National Character Area profile:

37. Yorkshire Southern Pennine Fringe

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Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper[1], Biodiversity 2020[2] and the European Landscape Convention[3], 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.

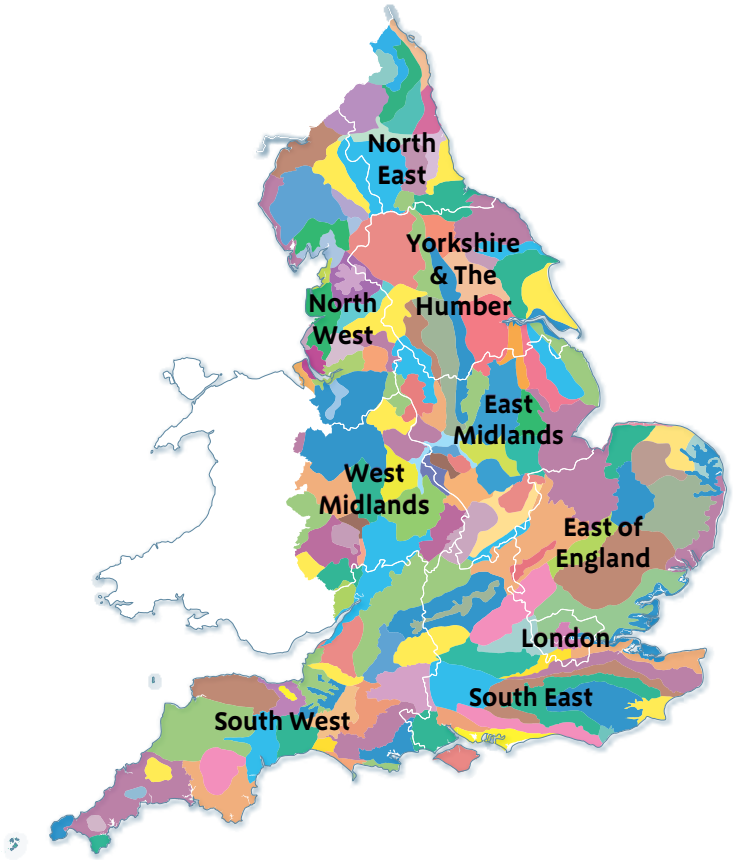
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and 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**

National Character Areas map



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

[2] 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**)

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

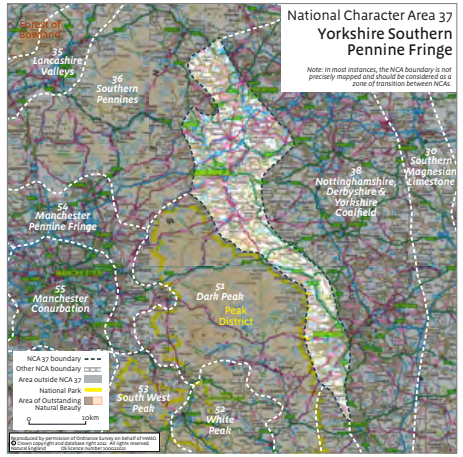
Summary

The Yorkshire Southern Pennine Fringe National Character Area (NCA) is a transitional landscape from the upland areas of the Southern Pennines NCA in the west through to the low-lying land of the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA to the east. The most striking aspect of the landscape is the mingling of predominantly 'gritstone' industrial towns and villages with the strong valley forms and pastoral agriculture of the Pennine foothills. The gritstone industrial buildings and settlements bring a sense of visual unity to the landscape. The landscape is dominated by industrial buildings and structures such as factories, chimneys, railways and canals. Travellers crossing the NCA from west to east experience a change from pastoral treeless hill tops, where drystone walls are the predominant field boundary, to wooded valleys, where large urban settlements such as Bradford, Huddersfield and Sheffield are focused in the valleys and were built up around the former industries such as coal mining, steel-making and the woollen industry. The World Heritage Site of Saltaire stands as an example model town built with the wealth produced by the industries prevalent in this area. In the east, settlements are separated by areas of arable farming with hedgerows and lowland meadows.

The NCA is characterised by steep slopes that are cut through by narrow rivers, notably the Don, the Calder, the Hebble Brook and the Colne in the north and the Sheaf, the Rivelin and the Loxley in the south near Sheffield, which open up into valleys on lower land. The river corridors provide links through the NCA from the uplands into the towns and cities in the valleys, supplying not only water for the large population in these areas but also opportunities for people to access and enjoy the natural environment and for species movement through the landscape.

The presence of locally accessible minerals and materials and the fast-flowing water from the uplands attracted development of woollen towns in the north and iron ore and smelting in the south, notably around Sheffield. The presence of more than 5,000 listed buildings and 20 Registered Parks and Gardens reveals the industrial wealth that was used to shape the area and still provides strong sense of place today. The consistent use of local sandstone helps to retain identity and links to the geology of the area.

There are many opportunities to provide increased access and recreation for the large populations living in the valleys of the NCA, encouraging them to engage with the wider countryside both between settlements and up into the more upland areas. The geology of the area has had such a strong influence on the development of the local history and sense of place that opportunities should be taken to recognise, maintain and engage people with these features.



Click map to enlarge; click again to reduce.

Statements of Environmental Opportunity

- **SEO 1**: Protect and manage the rich industrial heritage – including historical settlement patterns and local vernacular styles, as well as the industrial and municipal buildings that were built with wealth when the industry thrived, such as the World Heritage Site at Saltaire – which links the history of the area to the landscape features, to enhance sense of place and history and inspire local communities through increased access and recreation opportunities.

- **SEO 2**: Manage flood plains and wetland habitats to regulate water flow and availability, and to enhance water quality and biodiversity. Increase the river and riparian habitat networks, for example along the Calder, the Don and the Colne in the north and along the Sheaf, the Rivelin and the Loxley in the south, and ensure good linkages with the networks of woodland and semi-natural habitats for the species they support and to improve the resilience of these habitats to climate change.

- **SEO 3**: Protect the distinctive landscape character with its contrasts between open pastures on hill tops, woodland on valley sides and the settlements nestled in the valley bottoms. Manage the arable and pastoral farmland and the areas of woodland to improve their contribution to biodiversity, food provision and landscape character, to improve soil and water quality, and reduce soil erosion.

- **SEO 4**: Plan to optimise opportunities for access to the natural environment for the large urban populations in the area, making the most of key landscape features to redefine sense of place in the changing landscape and encouraging implementation of well-designed and managed green infrastructure, sustainable urban drainage systems and good use of planting to screen urban edges.

View west from the hillside road above Jackson Bridge over Scholes to farmland with regular drystone walling patterns on the foothills of the South Pennines. Broad-leaved woodland occupies parts of the steeper valley sides.

Description

Physical and functional links to other National Character Areas

The Yorkshire Southern Pennine Fringe is a transitional area, lying between the pastures of the upland Pennine block to the west and the lower-lying arable land to the east. Within the National Character Area (NCA), there is also a transition of land use across the area, from more rural, upland and sparse landscape in the west to the more heavily developed industrial areas in the east.

Several major and minor rivers flow from west to east through the area. These include the Don, the Calder and the Colne in the north-east, and the Sheaf, the Rivelin and the Loxley to the south, near Sheffield. Deeply incised river valleys show distinct shoulders where they have cut down from earlier broader valleys; narrow valleys open out as they descend to the east. These rivers and their associated riparian habitats also provide strong ecological links from the Pennine uplands to the surrounding lowlands, serving as essential ecological networks to aid the movement of species. Management activities of these watercourses upstream are therefore likely to affect this NCA, just as management within this NCA will impact on areas downstream in the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA and the Humberhead Levels NCA – and ultimately the Humber Estuary NCA.

In places there are extensive views out to the east over the adjacent towns and agricultural land of the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA. The steep slopes of the NCA, together with the tops of the Southern Pennines NCA and Dark Peak NCA including the Peak District National park, provide a dramatic backdrop and views from lower-lying NCAs to the east.

The Special Protection Area and Special Area of Conservation designated in the adjacent Southern Pennines NCA would benefit from improved management of upland pastures in this NCA, to provide further support for key species, especially twite.

Historic as well as modern infrastructure is a key characteristic of the NCA with canal routes now providing recreational opportunities such as along the Calder and Hebble Navigation.

Key characteristics

- A transitional landscape dissected by steep-sided valleys, dropping from the high gritstone hills in the west to lower land in the east, and thus creating an important backdrop to the many industrial towns and villages within and beyond the NCA.
- Sandstones and gritstone beds of Millstone Grit (Namurian) age underlying smooth hills and plateaux in the west. These are overlain in the east by beds of sandstone, siltstone and mudstone of Coal Measures age.
- Rivers creating a deeply dissected landscape, with high plateaux cut by steep-sided valleys, and fanning out in 'fingers' across valleys of the NCA.
- Treeless hill tops with tracts of rough grazing and extensive areas of enclosed pasture to the west, but with broadleaved woodland on steeper valley sides, giving the impression of a well-wooded landscape, especially to the north and west of Sheffield.
- Predominantly pastoral farming, especially in western areas, with a shift to more arable land in the drier eastern areas.
- Boundary features that change from distinctive patterns of drystone walls on the upland hills, to hedgerows becoming the predominant field boundary in the east.
- Close conjunction between rural landscapes and the rich industrial heritage of the urban areas, including settlements associated with the textile industry, with large mills and tall chimneys, and large factories and forges associated with the iron, steel and manufacturing industries.
- Urban development constrained within valley floors and up side slopes, with location and layout strongly influenced by the landform.
- Industrial wealth revealed in magnificent civil architecture in town centres, notably Bradford, Halifax, Huddersfield and Sheffield, and several stately homes with designed parklands.
- Evidence of bronze-age and Roman habitation still present on uplands, and old pack-horse routes that once joined settlements across the Pennines still in place, or now forming modern major road routes.
- Extensive and dramatic views from higher land out over lower-lying land to the east, even from within urban areas.
- Several reservoirs contained within narrow valleys contributing a distinct character as well as providing popular places to visit.
- Small patches of fragmented priority habitats providing important refuges locally for wildlife. Grassland mosaics are particularly important in supporting waders and the twite that breeds on adjacent moorland areas; lowland woodland is also an important feature.
- In places a dense network of roads and urban development, with many road, rail and canal routes crossing the NCA, and a high density of footpaths throughout.

Yorkshire Southern Pennine Fringe today

The Yorkshire Southern Pennine Fringe NCA marks a transition from the uplands to the west to the low ridges of the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA to the east. The most striking aspect of the landscape is the close juxtaposition of predominantly gritstone industrial towns and villages with the strong valley forms and the pastoral agriculture of the Pennine foothills. The use of local gritstone for industrial buildings and houses gives a strong sense of visual unity and connection to the landscape.

The sandstones and mudstones of Millstone Grit age support extensive but poorly drained pasture land which is prominent in the west of the area; this is overlain by beds of sandstone, siltstone and mudstone in the east, giving rise to quality building stone and more fertile soils for agriculture.

