts.
- Long views over lowlands to the east and west, and most prominent in the south.
- Woodlands combining with open arable land to create a wooded farmland landscape in places, where traditionally coppiced woodlands support dormouse populations.
- Unifying influence of creamy white Magnesian Limestone used as a building material and often combined with red pantile roofing.
- Localised industrial influences, especially in the Aire and Don valleys, and in the south and along the fringe of the Coal Measures to the west, with former mines and spoil heaps (many now restored), power lines, settlements, industry and transport routes.
- Influenced by the transport corridor of the A1 which is apparent in an otherwise undisturbed rural countryside.
- Archaeological evidence, with some notable prehistoric sites, reflects the longstanding importance of the area for occupation and transport.



**Bramham Park is one of a number of large country houses that have designed gardens and parklands.**

## Southern Magnesian Limestone today

The underlying Permian Magnesian Limestone forms a distinct but low ridge of land running north to south, cut through by rivers following some dramatic gorges. Towards the north the limestone is largely covered by drift deposits, so that the ridge is less obvious, but the whole area is unified by the widespread use of the local limestone as a building material. The well-drained soils and low altitude have given rise to a landscape of rolling landform, fertile farmland and well-wooded estates. The ridge forms an escarpment with a steep scarp face to the west and a gentle slope dipping to the east, elevated enough to give long views out over the more industrialised lowlands to the west and the farmed lowlands to the east.

The soils are free draining and very fertile, giving rise to productive arable cropping. The fields are generally large and geometric, bounded by low, flailed hawthorn hedges, although stone walls do also occur, for example as estate boundaries and in villages. Hedgerow trees are infrequent, which adds to the open character of the farmed landscape, and the hedges often emphasise the rolling landform. This open, rolling farmland contrasts with the scattered woodlands and supports important populations of farmland birds including lapwing, grey partridge, yellow wagtail, tree sparrow and corn bunting.

Woodland cover is reasonably high overall, often owing to the trees and woodlands in the grounds of the many large country houses that were established on the ridge plateau. Historical evidence suggests that woodland cover is currently higher than at the time of the Domesday Book records. Many are plantation woodlands, but oak, ash and lime typically form the canopy of deciduous woodlands. The few remnants of ancient woodland in this area have a particular abundance of the nationally scarce large-leaved lime. A good example is Sprotbrough Gorge where the canopy consists of ash and wych elm and is the largest area of this woodland type in South Yorkshire. Where hazel forms the understory, woodland can be particularly important for dormouse, and this NCA has been identified as a priority area for its conservation. The woodlands support

a wide range of birds including lesser spotted woodpecker, marsh tit, spotted flycatcher and hawfinch.

The designed parklands and gardens, supported by estates, are a major influence on the landscape. With their extensive areas of woodlands, plantations and game coverts, in places they give the feel of a well-wooded landscape. The estates include early monastic abbeys such as Fountains Abbey and Newstead Abbey, and later, country houses established with the wealth generated from the industrialisation of the coalfield to the west. Designed parklands include the internationally renowned gardens at Studley Royal, along with Newby Hall, Bramham Park, Lotherton Hall, Brodsworth Park, Hardwick Hall and Annesley Hall. Fountains Abbey is part of the Studley Royal and Fountains Abbey World Heritage Site and provides outstanding value to the area through the designed landscape and associated Cistercian abbey.



**Hetchell Woods provides a refuge for species of lowland calcareous grassland habitat and a mosaic of grassland, woodland and wetter habitats.**

Other semi-natural habitats are limited and fragmented. Of particular note are the small areas of Magnesian Limestone (calcareous) grassland, which is characteristic of this landscape. It is a nationally scarce habitat, and has a number of rare specialist species such as Yorkshire broomrape and the brown argus butterfly which is associated with it. These grasslands tend to occur on steeper slopes or in the narrow valley bottoms, and some of the most significant stretches can be found around Maltby, west of Sprotbrough, and near Castleford, Micklefield and Bramham. Where they are not actively managed, they are replaced by scrub, which forms a particularly varied mix, with hawthorn, blackthorn, guelder rose and dogwood, providing important habitat for birds and insects.

The river valleys that cut through the limestone ridge are picturesque, with some dramatic gorges with overhanging woodlands. These include Nidd Gorge at Knaresborough, the Don Gorge near Conisbrough and Creswell Crags. In medieval times defensive castles were built on the high land of gorges such as these, giving them control over movements up and down the river valleys, and these castles – such as Knaresborough, Conisbrough, Mexborough and Tickhill – still remain as striking features in the landscape.