The uplands of the Pennines drop down from west to east and the land is deeply dissected by a series of rivers, notably the Calder, the Colne, the Holme, the Don, the Loxley, the Rivelin and the Sheaf. These and smaller rivers have created steep-sided valleys, with woodland on the steeper slopes, forming clear visual backdrops to the settlements. Many contain reservoirs, which each bring a distinctive character to their valleys and provide good opportunities for accessing and enjoying the countryside. They include Blackmoorfoot, Broadstone, Ingbirchworth, Royd Moor, Scout Dike, Underbank, Moor Hall and Damflask.

The settled valleys contrast strongly with the treeless rough grazing and remnant moorlands on higher land and the extensive areas of pastures enclosed by drystone walls on the Pennine foothills. Here there are scattered farmsteads and hamlets, and the landscape has a more remote feel, even though towns are not far away. The farmhouses, barns and walls are all built of local sandstone and gritstone, again providing strong visual unity. On some areas of the plateaux there are distinctive patterns of regular rectangular fields delineated by drystone walls, for instance near Penistone and Honley.

The mix of urban and rural in the NCA provides people with a strong sense of place as here at Sowerby Bridge within the wider landscape setting.

Farming in the west is largely based on livestock, including some dairying, where the climate is wetter and cooler due to altitude. Here there are mosaics of grasslands enclosed by drystone walls, creating a patchwork of textures and colours across the hillsides, and providing a range of feeding and breeding opportunities for waders (curlew, lapwing and snipe) and other birds such as the twite. Many of the grassland habitats have been subject to agricultural improvements and have lost much of their biodiversity interest. Semi-natural habitats are generally interspersed in this landscape as small fragments of those found more widely in upland areas; for example, patches of upland heath, acid grassland and purple moor grass still exist. These patches of habitat are very important for wildlife locally, as recognised through their designation as Local Wildlife Sites; however, they are not recognised within national designation schemes. To the east there is more arable cropping, and hedges take over from walls as the predominant field boundary. The proximity of urban areas has led to horse grazing and other typical peri-urban land uses in places.

Generally tree cover is fairly high, with 11 per cent of the area under woodland. Some of the higher pastures to the west are almost treeless, but this is offset by other areas that have retained a substantial framework of woodlands, notably around Grenoside, north of Sheffield. Elsewhere there are small woodlands, in some instances reinforced by hedges and hedgerow trees, giving the impression of a well-wooded landscape. Generally woodland occurs on the steep valley sides and is mostly broadleaved, with some conifers. Valley bottoms tend to be developed right up to the banks of the rivers, but there are a few undeveloped valleys where there are pastures and meadows, and hedges with ash and oak hedgerow trees. The narrow wooded valleys on the west side of Sheffield have become part of a network of habitats and other linear green areas that extend and allow species to move right into the centre of the city.

The pronounced landform gives rise to dramatic views, with long views over busy urban areas across valleys and over lower-lying land to the east. From within the towns there are views out to the surrounding hills, so that town and country are more obviously linked. Around Batley and Dewsbury, where the Coal Measures rocks are exposed, the hills and valleys are gentler and more rounded, and urban development has extended further. Here there is a complex mix of land cover, with small patches of open land, fields and woods separating areas of housing and industry.

The impact of development is nearly always evident, with dense networks of roads where the landform permits, as around Batley and Dewsbury, and many main road, rail and canal routes cutting across the area. The area contains a wealth of industrial archaeology which contributes significantly to the strong sense of historical character and identity, although this is breaking down in some of the more extensive urban areas.

Lapwing rising from a ploughed field near Penistone. The farmland and grassland mosaics in the upland fringe provide a range of feeding and breeding habitats for wading birds.

Patterns of settlement and industrial development have been strongly influenced by the landform; location of raw materials and fast-flowing rivers shaped the location of the textile, coal and steel industries and the towns that grew up around them. Mills, factories and towns and canal, rail and road routes have been largely confined to the valleys, spreading along in linear form. Tall mill chimneys often act as focal points, while terraces of stone-built houses follow the valleys and spread up the side slopes.

Although united by the use of gritstone in building, the settlements also vary and thus alter the character of the landscape. In the north are the woollen and engineering towns of Halifax, Huddersfield and Bradford, where large stone mills, now often converted to other uses, are prominent in the landscape; the town centres are dominated by substantial and imposing civic buildings. In the south, to the west of Sheffield, the many stone-built Victorian houses and gardens built by wealthy industrialists are evident. In between, smaller settlements such as Penistone and Holmfirth have a distinctly Pennine character, combining compact gritstone centres with the contrasting open hills and pastures. There is continued pressure around existing settlements for more development for housing and employment, which may impact on the urban–rural mix found in the NCA. To redress the decline of past industries there is also strong pressure to regenerate old industrial areas and many of the housing estates that were built around these to support workers.

The wealth created by the industries was often used to build stately homes with designed parklands, many of which are now public parks within wider urban areas, such as Weston Park and the Porter Valley parks in Sheffield and Lister Park in Bradford. The People's Park in Halifax was designed by Sir Joseph Paxton in 1857 and was later donated to the people of Halifax. Local Nature Reserves cover 1 per cent of the NCA, providing a relatively high number of opportunities for recreation in and engagement with the natural environment. Sheffield in particular has good green infrastructure linking the city to the surrounding countryside and the Peak District National Park to the west. Access across the NCA through footpaths, canals and disused railway tracks also makes the landscape more permeable for people and wildlife. The long-distance routes of the Trans Pennine Trail and Calderdale Way provide an important resource.

The landscape through time

This landscape is underlain by Upper Carboniferous strata. Most notable are the hard, coarse-grained sandstone beds ('gritstones') interbedded with softer siltstones and mudstones of the Millstone Grit, which dips to the east here where it is overlain by the beds of sandstone, siltstone, mudstone, coals and ironstone of the Coal Measures. The smooth hills and plateaux formed by the Millstone Grit are dissected by fast-flowing rivers and streams to form deep, narrow valleys, with the rivers flowing to the east. Except in the vicinity of Bradford, the area lies to the south of the southern limit of the ice sheet during the last glaciation, and lacks glacial deposits.

Early settlement in this area seems to have been sparse, although prehistoric earthworks and rock art survive in woodland areas to the south of the area. Flint scatters suggest that Mesolithic habitation sites may be preserved under peat in the uplands, while traces of bronze-age settlement are preserved on the undeveloped higher land to the west. There is some evidence of former Roman field systems and infrastructure, for example Finkle Street.

The woollen industry has been the main influence on the landscape since the 12th century. It arose due to the suitability of the land for sheep rearing, combined with the numerous watercourses running off the Millstone Grit which provided soft water suitable for wool preparation processes. The woollen industry was initially a home industry, in small settlements on the plateaux, with small intakes of land enclosed to support subsistence farming for the woollen trade workers. The laithe house (adjoined house and byre) building style is directly related to this lifestyle. Traditionally settlements in the Yorkshire Southern Pennine Fringe were dispersed along valley bottoms.

Significant features are the old pack-horse trading routes across the Pennine hills, which linked settlements lying to the east and west. These have evolved into today's modern road routes.

Between 1750 and 1850 rapid industrial development transformed the area. In the valleys to the west of Sheffield plentiful ironstone reserves gave rise to small-scale smelting works. The ready supply of water power led to the establishment of textile and cutlery factories in the valleys. Later, coal for steam was exploited to drive machinery, which led to the massive expansion of the steel and woollen industries. This was initially derived from shallow coal mines on the side slopes of the Pennines, then from larger mines that extended into the deeper, richer veins to the east.

Mass migration of people into the industrialised valleys followed, and an extensive programme of building – mills, factories and housing – took place. In the late 18th and 19th centuries, canals and then railways were constructed to move raw materials and manufactured goods, and reservoirs were built to provide drinking water to the conurbations. Market gardens also supplied the cities, while quarries were opened up to supply building stone for both local use and export.

The impermeable mudstones of the Millstone Grit rocks in the west give rise to extensive but poorly drained pasture land, and traditionally the gritstone has been a source of grindstones and building stone. Coal Measures sandstones, notably the Elland Flags, provide excellent quality building stone. This was used extensively during the rapid growth of the large conurbations of Bradford, Halifax and Huddersfield and elsewhere. Some large quarries, both active and inactive, remain as features within the landscape, especially around Halifax.

Wealthy industrialists built major civic buildings and created a number of parks and gardens in the area during this period, which still contribute to the character of the landscape today. A notable example is the model town at Saltaire, which is now a World Heritage Site. In upland areas the continued sheep rearing resulted in large, regular, rectangular fields on the plateaux being enclosed by stone walls and forming strong patterns in the landscape.

Today the NCA is becoming increasingly urbanised through both settlement expansion and conversion of rural buildings and structures, for example individual wind turbines and larger wind farm developments. Within the wider landscape there has been an increase in woodland cover and management, with management agreements for woodland and other semi-natural habitats helping to enhance some of these features.

Conversion of rural buildings and development of structures, such as these turbines on Royd Moor, increase the urban feel of the landscape.

Ecosystem services

The Yorkshire Southern Pennine Fringe NCA provides a wide range of benefits to society. Each is derived from the attributes and processes (both natural and cultural features) within the area. These benefits are known collectively as 'ecosystem services'. The predominant services are summarised below. Further information on ecosystem services provided in the Yorkshire Southern Pennine Fringe NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision:** Agriculture is a mix of predominantly livestock rearing on the poorer soils on the slopes in the west and large areas of arable in the eastern lower-lying areas. There are limited pigs, poultry and dairying across the NCA. Farms are generally small in size.

- **Biomass energy:** Approximately 11 per cent of the NCA is covered by woodland. This provides opportunities to bring unmanaged woods into sustainable management, to increase biomass provision. The NCA is considered to have a medium yield for short rotation coppice and miscanthus throughout the area.

- **Water availability:** The NCA overlays the Millstone Grit and Coal Measures minor aquifers, as well as including a number of large reservoirs (particularly around Sheffield). The reservoirs are significant in providing water to Sheffield and adjacent settlements, for use by both residents and industries. Water captured in reservoirs within the Yorkshire Southern Pennine Fringe NCA plays an important role in reducing flooding in settlements downstream, both within this NCA and the adjacent Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA.

  Water remains available within stretches of the main rivers of this NCA; this is a resource that will need to be managed to ensure that water supply to NCAs further downstream can be maintained, and to respond to increased demand as a result of climate change.

Regulating services (water purification, air quality maintenance and climate regulation)

- **Regulating water quality:** Water quality is important in providing clean drinking water to the large urban areas of the NCA. Aquifers, reservoirs and main rivers deliver this service, and water quality is generally moderate. There was an overall improvement in water quality in the River Don in the late 1990s and early 2000s due to restoration of industrial and coal mining areas. Groundwater quality is generally poor, and pollution from run-off in urban areas is an issue in this NCA.

- **Regulating water flow:** Fluvial flooding in this NCA is influenced by narrow river valleys and limited flood plains, and by significant built development associated with large urban centres. Serious flooding problems exist within a number of major settlements, such as Sheffield, Halifax and Dewsbury. A considerable number of channel improvements and flood defence schemes have been implemented along the River Calder in particular.

  The River Don is heavily modified and has little natural flood plain as it flows into Sheffield; it reacts very quickly to rainfall, and can create significant flooding issues within the city centre and surrounds[4]. Flood management plans for the River Don include reducing run-off and soil erosion and storing floodwaters, for example by optimising washlands and the natural flood plain north of Sheffield. The Environment Agency notes that as the majority of existing reservoirs along the River Don are for water supply, there is little attenuation achieved by them, particularly in winter months when the reservoirs are full.

[4] *Don Catchment Flood Management Plan*, Environment Agency (July 2010)

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** Sense of place is provided by the strong landform of hills, ridges and broad valleys dominated by the distinct backdrop of the Pennines to the west, with extensive urban and industrial development contained within the steep-sided valleys. This creates a dramatic interplay of views between settlements and the surrounding hillsides. This is supported by a strong local vernacular of gritstone and sandstone, used extensively throughout the NCA for field boundaries and traditional buildings, bringing a sense of visual unity to the landscape.

  The success of industry in this area is very strongly linked to geology; the presence of raw materials needed for industrial processes close to natural features such as soft water rivers gave rise to a strong industrial base in the area. The industrial heritage – particularly the large buildings including large mills – is evident in all the main valleys, and these tend to dominate the towns. Both the emerging municipalities and individual 19th-century industrialists displayed their wealth and status by ambitious programmes of building public facilities, such as town halls, libraries, museums and schools, which are now a prominent feature of nearly every urban centre. Examples include the centre of Dewsbury, which is dominated by sturdy stone buildings; Sheffield and Bradford, which both have magnificent Victorian town halls; and Saltaire, which is an entire town, complete with mills, schools, library and church, built in 1853 on the River Aire by the industrialist Sir Titus Salt.

- **Sense of history:** The most evident aspect of history is the strong sense of industrial heritage found in the valleys throughout the NCA. These are rich in industrial archaeology and have been influenced by the various industries that grew up along them and became so important to the growth and identities of the towns and cities. (Examples include steel and cutlery around Sheffield, and wool in the north around Halifax and Huddersfield.) The buildings associated with these industries are prominent throughout the landscape, and include the large mills that are evident in all the main valleys and tend to dominate the towns, as well as the civic buildings built by wealthy industrialists, such as the centre of Dewsbury and Saltaire. Saltaire was built as an entire town complete with mills, schools, library, canteen and church, and is now a World Heritage Site.

  The canal and rail network underlines the area's coal mining and quarrying past. The history of the landscape is also evident in bronze-age and Roman remains on the undeveloped higher land to the west, as well as the old pack-horse trading routes across the Pennine hills, which once linked settlements lying to the east and west and have now evolved into today's modern road routes.

- **Recreation**: Recreation is supported by 1,315 km of rights of way (equivalent to a relatively high density of 2.25 km per km^2), including the Trans Pennine Trail and the Calderdale Way long-distance routes, as well as small areas of open access land, which covers 1.3 per cent of the NCA. The mix of urban settlements within the Pennine fringe rural landscape makes opportunities for recreation development high in this NCA. Well-designed green infrastructure can connect people within the urban centres through river and canal corridors up onto the hills and ridges of the higher Pennine fringe areas and onto the Southern Pennines and Dark Peak NCAs themselves.

- **Biodiversity**: There is almost 4,000 ha of priority habitat within the NCA (5 per cent of the NCA area), which comprises in particular lowland mixed deciduous woodland and wet woodland. Other priority habitats include lowland beech and yew woodland, meadows, grassland and heathland. The number of national designations within the NCA is low, despite the area providing habitats that support priority species within nationally designated sites in adjacent NCAs, for example South Pennine Moors Special Area of Conservation and Special Protection Area (SPA).

Statements of Environmental Opportunity

SEO 1: Protect and manage the rich industrial heritage – including historical settlement patterns and local vernacular styles, as well as the industrial and municipal buildings that were built with wealth when the industry thrived, such as the World Heritage Site at Saltaire – which links the history of the area to the landscape features, to enhance sense of place and history and inspire local communities through increased access and recreation opportunities.

For example, by:

- Managing and maintaining historic parklands, to retain their character and promote new opportunities for access, recreation and interpretation at these sites where appropriate.
- Conserving the old pack-horse and trading routes that linked settlements across the Pennines, to provide recreation and access for people and a link to these historical assets through appropriate interpretation.
- Retaining evidence of mills, factories and forges associated with the iron, steel and woollen industries from early small-scale stages to the large industrial-scale works, and providing access and interpretation where possible.
- Strengthening local sense of place through connection to past industrial heritage, for example through recognising that the suitability of the land for sheep rearing combined with numerous watercourses led to the development of the woollen and textile industry in the north of the NCA, while in the south-west of Sheffield the fast-flowing streams and reserves of iron led to the development of the steel and cutlery industry.
- Restoring key structures, in particular tall mill chimneys where they function as focal points within a valley, to retain historical evidence.
- Using appropriate materials, especially local stone, when converting historical buildings to other uses, to maintain visual unity.
- Managing and conserving the World Heritage Site at Saltaire, to provide an international site of importance for explaining the history of the area.
- Encouraging imaginative interpretation to reveal the strong links between the landscape, in particular the underlying geology and the industries of the area, from the woollen industry in the north to the iron and steel industries around Sheffield.
- Providing interpretation of other key structures such as the reservoirs, to make the links between landscape, geology and history.
- Using local sandstone for new, restored and converted buildings, and restoring traditional farm buildings, incorporating local styles and building techniques.
- Respecting the distinct character of the historic towns and ensuring that new development respects that character and settlement form, for example the linear pattern of development within the valleys to the north, with associated mill cottages, and the more industrial settlements that grew up around Sheffield and Halifax. Retain the open countryside between settlements.
- Identifying and protecting the remnants of bronze-age and Roman habitation on elevated land.

SEO 2: Manage flood plains and wetland habitats to regulate water flow and availability, and to enhance water quality and biodiversity. Increase the river and riparian habitat networks, for example along the Calder, the Don and the Colne in the north and along the Sheaf, the Rivelin and the Loxley in the south, and ensure good linkages with the networks of woodland and semi-natural habitats for the species they support and to improve the resilience of these habitats to climate change.

For example, by:

- Restoring natural river dynamics and profiles where possible, enabling more active geomorphological processes such as the creation of meanders.
- Extending flood plains to store floodwaters, in particular along the Calder, the Colne and its tributaries around Huddersfield, and the Don, and restoring and creating riparian habitats such as emergent vegetation, wet pastures, reedbeds, marsh and wet woodlands that will reduce peak flow rates and help to improve water quality.
- Seeking opportunities to create and link wetland habitats, including wet woodlands and grasslands along river corridors. Introduce riparian trees and wet woodland along watercourses, but avoid long, continuous stretches of tree cover.
- Seeking opportunities to slow river flows by planting flood plain woodland.
- Encouraging low-input grassland management and extensive grazing regimes, along with permanent grass buffer zones, to reduce water pollution and sediment run-off.
- Restoring and creating lowland meadows within valleys, linking and buffering existing habitat patches to create a permeable network through the landscape that will help species to adapt to climate change and aid in water quality and flow regulation.
- Minimising development on the flood plain where possible, to allow more space to deal with floodwater more naturally.
- Promoting efficient use of water in agriculture and industry to reduce need for abstraction, such as grey water use on industrial sites and infield ponds on farms.
- Extending and linking native broadleaved woodland, particularly on steep valley sides and in cloughs and gills, to absorb water, thereby reducing flood issues and binding the soil to reduce erosion and to enhance water quality.
- Restoring Plantations on Ancient Woodland Sites (PAWS) and encouraging appropriate management of PAWS and ancient semi-natural woodlands.
- Creating areas of semi-natural habitats and managing water flow to increase water recharge of aquifers and reservoirs, to maintain adequate water supply and to help to address the problem of increased rainfall as a result of climate change.

SEO 3: Protect the distinctive landscape character with its contrasts between open pastures on hill tops, woodland on valley sides and the settlements nestled in the valley bottoms. Manage the arable and pastoral farmland and the areas of woodland to improve their contribution to biodiversity, food provision and landscape character, to improve soil and water quality, and reduce soil erosion.

For example, by:

- Conserving areas of upland heath, creating new habitat next to these areas to buffer and extend them. Encourage appropriate management of upland heath habitat to support wildlife.
- Seeking opportunities to manage pastures to increase their species richness and create mosaics of grassland habitats, providing variation in structure, hydrology, texture and species richness, to offer feeding, breeding and refuge sites for birds such as lapwing, redshank, curlew, snipe, yellow wagtail and twite, especially in the west, alongside the SPA.
- Maintaining permanent pastures and introducing extensive or variable grazing regimes with low inputs of fertilisers to improve soil structure and water infiltration.
- Maintaining and restoring drystone walls, especially where they form clear historical patterns and/or are widely visible.
- Maintaining and managing hedgerows on lower land where they are the typical form of field boundary and where they can help to reduce soil erosion.
- Introducing a wider range of semi-natural habitats in arable areas, in particular permanent grassland margins, and linking them to existing areas of lowland meadow and to the wider species-rich grassland resource where possible. This will help to deliver improvements in soil quality and reduce soil erosion.
- Encouraging arable options such as conservation headlands and pollen and nectar swards that will support farmland birds and provide structural diversity and food sources for pollinating insects.
- Encouraging the creation of grass buffer strips alongside watercourses to reduce soil erosion and water pollution.
- Identifying opportunities for educational access to farms, to enable local urban populations to understand farming practices and enjoy access to the open air and countryside.
- Maintaining the open character of the high plateaux in the west to allow retention of long views over the eastern edges of the NCA and beyond and the sense of isolation and tranquillity.
- Maintaining the character of individual settlements by managing the rural land surrounding cities and towns, to retain the wild and open sense of place and the juxtaposition between urban and rural.
- Promoting sustainable food provision in the NCA to increase production, while reducing impacts on other ecosystem services.
- Managing existing woodland to ensure the long-term survival of wood of mixed age groups and the increased production of wood fuel and timber.
- Replacing non-native species with native broadleaved species where the primary interest is improving biodiversity and contributing to landscape character.
- Bringing attention to archaeological and historical features of woodland such as internal banks to organise coppicing, bell pits and charcoal-burning platforms.

SEO 4: Plan to optimise opportunities for access to the natural environment for the large urban populations in the area, making the most of key landscape features to redefine sense of place in the changing landscape and encouraging implementation of well-designed and managed green infrastructure, sustainable urban drainage systems and good use of planting to screen urban edges.