The rivers continue to play an important role in connecting the industrial towns to the west with the Humber and the North Sea to the east. Historically the rivers were important transport corridors. Along some valleys, such as the Aire, there are widespread industrial influences including evidence of mining spoil, power lines, railways, roads, subsidence depressions and pits where sand and gravel have been extracted. Areas in the south around Nottingham are more heavily settled where the limestone is more faulted, giving rise to more industrial activity as a result of the availability of coal and other materials.

Most of the settlements have more in common with the traditional former mining towns and villages lying to the west and grew up to service the large industrial towns. Only a few are rural limestone villages, with red pantile roofs. Limestone buildings can be found in towns such as Wetherby, Tadcaster, Boston Spa and

Ripon, in the villages and isolated large farmsteads, and in estate boundary walls, as well as in the defensive castles such as at Conisbrough. These contrast with the later factories and terraces of workers' housing in urban areas which were built in brick with slate roofs.

The importance of the limestone as a building material is reflected in the presence of a number of large limestone quarries, for example near Bolsover, while the quality of the water abstracted from the limestone aquifers has contributed to the development of breweries (for example at Masham and Tadcaster) and spas (Boston Spa). In the north, associated with the valleys of the Ure and Swale, deposits of sand and gravel have also been exploited, and wetlands created from the altered landforms.

The limestone ridge has played an important role in connecting communities from prehistory, with a series of henges and other features running down the ridge from Thornborough to Ferrybridge. There is evidence of Roman camps and settlements linked by the main north–south route which followed the drier, elevated land, and which now forms the A1. The M1, M18 and M62 all cross the ridge, linking west with east. These major roads introduce traffic noise, and are often highly visible along their length. This accessibility by road and rail to routes running both north–south and east–west has given rise to a large number of warehousing sites over recent years. Access for people is less well established within the NCA with low levels of access routes. Formal access is provided by the established parks and gardens of the large estates such as the gardens at Newby Hall. The extent of parkland has reduced over recent decades, but as Registered Parks and Gardens cover 2.5 per cent of the area, they remain a key influence on the character of the landscape, as well as being home to many veteran trees, important for the insects and lichens that they support. Many of the parklands are now open to the public, providing important access opportunities.



## The landscape through time

Underlying the NCA are the Upper Carboniferous Coal Measures, a sequence of river-lain sandstones, silts and muds and, at depth, coal. Exposed in the deeper river valleys, it has had a significant influence on the modern development of the NCA as a source of mined coal and the local use of sandstone in buildings. The NCA is dominated by the easterly dipping Permian Magnesian Limestone escarpment. The Magnesian Limestone was deposited on the western edge of a shallow tropical sea (similar to the Bahamas) approximately 250-260 million years ago and forms a continuous belt from Nottingham to the Durham coast. It comprises a lower unit of dolostone and dolomitic limestones (the Cadeby Formation), which forms the dominant landscape feature, overlain by red mudstone with gypsum (the Edlington Formation). Following on from this is the upper dolostone and dolomitic limestone unit (the Brotherton Formation) followed by more red mudstone and gypsum (the Roxby Formation). The sequence locally has a number of swallow holes caused by the underground dissolution of gypsum and limestone. The Magnesian Limestone sequence is clearly seen where it is cut by rivers, for example in the Nidd Gorge at Knaresborough, the Wharfe Valley at Wetherby, Boston Spa and the Don Gorge near Doncaster.

Exposures in the Magnesian Limestone, often associated with former quarries, provide important and accessible sections allowing interpretation and understanding of and continued research into the geodiversity of the NCA. The best examples of these exposures are protected as Sites of Special Scientific Interest, for example at Quarry Moor near Ripon and Cadeby Quarry.

North of Wetherby the Magnesian Limestone is largely covered with glacial deposits from the last glaciations. South of Wetherby the Magnesian Limestone has only a thin local cover of glacial deposits. The soils here are derived from the limestones and, locally, their associated red clays. They are generally very fertile and often support agricultural land classified as Grade 2 in quality.



Limestone quarrying in central and southern areas has local impacts on the landscape but can also provide opportunities through restoration of sites after use.