For example, by:

- Maintaining access to the natural environment through links to the footpath network, and promoting new links to the Trans Pennine Trail and the Calderdale Way long-distance routes.
- Promoting the use of canals and disused railways as linear access routes that can open up access to the wider countryside while also providing a link to historical interest and improving biodiversity.
- Ensuring that the dramatic views are retained both from hill tops into and across the urban areas, and from urban areas out into the countryside.
- Improving access to open geological landform and exposures to provide interpretation of their role in the history of the area, for example at disused quarries, making the link between extraction of minerals and the prevalence of industrial development in the area.
- Encouraging increased access to farms and rural estates, parks and gardens, as appropriate.
- Ensuring that existing urban areas and new residential development contains well-designed and managed green infrastructure to provide a range of access experiences, taking into account the different cultural needs, abilities and interests of the local urban populations.
- Ensuring that all new development addresses sustainability, through keeping impervious surfaces to a minimum and including sustainable drainage systems that incorporate more permeable surfaces, greenspace and swales, to improve water infiltration and hold back run-off.
- Protecting the role of the greenbelt in retaining settlement distinction and the urban and rural mosaic feature of the NCA, and encouraging use of planting and biomass to screen urban edges.
- Managing horse and pony grazing to reduce soil compaction and erosion and the degradation of pasture land.

Supporting document 1: Key facts and data

Area of Yorkshire Southern Pennine Fringe National Character Area (NCA): 58,510 ha

1. Landscape and nature conservation designations

The Yorkshire and Southern Pennines Fringe National Character Area lies to the east of the Pennines, and the Peak District National Park lies to the west of the southern part. Only 394 ha, less than 1 per cent, of the NCA falls within the National Park boundary.

A management plan for the protected landscape can be found at:

- www.peakdistrict.gov.uk/

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	% of NCA
International	n/a	n/a	0	0
European	Special Protection Area (SPA)	n/a	0	0
	Special Area of Conservation (SAC)	n/a	0	0
National	National Nature Reserve (NNR)	n/a	0	0
	Site of Special Scientific Interest (SSSI)	A total of 12 sites wholly or partly within the NCA	63	<1

Source: Natural England (2011)

Please note: (i) Designated areas may overlap (ii) all figures are cut to Mean High Water Line, designations that span coastal areas/views below this line will not be included.

Only a small area of the NCA is designated at a national level representing just 63 ha. Of the total area designated half a hectare is designated as both SPA and SAC and represents the very edge of the South Pennine Moors area.

There are 288 local sites in the Yorkshire and Southern Pennines Fringe covering 3,923 ha, 7 per cent of the NCA. This represents a high coverage of local designations compared with the low area of nationally designated sites and reflects the high value that has been placed on local sites to protect habitats and species in this NCA.

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
- Details of Local Nature Reserves (LNR) can be searched at: http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp
- Maps showing locations of Statutory sites can be found at: http://magic.Defra.gov.uk/website/magic/ – select 'Rural Designations Statutory'

1.1.1 Condition of designated sites

SSSI condition category	Area (ha)	Percentage of NCA SSSI resource
Unfavourable declining	1	1
Favourable	51	80
Unfavourable no change	0	0
Unfavourable recovering	12	19

Source: Natural England (March 2011)

- Details of SSSI condition can be searched at: **http://www.sssi.naturalengland.org.uk/Special/sssi/reportIndex.cfm**

2. Landform, geology and soils

2.1 Elevation

This is a transitional area with land falling from the Pennines to the west down to the Coalfield to the east. Maximum heights are around 400 m dropping down to just over 30 m with the mean elevation being 181 m.

Source: Coal Measures Natural Area Profile, Yorkshire and Southern Pennines Fringe Countryside Character Area description

2.2 Landform and process

The area is cut by a number of deeply incised river valleys showing distinct shoulders where they have cut down from earlier broader valleys. The geology dips very gently to the east and the area as a whole falls away to the east, with initially narrow valleys opening out as they descend.

Source: Coal Measures Natural Area Profile, Yorkshire and Southern Pennines Fringe Countryside Character Area description

2.3 Bedrock geology

The landscape is underlain by Carboniferous strata. The solid geology of the east of the NCA is dominated by Carboniferous Coal Measures rocks of the Westphalian series with harder gritstones of the Namurian being exposed in the west of the area. A breakdown of the solid geology according to total land area is; 51 per cent sandstone and 49 per cent mudstone, siltstone and sandstone. The rocks have been extensively exploited for building stone and historically for iron and coal. The remaining commercial extraction is for fireclay, high quality building stone and roadstone.

Source: Coal Measures Natural Area Profile, Yorkshire and Southern Pennines Fringe Countryside Character Area description

2.4 Superficial deposits

The drift geology is relatively limited with predominantly alluvial deposits in the widening valleys to the east and along the river corridors. There are a few very limited glacial deposits in the north of the area. Except for in the vicinity of Bradford, the NCA occurs to the south of the southern limit of the ice sheet that extended to the area during the last glaciations and so lacks glacial deposits.

Source: Coal Measures Natural Area Profile, Yorkshire and Southern Pennines Fringe Countryside Character Area description

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	6
National	Mixed Interest SSSI	0
Local	Local Geological Sites	82

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: **http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm**

2.6 Soils and Agricultural Land Classification

The quality of agricultural land is generally poor with only 15 per cent of the area classified as Grade 3, and this is found on the lower lying land between Bradford and Huddersfield. Elsewhere the side slopes of the Pennines give rise to mostly Grade 4 (45 per cent) land with some patches of Grade 5 land on the tops (2 per cent). Agriculture is mainly stock rearing in the wetter, poorer pastures in the west of the NCA, but with significant areas of arable on the lower land to the east combined with permanent pastures. A large proportion of the area is urban (37 per cent).

Source: Natural England (2010)

The main grades of agricultural land in the NCA are broken down as follows (as a proportion of total land area):

Grade	Area (ha)	% of NCA
Grade 1	0	0
Grade 2	0	0
Grade 3	9,024	15
Grade 4	26,118	45
Grade 5	1,293	2
Non-agricultural	726	1
Urban	21,350	37

Source: Natural England (2010)

- Maps showing locations of Statutory sites can be found at: http://magic.Defra.gov.uk/website/magic/ – select 'Landscape' (shows ALC classification and 27 types of soils).

3. Key water bodies and catchments

3.1 Major rivers/canals

The following major rivers/canals (by length) have been identified in this NCA.

- River Don 29 km
- River Calder 25 km
- River Loxley 7 km
- Little Don River 7 km
- River Sheaf 6 km
- River Aire 4 km

Source: Natural England (2010)

Please note: Other significant rivers (by volume) may also occur. These are not listed where the length within the NCA is short.

Several rivers drain from the plateau in the west down to the lowlands of the Coalfield to the east. The tributaries of the River Calder flow south-east or north-east down narrow valleys cut into the side slopes of the Pennines to join the Calder and flow eastwards. The rivers Don, Loxley, Rivelin and Sheaf also flow towards the east coming together in the Sheffield area.

There are also several canals which were constructed to transport goods east – west: Calder and Hebble navigation 18 km; Huddersfield Broad Canal 7 km; Huddersfield Narrow Canal 7 km; Leeds and Liverpool Canal 3 km and Rochdale Canal <1km.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 51,417 ha, or 88 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies at:
http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 6,335 ha of woodland (11 per cent of the total area), of which 2,547 ha is ancient woodland. South Yorkshire Forest Partnership Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 5,236 ha of this NCA, which is 9 per cent of the NCA.

Source: Natural England (2010), Forestry Commission (2011)

4.2 Distribution and size of woodland and trees in the landscape

Most of the woodlands are on the steeper slopes of the valley sides. There are some substantial and linked blocks of woodland, much of it coniferous, to the north of Sheffield around Wharnecliffe and Grenoside. The narrow wooded valleys to the west of Sheffield have become part of a network of linear parks that lead right into the centre of the city. There are localised areas where hedgerows with trees and small woodlands have been retained giving an impression of a well-wooded landscape. Overall it is a fairly well-wooded NCA although much of this resource is fragmented.

Source: Coal Measures Natural Area Profile, Yorkshire and Southern Pennines Fringe Countryside Character Area description

4.3 Woodland types

A statistical breakdown of the area and type of woodland found across the NCA is detailed below.

Area and proportion of different woodland types in the NCA (over 2 ha)

Woodland type	Area (ha)	% of NCA
Broadleaved	5,369	9
Coniferous	727	1
Mixed	103	<1
Other	136	<1

Source: Forestry Commission (2011)

Area and proportion of ancient woodland and planted ancient woodland within the NCA.

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	1,377	2
Planted Ancient Woodland (PAWS)	1,170	2

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

On the higher land in the west there are some unenclosed pastures on the fringes of the moorlands, but predominantly the pastures are enclosed by drystone walls built from local hard sandstones and Millstone Grit. There is a marked change from west to east with walls giving way to hedgerows and fences on the lower lying land where there is more arable cultivation. Walled tracks lead from the valley bottom to the fell tops giving access to the open moorland for summer grazing.

Source: Coal Measures Natural Area Profile, Yorkshire and Southern Pennines Fringe Countryside Character Area description

5.2 Field patterns

In places there are very strong, regular patterns of rectilinear enclosures resulting from the Parliamentary enclosures of the 19th century, such as around Penistone, Stocksbridge and Holmfirth. Generally the fields are small to medium sized and in some localised areas the hedgerows contain hedgerow trees, mostly ash and oak.

Source: Yorkshire and Pennines Fringe Countryside Character Area description; Countryside Quality Counts (2003)

6. Agriculture

The following data has been taken from the Agricultural Census linked to this NCA.

6.1 Farm type

Between 2000 and 2009 the greatest changes in farming have been seen in the numbers of animal holdings. Since 2000 there has been a significant drop in the number of dairy holdings, down from 114 in 2000 to 63 in 2009. There has been an increase of 75 per cent in poultry holdings, up from 16 in 2000 to 28 in 2009. Changes in grazing have seen an 89 per cent increase in grazing in 'Less Favourable Areas' (up from 143 in 2000 to 270 in 2009) and a decrease in grazing livestock in the lowland (down to 89 in 2009 from 187 in 2000).

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Generally farm size is small with only 42 holdings over 100 ha, representing just 5 per cent of all holdings but covering 40 per cent of the farmed area, in 2009. 82 per cent of the holdings were 50 ha or less. The most common farm size was between 5 ha and 20 ha with 311 holdings covering 23 per cent of the farmed area.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 27,414 ha; owned land = 16,058 ha
2000: Total farm area = 23,814 ha; owned land = 14,959 ha.

Just less than two-thirds of the holdings are self owned.

Source: Agricultural Census, Defra (2010)

6.4 Land use

The high proportion of land put down to grass (90 per cent) reflects the conditions, which are more suitable for the production of grass and rearing of livestock than arable cultivation.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Sheep are the most numerous livestock in the NCA (48,600 animals) compared to cattle (30,400) and pigs (13,800). Sheep numbers increased slightly between 2000 and 2009 (5 per cent increase) while numbers of cattle and pigs decreased by 13 per cent and 12 per cent respectively. The overall livestock figures remained fairly constant between the surveys in 2000 and 2009.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The majority of farms (70 per cent) are run by principal farmers. The low number of salaried managers probably reflects the overall small size of holdings and the marginal nature of agriculture in the area, where many holders have other occupations to supplement their incomes from farming. Overall numbers working in agriculture in the NCA have remained stable. Farm holdings in the NCA are often a part time activity run by those engaged in other work elsewhere. This is reflected in the low number of salaried managers, although this increased between 2000 (10) and 2009 (35).

Source: Agricultural Census, Defra (2010)

Please note: (i) Some of the Census data is estimated by Defra so will not be accurate for every holding (ii) Data refers to Commercial Holdings only (iii) Data includes land outside of the NCA belonging to holdings whose centre point is within the NCA listed.

7. Key habitats and species

7.1 Habitat distribution/coverage

Broadleaved woodland is the main habitat within the NCA. Lowland mixed deciduous woodland and wet woodland are the two main types and are often found along the steep-sided valleys, for example, south of Huddersfield, north and west of Sheffield, and in lower Calderdale. Other habitats occur, such as remnant areas of moorland and rough pastures and also wetland habitats associated with the river valleys and past industry, but these are often very fragmented. The transitional nature of the NCA gives rise to a landscape with many sites that support a mosaic of habitats supporting a wide diversity of species, often more characteristic of surrounding NCAs.

A breakdown by habitat is provided below:

Lowland mixed deciduous woodlands: Deciduous woodland comprises oak mixed with ash, rowan and birch. The understorey includes hazel, holly, honeysuckle and blackberry covered brambles. The woodland floors are brightened by bluebells in the spring and wild daffodils, yellow archangel, broad leaved helleborine, moschatel and wood sorrel add to the floral display. Traditional coppice management of these woodlands produced rides and glades that provide space for a number of plants and insects, in particular butterflies through the summer months. Pennine birch–oak wood is often found on the steep slopes where there is thin acid soil. In the valley bottom ash–wych elm and alder woodland developed on the alluvial soils. Hawthorn, hazel and elder are frequent in the understorey with creeping soft-grass and bluebell dominating the ground flora. Wet woodland with alder, grey willow and downy birch forms small stands of woodland in flushed areas on the sides of some larger cloughs. The ground flora includes marsh thistle, creeping buttercup, yellow pimpernel, opposite-leaved golden-saxifrage and bog mosses. Unlike drier woods the wet ground conditions deter livestock and natural regeneration can be reasonably good.

Lowland dry acid grassland: Small, fragmented patches are found around Huddersfield and west of Bradford on nutrient-poor acidic soils. Sometimes mixed with lowland heathland where slight differences in soil and management over the years have favoured a different range of plants.

Upland heathland and blanket bog: Found along the western edge of NCA as land rises to the South Pennines and Dark Peak. Heather moor is important for a number of breeding birds, upland plants and insects. On steep slopes a more varied structure of the heathland is seen where the vegetation has been less frequently burnt. Bilberry and crowberry can be found in some locations beneath the heather. The blanket bogs are generally poor in lower plants but still support breeding golden plover and curlew and nationally important numbers of merlin.

Lowland meadows: Traditional hay meadows have decreased in the area; the best example can be found at Spring Meadows, Alderman's Head and Cow Croft Meadows SSSI. This is the finest example of traditionally managed, unimproved neutral hay meadow in South Yorkshire. The swards include a rich variety of herbs and grasses characterised by crested dog's-tail and common knapweed.

Rivers, streams and canals: The rivers and streams have improved in quality in the past few decades and as a result are home to small sticklebacks and minnows, roach and brown trout. Otters and water voles live in the banks. Canals are important in bringing wildlife to people's doorsteps and in summer particularly, support large numbers of damselflies and dragonflies. Recreational pressures and introduced species are both issues that may affect wildlife in these habitats.

Source: Coal Measures Natural Area Profile

7.2 Priority habitats

The Government's new strategy for biodiversity in England, *Biodiversity 2020*, replaces the previous Biodiversity Action Plan (BAP) led approach. Priority habitats and species are identified in *Biodiversity 2020*, but references to BAP priority habitats and species, and previous national targets have been removed. Biodiversity Action Plans remain a useful source of guidance and information. More information about *Biodiversity 2020* can be found at;

http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx

The NCA contains the following areas of mapped priority habitats (as mapped by National Inventories). Footnotes denote local/expert interpretation. This will be used to inform future national inventory updates.

Priority habitat	Area (ha)	% of NCA
Broadleaved mixed and yew woodland (broad habitat)	3,948	7
Lowland dry acid grassland	308	1
Upland heathland	228	<1
Blanket bog	129	<1
Lowland meadows	122	<1
Purple moor grass and rush pastures	115	<1
Fens	23	<1
Upland calcareous grassland	22	<1
Lowland heathland	4	<1

Source: Natural England (2011)

- Maps showing locations of priority habitats are available at: **http://magic.Defra.gov.uk/website/magic/** select 'Habitat Inventories'

7.3 Key species and assemblages of species

- Maps showing locations of priority habitats are available at: **http://magic.Defra.gov.uk/website/magic/**
- Maps showing locations of S41 species are available at: **http://data.nbn.org.uk/**

8. Settlement and development patterns

8.1 Settlement pattern

The NCA is characterised by major towns and extensive urban areas, including three cities and several large towns, divided by open countryside. The current settlement pattern arose from dispersed medieval settlements linked by packhorse trails, with upland textile production supported by smallholdings.

Source: Yorkshire and Southern Pennines Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

The main towns and cities within the NCA are; Sheffield* (440,000) Bradford* (300,000), Huddersfield (146,000), Halifax (84,000), Batley (50,000), Holmfirth/ Honley (23,000), Dronfield* (21,000) and Stocksbridge (13,000). (Towns marked with an asterisk only occur in part within the NCA.)

The total estimated population for this NCA (derived from ONS 2001 census data) is; 991,492.

Source: Office for National Statistics census data 2001, Countryside Character Area description; Countryside Quality Counts (2003), Natural England (2012)

8.3 Local vernacular and building materials

Traditional buildings are constructed in local Coal Measures sandstones and Millstone Grit with sandstone flags on roofs, giving a high degree of visual coherence to older settlements. There is a high concentration of pre-1750 farmstead buildings and occasional field barns along with later weavers' cottages, non-conformist chapels and villas for the wealthy industrialists (these especially to the west of Sheffield). In the 19th century town centres underwent change with the construction of magnificent municipal buildings – town halls, libraries, museums – all built of local stone. Rows of terraced housing were constructed for factory workers. About 52 per cent of listed historic farm buildings remain unconverted, while about 82 per cent are intact structurally.

Source: Yorkshire and South Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

Prehistoric evidence is scattered throughout the NCA with rock art in woodland at Cullingworth and Ecclesall Wood, prehistoric earthworks at Castle Hill and Almondbury, the Old Bull Ring in Denby Dale, Hagg Wood, Myers Wood near Huddersfield and along the Don valley.

Dispersed settlements in valley bottoms were linked by packhorse trails during medieval times, with occasional wayside crosses. The laithe house tradition was prevalent with some cruck-framed animal shelters south of Huddersfield.

Industry and related urbanisation have had an impact on the NCA landscape from the 15th century. Linear settlements developed in the valleys alongside large nucleated gritstone towns based on the woollen industry, for example Halifax, Cleckheaton, Brighouse, Huddersfield, Honley, Holmfirth, Penistone and Bradford. Coal powered steel production led to the expansion of Sheffield, Stocksbridge and Dronfield. The area retains pockets of pre-industrial development including weavers' cottages and small forges.

From the mid 18th century canals and rail infrastructure were developed helping industries, such as the quarries around Halifax, to export produce to new markets; these remain strong features in the landscape today. Other changes included the expansion of quarries for building stone and the construction of reservoirs to supply water to industry and towns. The wealth generated by the rapid increase in industry lead to the creation of public and private parks and grand civic architecture, especially in town centres. There are also several non-conformist chapels, institutes, schools and churches from this period, including the planned village of Saltaire, now recognised as a World Heritage Site.

Source: Countryside Quality Counts Draft Historic Profile, Countryside Character Area description

9.2 Designated historic assets

This NCA has the following historic designations:

- 20 Registered Parks and Gardens covering 277 ha
- 0 Registered Battlefields
- 47 Scheduled Monuments
- 5,002 Listed Buildings

Source: Natural England (2010)

These figures, with many listed buildings and several registered parks and gardens, reflect the significance of the wealth generated by the industrial period that led to the building of major municipal buildings and homes, along with their designed surrounds.

The mid 19th century designed settlement of Saltaire, with its mills, canteen, school, hospital, public hall and range of housing for workers of different status is a World Heritage Site and includes a buffer zone.

The scheduled monuments include several early industrial workplaces, as well as carved rocks, wayside crosses, moated houses and Romano-British settlements.

- More information is available at the following address:
  http://www.english-heritage.org.uk/caring/heritage-at-risk/
- **http://www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/**

10. Recreation and access

10.1 Public access

- Four per cent of the NCA, 2,171 ha, is classified as being publically accessible. This NCA abuts the extensive open access areas of the Southern Pennines, but contains virtually none within it.
- There are 1,315 km of public rights of way at a density of 2.2 km per km^2.
- There are no National Trails within the NCA.

Sources: Natural England (2010)

The table below shows the breakdown of land which is publically accessible in perpetuity:

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	n/a	n/a
Common Land	68	<1
Country Parks	19	<1
CROW Access Land (Section 4 and 16)	776	1
CROW Section 15	70	<1
Village Greens	<1	<1
Doorstep Greens	3	<1
Forestry Commission Walkers Welcome Grants	736	1
Local Nature Reserves (LNRs)	525	1
Millennium Greens	6	<1
Accessible National Nature Reserves (NNRs)	n/a	n/a
Agri-environment Scheme Access	4	<1
Woods for People	1,188	2

Sources: Natural England (2011)

Please note: Common Land refers to land included in the 1965 commons register; CROW = Countryside and Rights of Way Act 2000; OC and RCL = Open Country and Registered Common Land.

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) it can be seen that the large cities and towns and considerable urban fringe influencing the lower ground in the east means that this is not a very tranquil area. The most tranquil parts are the upper reaches of the valleys, the higher land between Holmfirth and Sheffield and the uplands in the west of the NCA.

A breakdown of tranquillity values for this NCA is detailed in the table below:

Category of tranquillity	Score
Highest value within NCA	21
Lowest value within NCA	-98
Mean value within NCA	-31

Sources: CPRE (2006)

- More information is available at the following address: **http://www.cpre.org.uk/what-we-do/countryside/tranquil-places/in-depth/item/1688-how-we-mapped-tranquillity**

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that the central area of the NCA has remained intruded since the 1960s (and before) and that most of the area has lost any remaining undisturbed character.

A breakdown of intrusion values for this NCA is detailed in the table below.