Internationally important evidence of early use of this landscape by humans is found in the caves at Creswell Crags. Creswell Crags provides evidence of three phases of occupation. The earliest, 40,000–60,000 years ago, corresponds to a Neanderthal occupation of migrating hunter gatherers and is evidenced through stone tools; there is also evidence of occupation approximately 32,000–33,000 years ago by modern hunter gatherers and lastly upper Palaeolithic hunters 14,000–15,000 years ago. Tools and animal remains found in the caves provide important evidence of the adaptation of humans to the late glacial and early post-glacial environments and the caves also contain the only evidence of Palaeolithic art in the country. The area was extensively exploited by hunter-gatherer groups during the Mesolithic Period and the succeeding Neolithic Period saw the construction of several important groupings of barrows and henge monuments, particularly around Thornborough Henges between the Ure and the Swale rivers. The intact quality of the three henges at Thornborough and their position in a landscape, rich in other burial monuments and features, make this site nationally important. Significant monuments are also found elsewhere, however, such as the Neolithic long barrow at Whitwell.

The light and fertile soils of the ridge favoured settlement in this area at the onset of farming around 4,000 BC.

There is evidence that, from the Iron Age to well after the end of the Roman occupation, there was increased agricultural exploitation of the area with the use of ditches and banks to define settlements, stock pens, fields and tracks. In this period, the landscape had probably been cleared of much woodland and was occupied by single, quite widely spaced farmsteads with their associated field systems and ditched trackways leading outwards to the open pastures and woodland. Examples of important defensible hill forts remain from this period at Barwick in Elmet in the central section and Markland Grips in the south.



**There are some large wooded areas within the NCA giving some places a well wooded feeling within the more open landscape.**

The Roman occupation had a major influence on the landscape as the ridge was a favoured location for the making of Roman roads along with military camps and settlements. The routes, later to become known as Ermine Street and Dere Street, were the basis for much of the route of the modern A1 which has a significant influence on the landscape today.

Arable-based open field farming, probably developed in the later Anglo-Saxon period, was extensive until the late 18th century, after which the present day pattern of large-scale fields and some dispersed farmsteads was established. Earlier small-scale and irregular enclosure patterns can still be seen around some villages.

In Yorkshire, Ripon developed as an ecclesiastical centre from the 7th century (the shrine of St Wilfrid), and in the 12th century as a planned borough with a market and church of collegiate canons, while in Derbyshire Bolsover was a planned 12th-century town outside the castle. The medieval period saw the pattern of nucleated settlements laid down, such as the market towns of Knaresborough and Pontefract, but a high number of deserted/shrunken settlements indicate a subsequent reduction in population from the high settlement levels of the early 14th century. Knaresborough originated as a medieval market centre between the Pennines and the Vale of York, and as a textile centre, until its decline from the early 19th century. Several dramatic defensive sites were established, especially overlooking the narrow gorges which acted as routes across the ridge, such as at Knaresborough, Conisbrough and Barlborough.

Wealthy landowners have also had a notable influence on the landscape by means of the fine buildings and designed parklands that they created from the 16th century. The wealth and resource range from the remains of the great abbeys, such as Fountains Abbey near Ripon, to the chain of country houses and designed parklands which runs along the ridge from Bedale Hall in the north to Hardwick Hall and Newstead Abbey, once home of Lord Byron, in the south. It includes the internationally renowned gardens at Studley Royal and estates such as Bramham, Ledston and Lotherton to the east of Leeds as well as Brodsworth, Cusworth and Melton Parks near Doncaster, with later estates based on the industrial wealth earned from surrounding areas. Some of these houses, parks and estates were created by wealthy industrialists involved in coal mining and steel making in areas to the west during the 18th and 19th centuries.

In the 19th and 20th centuries development followed the rivers, notably the Aire and the Don, as they were key trading routes between the North Sea and the industrial hinterland. Exploitation of deep coal resources at Maltby and Creswell led to industrial developments and settlements, while military installations and airfields were constructed along the line of the A1.

This narrow strip of land has been under considerable pressure from both industrial and residential development in recent years, leading to an expansion of towns such as Castleford, Doncaster and Hucknall. There has also been a significant increase in large warehouses, associated with the upgrade of the key north–south route of the A1, and its links with other motorways running east–west. These developments have led to a reduction in the extent of dark night skies and tranquillity.

Mineral workings have also had local impacts on the landscape, with limestone quarrying in central and southern areas (including around Whitwell), coal mining around Maltby, Creswell and Bolsover, and sand and gravel extraction in particular in the Ure and Swale corridors.

The landscape still remains dominated by agriculture, in particular arable production, with a recent reduction in livestock and dairying. Woodland cover has increased over time, with many small woodland parcels established throughout the area, and larger blocks in the south associated with the Greenwood Community Forest. However, traditional coppice management, which contributed to the diversity of woodland fauna including the dormouse, and flora have declined. Improved management of hedgerows in this area continues to enhance the landscape and the biodiversity within it.