Category of intrusion	1960s (%)	1990s (%)	2007 (%)	% change (1960s-2007)
Disturbed	58	63	63	5
Undisturbed	15	10	1	-14
Urban	27	27	36	9

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the large decrease in undisturbed areas to just one per cent of the overall area, this is linked to the increase in urban areas over the same period.

- More information is available at the following address: **http://www.cpre.org.uk/resources/countryside/tranquil-places**

12. Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National Forest Inventory, Forestry Commission (2011)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)
- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)

Please note all figures contained within the report have been rounded to the nearest unit. For this reason proportion figures will not (in all) cases add up to 100%.
The convention <1 has been used to denote values less than a whole unit.

Supporting document 2: Landscape change

Recent changes

Trees and woodlands

- There has been a significant increase in woodland cover and management with extensive uptake of management agreements, covering 20 per cent of the wooded area in 2003. Of these, many were on ancient woodland sites where the proportion covered by a Woodland Grant Scheme increased from 5 per cent in 1999 to 24 per cent in 2003.

Boundary features

- Boundary features are generally felt to be neglected throughout this NCA with limited uptake of agri-environment funding to support their management and restoration. The greatest uptake of environmental stewardship options is seen in the west of the NCA with 388,710 m of drystone walls included in agreements (representing 80 per cent of the total length of boundary in agreement).

Agriculture

- Agricultural character has remained fairly constant throughout recent years and farm size remains relatively small. The largest changes have been seen in a move to increased grazing in less favourable areas alongside a decline in dairying and lowland livestock grazing between 2000 and 2009.

Settlement and development

- Although about half of the NCA is within a greenbelt, the rate of development outside urban and fringe areas has been moderately high, including a large number of barn conversions. There is continued pressure for housing and employment in areas outside of the urban city centres which has put pressure on the more rural satellite towns around Bradford and Sheffield in particular.

- The pressure for further conversions remains, combined with a perception of widespread use of non-traditional materials, and the desire for out-of-town residential development.

Semi-natural habitat

- There has been some enhancement of semi-natural habitats through the uptake of agri-environment grants for lowland pasture and upland in-bye pasture.

- Projects focusing on river systems – notably the Calder and the Don – are restoring wetland habitats along the river corridors.

Historic features

- A large number of the historic farm buildings remain structurally intact (82 per cent) and roughly 52 per cent of historic farm buildings remain unconverted, although pressure is increasing for domestic conversions and small business developments. Many industrial buildings have been converted with factories and mills being used for residential or employment developments or to provide community services, for example, the mill building in Saltaire World Heritage Site now houses an art gallery and range of small, local shops and cafes.

- There is less unity being used in building materials that reduces the visual impact of historic developments.

- The Heritage at Risk register indicates that there are currently 42 designated monuments at risk in this NCA.

Coast and rivers

- The ecological river quality across the NCA is generally considered to be moderate with greatest variation seen on stretches of the River Colne and its tributaries with some stretches with bad status east of Huddersfield and good status in the western end of the NCA.

- The chemical river quality is generally good status where assessment is currently required[5].

Minerals

- Active quarries are still fairly common within this NCA, mainly for sandstones that are used for building material. Sites vary in size from small to very large and as work at these sites is completed the restoration has provided opportunities to create new areas of semi-natural habitat and provide access for people and interpretation of geological features at these sites. Restoration plans are increasingly seeking to provide these benefits for local people rather than previous plans that mainly focused on agricultural and industrial end uses.

Drivers of change

Climate change in this area is likely to result in:

- Increased frequency and intensity of rainfall causing flooding in river valleys, notably the River the Don, the Calder, Hebble Brook and the Colne in the north and the Sheaf, the Rivelin and the Loxley in the south near Sheffield and increased 'flashiness' of their flows.

- Increased flooding risk associated with climate change will also lead to a likely increase in new flood defence schemes. Settlements, key trans-Pennine transport routes and many structures and buildings of historic interest are also particularly vulnerable to flooding. Riverside paths and pack-horse and clapper bridges will be very susceptible to flashy-style flooding.

- Increased incidences of summer droughts leading to increase in water demand in the urban areas and in agricultural areas, particularly for crop growth and to alleviate drought stress.

- Lower water flow rates and increased water temperatures may have negative impacts on water quality, fish and invertebrates and could cause greater incidents of algal bloom.

- Drought stress on areas of semi-natural habitat could also increase loss of areas of these habitats, restricting species movement and increasing local extinction rates.

- Warmer winters leading to increased tree growth could provide both opportunities for further woodland creation but also impact on other semi-natural habitats that are susceptible to scrub invasion.

[5] *Environment Agency Water Framework Directive – Online River Basin Management Plan Maps,* Environment Agency *(URL:* **http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=wfd_rivers#x=418676&y=404704&lg=2,7,8,9,&scale=5***)*

- Longer growing season potentially leading to double cropping in arable areas and a possible transition of rough pasture into pasture (improved grassland), as warmer temperatures enable grass to thrive at higher altitudes.
- A warmer climate could lead to new crops in arable areas and heat stress affecting cattle and sheep with more housing needed for cattle as a result and change in breeds.
- Changes in temperature and rainfall pattern could affect habitable ranges for a number of species and reduce species migration through loss of small or isolated habitats. This may be particularly marked in the fringe area where habitat is squeezed between pressure from development below and habitat management for specific habitats above.

Other key drivers

- Sheffield, Bradford, Huddersfield, Halifax, Holmfirth, Stocksbridge and Penistone will all be the focus for housing, employment, shopping, leisure, education, health and cultural activities and facilities in the region. These development pressures, plus the housing renewal programme in Sheffield will all provide opportunities for incorporating green infrastructure, but will also extend urban fringe influence further.
- Sheffield in particular has good green infrastructure with its many valleys running into the urban areas, but with a major housing renewal programmes and new housing developments, the pressure will increase on greenspace provision, although such programmes also open up opportunities.
- Planned increase in woodland cover under the Carbon Transition Plan, with new woodland planting associated in particular with the South Yorkshire Community Forest.
- Continuing pressure to increase renewable energy generation could result in a demand for onshore wind turbines and for biomass growth (Defra's maps show mostly medium potential yield for miscanthus and short rotation coppice throughout the area) and may have impacts on the landscape within the NCA and neighbouring NCAs such as the Dark Peak to the west.
- The increased need to use renewable energy is creating opportunities for the improved management of existing woodlands to provide wood fuel.
- Soils within southern parts of the NCA north of Sheffield are identified as having a 'very high' or 'extreme' vulnerability to soil poaching, and this is exacerbated by a perceived increase in 'horsiculture' through much of the area.
- The current poor performance of the region in terms of recycling and recovery means there is likely to be an increasing need for waste management facilities.
- Continued demand for sandstone as a building material (the Yorkshire and Humber Aggregate Mineral Resources map shows resources of sandstone as well as existing sandstone quarries[6]).
- Pressure for increased food production (and possible conversion of pasture to arable) associated with a drive for greater self-sufficiency.
- High level of urbanisation, with populations of mixed ethnic origin, some presenting a challenge to encourage engagement with the natural environment, but also opportunities exist for recreation and educational access, as urban greenspace, the countryside and the Peak District National Park are very accessible.

[6] Yorkshire and Humber Aggregate Mineral Resources map www.bgs.ac.uk/downloads/start.cfm?id=1377

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis section focuses on a selection of the key provisioning, regulating and cultural ecosystem goods and services for this NCA. These are underpinned by supporting services such as photosynthesis, nutrient cycling, soil formation and evapo-transpiration. Supporting services perform an essential role in ensuring the availability of all ecosystem services.

Biodiversity and geodiversity are crucial in supporting the full range of ecosystem services provided by this landscape. Wildlife and geologically-rich landscapes are also of cultural value and are included in this section of the analysis. This analysis shows the projected impact of Statements of Environmental Opportunity on the value of nominated ecosystem services within this landscape.

There has been an increase in grazing over recent years, particularly in less favourable areas.

Statement of Environmental Opportunity	Ecosystem Service																		
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: Protect and manage the rich industrial heritage – including historical settlement patterns and local vernacular styles, as well as the industrial and municipal buildings that were built with wealth when the industry thrived, such as the World Heritage Site at Saltaire – which links the history of the area to the landscape features, to enhance sense of place and history and inspire local communities through increased access and recreation opportunities.	↔ **	↗ **	↔ **	N/A	↔ **	↗ *	↗ **	↗ **	↔ *	↔ *	↔ *	↔ *	N/A	↑ ***	↑ ***	↗ **	↑ ***	↗ **	↗ **
SEO 2: Manage flood plains and wetland habitats to regulate water flow and availability, and to enhance water quality and biodiversity. Increase the river and riparian habitat networks, for example along the Calder, the Don and the Colne in the north and along the Sheaf, the Rivelin and the Loxley in the south, and ensure good linkages with the networks of woodland and semi-natural habitats for the species they support and to improve the resilience of these habitats to climate change.	↘ **	↔ **	↑ ***	N/A	o **	↗ ***	↑ ***	↑ ***	↗ ***	↗ ***	↗ **	↗ **	N/A	↗ **	↔ **	↗ **	↗ ***	↑ ***	↗ ***

Note: Arrows shown in the table above indicate anticipated impact on service delivery: ↑ = Increase ↗ = Slight Increase ↔ = No change ↘ = Slight Decrease ↓ = Decrease. Asterisks denote confidence in projection (*low **medium***high) ° symbol denotes where insufficient information on the likely impact is available.

Dark plum = National Importance; Mid plum = Regional Importance; Light plum = Local Importance

Statement of Environmental Opportunity	Ecosystem Service: Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 3: Protect the distinctive landscape character with its contrasts between open pastures on hill tops, woodland on valley sides and the settlements nestled in the valley bottoms. Manage the arable and pastoral farmland and the areas of woodland to improve their contribution to biodiversity, food provision and landscape character, to improve soil and water quality, and reduce soil erosion.	↗ ***	↔ **	↗ **	N/A	↘ **	↔ **	↗ ***	↗ ***	↗ ***	↗ ***	↗ **	↗ **	N/A	↗ **	↗ **	↗ **	↔ **	↗ ***	↗ **
SEO 4: Plan to optimise opportunities for access to the natural environment for the large urban populations in the area, making the most of key landscape features to redefine sense of place in the changing landscape and encouraging implementation of well designed and managed green infrastructure, sustainable urban drainage systems and good use of planting to screen urban edges.	↔ **	↔ **	↗ **	N/A	↔ **	↔ **	↗ **	↗ **	↔ **	o **	↔ **	↔ **	N/A	↑ ***	↗ ***	↗ **	↑ ***	↗ **	↑ **

Note: Arrows shown in the table above indicate anticipated impact on service delivery: ↑ = Increase ↗ = Slight Increase ↔ = No change ↘ = Slight Decrease ↓ = Decrease. Asterisks denote confidence in projection (*low **medium***high) ° symbol denotes where insufficient information on the likely impact is available.

Dark plum = National Importance; Mid plum = Regional Importance; Light plum = Local Importance

Landscape attribute	Justification for selection
Underlying geology of Coal Measures with harder gritstones in the west.	■ Geology provides building stone as well as resources of iron and coal, fireclay and roadstone leading to the development of the wool and iron industries. ■ Strong visual unity created by the widespread use of local stone for walls, traditional farm buildings, hamlets and settlements, including 19th-century terrace housing for mill workers, and for much of the fine civic architecture, giving rise to a strong sense of place, and connection with heritage.
A transitional landscape with a strong landform of treeless hilltops dropping down from the Pennines in the west, dissected by steep-sided valleys down to valleys with woodland on side slopes.	■ Deeply incised river valleys show distinct shoulders where they have cut down from earlier broader valleys; narrow valleys open out as they descend to the east. ■ The open hills and wooded valley sides create clear visual backdrops to the urban areas and industrial buildings and help to bring a sense of unity to the area, connecting urban with rural and creating a strong sense of place. ■ High plateau gives rise to long views out over urban areas, whilst there are often views from within urban areas out to surrounding hills and valleys, so that urban and rural are clearly linked, giving rise to a strong sense of identity and place.
Urban areas dominate with striking city centres and extensive development through the ages	■ Striking municipal buildings built from wealth generated by local industry. ■ Dense urban development, especially in city centres and terraces built to house mill and mine workers. ■ Importance of city parks in providing access and recreation opportunities for the factory workers. ■ Greenbelt is important for retaining the distinction between settlements and sense of place. ■ Infrastructure that feeds and supports urban areas such as railways and motorways cross the landscape.
Clear evidence of historical development over time, in particular 19th and 20th centuries, with early industrial forges and mills, then later large mills, chimneys, factories and associated housing.	■ The significant cultural heritage from the industrial period with its large stone buildings is a key characteristic of this area. ■ Interpretation of cultural heritage contributes to understanding and appreciation of history and our links to it. ■ Strong sense of identity is created by close links between settlements and industry – woollen towns to the north, manufacturing to the south – which is reinforced by retaining iconic elements.

Landscape attribute	Justification for selection
Substantial towns, many with fine civic architecture built by wealthy industrialists in town centres, giving strong urban identity.	■ Over 5,000 listed buildings reflect the widespread occurrence of significant and robust structures, many from the period of industrial development. ■ 20 Registered Parks and Gardens also reveal the industrial wealth that was used to build stately homes and designed grounds. ■ The importance of the setting of the urban areas is indicated through 68 per cent of the area being designated as greenbelt.
Earlier historic periods revealed through bronze-age and Roman habitation on uplands, and old pack-horse routes linking settlements on either side of the Pennines.	■ The 47 Scheduled Monuments in this NCA include several early industrial workplaces, as well as carved rocks, wayside crosses, moated houses and Romano-British settlements.
Strong pastoral character to the west, including a strong pattern of drystone walls, with a transition to more arable land to the east where hedges are more common on the lower-lying land.	■ Predominance of livestock rearing, due to majority of land being Grade 4. ■ Some areas between Bradford and Huddersfield are Grade 3, and are cultivated for arable crops and improved grassland. ■ Upland heath, lowland meadows, upland calcareous grasslands and purple moor grass and rush pastures are priority habitats predominant in this NCA. ■ Mosaics of upland pastures support a wider range of plant and animal species, and the pastoral western part of this NCA can be considered an important support zone for the internationally designated SPAs and SAC of the adjacent Southern Pennines, especially in providing feeding areas for waders and twite. Western parts of this NCA are included in the Integrated Biodiversity Delivery Area. ■ On some parts of the upland plateau, the pastures are enclosed into regular rectangular fields, which are highly visible within the wider landscape, such as around Penistone.
Good opportunities for enjoying landscape through high density of footpaths, and two significant long-distance paths.	■ Relatively high density of 2.25 km of public rights of way per km2, in an area with extensive towns and villages (36 per cent of the area), creates plenty of opportunity for local populations to access the natural environment and its cultural heritage.

Landscape opportunities

- Manage existing sites and plan for expansion sites to improve upland pastures to create mosaics of species-rich pastures and rushy pastures, to increase biodiversity (plants and insects in particular) and provide feeding and breeding opportunities for birds (especially waders, twite).
- Plan to increase areas of woodland, particularly on steep slopes and areas where they can help hold back floodwaters and provide flood attenuation services.
- Encourage increased access to and understanding of the natural environment, using existing networks of paths, creating links where appropriate, and in particular to address the needs of people living in densely populated urban areas.
- Plan to create and link wetland habitats in river valleys along the rivers Calder and Don, to strengthen landscape character and to improve connectivity for species and enhance biodiversity, and strengthen links between towns and surrounding urban areas. Manage existing wetland habitats so that they contribute to landscape character and biodiversity.
- Encourage any new developments to retain the distinctive character of each settlement and to incorporate green infrastructure that will contribute to biodiversity and provide opportunities for enjoyment of the natural environment.
- Plan interpretation of the rich cultural heritage, especially of the 18th and 19th centuries, to enable more people to understand and appreciate their cultural heritage or different histories.
- Protect pastoral character of western areas, with their mosaics of pastures under varying intensity of management, rough grasslands, meadows and strong patterns of drystone walls.
- Manage and restore drystone walls in the upland pasture land in the west of the NCA and hedgerows in the lower-lying land to the east of the NCA as the dominant field boundary features.
- Protect evidence of heritage from the industrial era, retaining key and iconic buildings.
- Protect the strong visual unity created by widespread use of local stone from walls and traditional farm buildings to civic architecture and town centres and the individual character of the different towns and clear patterns of settlement.
- Protect archaeology and ground features, such as late iron-age/Romano-British period cropmarks and earthworks of enclosed and unenclosed farmsteads with round houses, rectilinear field systems and strip lynchets.
- Protect historic features such as pack-horse routes and traditional farm buildings.
- Protect visible evidence of underlying geology, both by preventing the obscuring of landform and by keeping key views of landform and features open, including rock exposures in quarries. Liaise with quarry owners and land owners to provide access and interpretation of these features where possible.
- Manage conversion of vernacular buildings to ensure retention of key features and use of traditional materials, to retain visual quality and historic integrity.
- Manage development so that evidence of different periods of history, including the early industrial sites, is retained and conserved, and its significance interpreted.
- Manage existing woodlands to enhance production of biomass, retain historic features of interest and the importance of historic woodlands as features of the landscape.
- Manage arable areas so that they protect and maintain watercourses, historic ground features, hedges, hedgerow trees, riparian trees and other habitats.

Ecosystem service analysis

The following section shows the analysis used to determine key ecosystem service opportunities within the area. These opportunities have been combined with the analysis of landscape opportunities to create Statements of Environmental Opportunity.

Please note that the following analysis is based upon available data and current understanding of ecosystem services. It does not represent a comprehensive local assessment. Quality and quantity of data for each service is variable locally and many of the services listed are not yet fully researched or understood. Therefore the analysis and opportunities may change upon publication of further evidence and better understanding of the inter-relationship between services at a local level.

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Soils Livestock grazing Arable	The quality of agricultural land is generally poor with only 15 per cent classified as Grade 3 soils and this is found on the lower-lying land in the east of the NCA around Bradford and Huddersfield. 45 per cent is classified as Grade 4 soils, representing the side slopes of the Pennines with 5 per cent Grade 5 mainly found on the tops. Agriculture is predominantly livestock rearing better suited to the poorer soils on the slopes but there are large areas of arable in the lower-lying eastern parts. There are limited pigs, poultry and dairying found in the NCA. The large areas of urban fringe also mean there is much of the agricultural land (28 per cent) that supports ponies, horses and other urban fringe activities.	Regional	Climate change and increased demand for meat production are likely to increase intensification of farming in this area in the future. Increased demand has, in the past, led to loss of semi-natural habitats but future demand can provide opportunities to intensify in a sustainable way. The adjacent South Pennines and Dark Peak NCAs contain important designated areas and the role of farmland and semi-natural habitats in supporting species breeding on these sites should be taken into consideration in agricultural management. The majority of farms are small in size (80 per cent are below 50 ha) and this high proportion of small farms could make increases in food production more difficult to achieve.	Seek opportunities to encourage sustainable farming practices that will improve soil and water quality, safeguarding the resources required for sustainable food production in the area. This will also help provide complementary areas for species of nearby designated areas. Encourage sustainable grazing rates, especially within species-rich grassland sites.	**Food provision** **Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Regulating water flow** **Pollination**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Woodland Soils	11 per cent of the NCA is covered by woodland but much of this is unmanaged or in areas that make management difficult, for example on steep slopes. There are 727 ha of productive conifer plantations in the NCA, most of which is located just north of Sheffield.	Local	The close proximity of urban areas with rural makes this NCA a good opportunity to exploit timber provision for local use. So far commercial production in this area has been limited	Encourage the management of neglected woodlands to increase the provisions of timber and biomass for local use. Seek opportunities within managed woodlands to increase timber production but also to improve sites for wildlife and provide recreation opportunities for local residents.	**Timber provision** **Biodiversity** **Regulating soil quality** **Regulating soil erosion** **Recreation** **Regulating water flow**
Water availability	Rainfall Rivers Aquifers Reservoirs Woodland Semi-natural habitats	Key rivers in this NCA are the Calder, the Hebble Brook and the Colne in the north, and the Don and the Sheaf, the Rivelin and the Loxley (all tributaries of the Don) in the south. There is 'water available' for further abstraction within the river Don and the river Calder. The River Colne is 'over licensed' while the River Sheaf has 'no water available'. **Continued on next page...**	Regional	Relatively high rainfall on the higher land of the Pennines to the west, coupled with impermeable stone makes this a good location for the construction of reservoirs to capture water for domestic and industrial use in the towns and cities and in lower-lying NCAs to the east. As development pressure within the NCA increases this is likely to reduce the availability of water for other settlements further downstream and impact on water quality downstream as well. The presence of semi-natural habitats aids in the capture and filtering of water, increasing the amount entering the system in a way that can be utilised for people.	Incorporate measures into new developments to reduce both water need and run-off from those sites such as green roofs, swales and permeable surfaces to improve water filtration at source. Seek opportunities to retrofit water saving features into older developments and infrastructure features such as rain pits on roads. Seek opportunities to increase woodland and semi-natural habitat, especially on steep slopes and on flood plains where they can help hold back water flow during high rainfall periods and help to create a steady supply of water.	**Water availability** **Regulating soil erosion** **Biodiversity** **Sense of place / inspiration** **Regulating water quality** **Regulating soil quality**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability cont		**... continued from previous page** The NCA overlays the Millstone Grit and the Coal Measure minor aquifers. These groundwater sources have 'water available'. However, this status has been downgraded to 'no water available' around Huddersfield in order to protect the surface water resources in the River Colne. There is a series of large reservoirs to the north of Sheffield: these are Broadstone, Ingbirchworth, Royd Moor, and Scout Dike reservoirs to the north of Penistone; the Langsett, Middlehope and Underbank reservoirs south of Penistone; and Damflask reservoir north-west of Sheffield, serving the needs of Sheffield and adjacent settlements. High rainfall on the Pennines to the west and the fringe area can provide large amounts of water for use if it can be captured and treated.			Seek opportunities on agricultural land to reduce soil compaction and poaching to improve filtration and decrease speed and volume of run-off in these areas. This is particularly the case along the Sheaf valley and around Huddersfield.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	N/A	N/A	N/A	N/A	N/A	N/A
Biomass energy	Existing woodland Short rotation coppice Soils	The NCA is characterised by broadleaved woodlands and conifer plantations on steep valley sides. Woodland covers 11 per cent of the NCA area and offers potential for the provision of biomass by bringing unmanaged woodland under management. Current levels of biomass provision are limited.	Local	There is generally a medium potential yield for short rotation coppice and miscanthus throughout the NCA[7]. The steep slopes common across the NCA will be better suited to short rotation coppice than miscanthus as a biomass crop. Currently limited the provision of biomass energy from within the NCA could increase with more woodlands being brought under more traditional management practices such as thinning and coppicing. The opportunities to provide more biomass within the NCA are limited by sloping landform and other physical factors. Biomass crops such as short rotation coppice and miscanthus can be used to help assimilate the visual impact of new developments and there may be opportunities as the demand for more development continues around current settlements.	Seek opportunities to bring woodlands under more traditional management to increase production of wood fuel for local use, which may also improve the woodland for wildlife and provision of other ecosystem services. Seek opportunities to reduce landscape visual impacts of new developments with the planting and management of biomass crops sensitively. Encourage planting of new woodlands with potential to provide local biomass produce.	**Biomass energy** **Regulating water quality** **Water availability** **Regulating soil erosion** **Regulating soil quality** **Sense of place / inspiration** **Biodiversity**

[7] *'Opportunities and Optimum Sitings for Energy Crops'*, Natural England (URL: www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/037.aspx)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Soils Woodland Semi-natural habitats	The majority of the NCA has a low soil carbon content of 0–5 per cent reflecting the dominance of mineral soils across this NCA that are often low in organic matter. Nevertheless, there are small fragmented areas with higher carbon content on the higher moorlands. These are associated with the peaty moorland soils of slowly permeable wet very acid upland soils with a peaty surface and the very acid loamy upland soils with a wet peaty surface (together covering 6 per cent of the NCA). These soils provide an important carbon store and should be carefully conserved. Carbon content is also likely to be higher under the 6,335 ha of woodland within the NCA, and the small areas of other semi-natural habitat.	Local	Areas of high carbon content provide the opportunity for management to conserve these soils and maximise the benefits for climate regulation. The soils under the large areas of woodland will also have increased carbon storage, as well as the climate regulation afforded through the storage of carbons in the trees themselves. Opportunities within the NCA to increase carbon storage will be provided mainly through creation and improved management of areas of woodland and semi-natural habitats. The planning of green infrastructure in new developments can help to provide local climate regulation services.	High carbon soils are generally found in the upland areas of the NCA and opportunities should be taken to conserve these areas through appropriate land management. Seek opportunities to create new areas of woodland and semi-natural habitats that will both increase carbon storage and provide local climate regulation where close to developments. The small patches of upland heathland and blanket bogs found in the west of the NCA have the greatest capacity to store carbon and should be conserved. Encourage the incorporation of well designed green infrastructure into new developments to help produce a cooling effect.	**Climate regulation** **Biodiversity** **Regulating water flow** **Regulation water quality** **Regulating soil erosion** **Regulating soil quality** **Sense of place / inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Rivers Semi-natural habitats Geology Soils Reservoirs	The ecological potential of the many artificial or heavily modified waterbodies in the NCA, and ecological status of the few unmodified surface waterbodies, is generally 'moderate'. However, there are a few river lengths throughout the NCA of 'good' or 'poor' ecological status or potential. The chemical status of surface waterbodies in the NCA is generally 'good' or 'does not require assessment' although lengths of the River Calder are 'failing to achieve good' chemical status. There has been a general improvement in river chemistry quality in the River Don between 1990 and 2005 through the restoration of industrial and coal mining areas. The chemical status of groundwater across the NCA is 'poor'.	Regional	Diffuse water pollution from run-off is a major source of pollution in this NCA from both agricultural land and urban settlements. Best practice guidance exists for reducing sediment run-off from agricultural land and from urban developments. In the west of the NCA livestock grazing is common and this may cause problems for water quality where livestock have access to watercourses. A third of the NCA is classified as urban and opportunities should be taken to reduce run-off of oil and pollutants from developments and roads in these areas through the development of integrated sustainable urban drainage schemes and through creation of more accessible greenspace. In recent years significant investment has been directed to cleaning up the River Don. This combined with the decline in steel manufacturing over the past thirty years and improvements in treatment and environmental regulation has led to a reduction in the solids and metals loads discharged to the river from various process waters[8].	Encourage farming management practices to reduce nutrient run-off and improve soil quality such as more accurate pesticide application practices, appropriate timing of machinery use and stocking levels and introduction of organic matter to the soil. Encourage appropriate stocking levels to reduce poaching and fence off watercourses to prevent access by livestock, thus preventing sediment entering the watercourses. Seek opportunities to create buffer strips of grassland and woodland habitats along watercourses. Encourage the implementation of sustainable drainage systems in new developments and the retrofitting of these features in old developments when opportunities arise.	**Regulating water quality** **Regulating water flow** **Regulating soil quality** **Regulating soil erosion** **Biodiversity** **Food provision** **Pollination**

[8] *The State of Sheffield's Urban River Corridors,* TC Wild, EA Hathway, S Moore, EA Shaw, P Moug and DN Lerner (2008)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Soils Semi-natural habitats Geology	Fluvial flooding in this NCA is exacerbated by narrow river valleys and limited flood plains, and by significant built development associated with large urban centres. The River Calder is set in relatively steep narrow valleys, and is predominantly urban. Serious flooding problems exist and have been addressed in part by a considerable number of channel improvements and flood defence schemes along the river (including three within the NCA, south of Halifax). However, significant areas on the Calder are still at risk from flooding, and further problems arise from potential flooding due to snow-melt and localised thunderstorms, which have, on occasions been severe in this area. Major flood alleviation schemes have been carried out on the Calder, including (within this NCA) at Dewsbury. **Continued on next page...**	Regional	With several major rivers draining the upland catchments of NCAs to the west, flooding is a major issue here. Urban settlements along the watercourses on lower-lying land are often heavily modified and have limited land available for the natural attenuation of floodwaters during peak times. The geology of the NCA, with rivers running through steep, narrow slopes, naturally funnels water down to lowland areas in the east during periods of heavy rainfall. The heavily modified watercourses within the valleys (as a result of urbanisation) are less able to cope with flood flows as there is limited natural flood storage or overspill areas within the developed landscape. Climate change may result in more frequent and more intense storm events, thus increasing the likelihood of floods so uptake of management practices throughout the NCA will be necessary to address this. Management of water both upstream, within the Southern Pennines NCA, will have a large impact on water flow rates within this NCA. Flood management plans for the River Don include reducing run-off and soil erosion and storing floodwaters including by optimising washlands and natural flood plain north of Sheffield. The Environment Agency notes that as the majority of existing reservoirs along the River Don are for water supply, there is little attenuation achieved by them, particularly in winter months when the reservoirs are full.	Seek opportunities to increase areas of semi-natural habitats and woodland to help improve infiltration rates and slow the flow of water across the landscape and steady the entrance of water into watercourses. Encourage the creation and management of semi-natural habitats, woodlands, trees and hedgerows on agricultural land, especially adjacent to watercourses, to help slow rates of water flow. Encourage the creation of flood storage areas, especially upstream of the major towns, to store water at peak times. Support land management practices in adjacent NCAs to enable a whole river catchment approach to water management, recognising the importance of managing water at source as much as possible.	**Regulating water flow** **Biodiversity** **Regulating water quality** **Regulating soil erosion** **Regulating soil quality**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow cont		**... continued from previous page** Flood risk is significant in Sheffield, including in the city centre. The primary source of fluvial flooding is from the River Don and its tributaries. The Don is heavily modified and has little natural flood plain when it reaches Sheffield, and reacts very quickly to rainfall[9]. Flows in the River Don and its tributaries are strongly affected by upstream reservoirs and abstraction for agricultural use, with wastewater treatment works having a large impact on the river flows[10].		Flood management plans in Sheffield include improving and potentially building new flood defences to increase the level of flood protection, considered vital to the sustainability of the City. Additional measures also include opening up some of the existing channel restrictions downstream, in Chesterfield (outside the NCA), where bridges and culverts currently restrict flood flows. Flooding may still occur on the River Calder downstream of Brighouse; however there are areas of undeveloped flood plain and washlands in the Calder river corridor which provide flood storage opportunities.	Encourage new developments to incorporate sustainable urban drainage systems to improve infiltration and thus reduce flow of water from urban areas. Seek opportunities to remove obstructions from watercourses, such as redundant weirs, and reduce hard engineering where possible to allow the rivers to follow more dynamic and natural courses. This will help peak flows to spill out into flood storage areas reducing the energy of flood flows arriving in urban areas.	

[9] *Don Catchment Flood Management Plan,* Environment Agency (July 2010)

[10] *The State of Sheffield's Urban River Corridors,* TC Wild, EA Hathway, S Moore, EA Shaw, P Moug and DN Lerner (2008)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soils Semi-natural habitats	This NCA has 5 main soilscape types: ■ Freely draining slightly acid loamy soils, covering 50 per cent of the NCA; ■ Slowly permeable seasonally wet acid loamy and clayey soils (40 per cent); ■ Slowly permeable wet very acid upland soils with a peaty surface (4 per cent); ■ Loamy and clayey flood plain soils with naturally high groundwater (3 per cent); and ■ Very acid loamy upland soils with a wet peaty surface (2 per cent).	Local	The freely draining slightly acid loamy soils allow water infiltration and therefore may be valuable for aquifer recharge requiring the maintenance of good soil structure (aided by the addition of organic matter) and requiring the matching of nutrients to needs to prevent pollution of the underlying aquifer. Conversely, the slowly permeable seasonally wet acid loamy and clayey soils are easily damaged when wet and at risk of compaction and/or capping. The poor water infiltration that results will tend to exacerbate run-off problems leading to diffuse pollution and flooding. These soils may have limited potential for increasing organic matter levels by management interventions.	Encourage farming management practices to improve soil structure such as introduction of organic matter to fertilise in preference to artificial fertilisers, appropriate timing of machinery use and other activities, appropriate stocking rates to reduce poaching and compaction and matching nutrient inputs to needs as far as possible.	**Regulating soil quality** **Regulating soil erosion** **Food production** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Soils Semi-natural habitats Farmland	The soil types of this NCA divide roughly in half between those subject to soil erosion and those that are fairly resistant. The freely draining slightly acid, loamy soils and peaty soils found in the west of the NCA on steep slopes and upland areas are at higher risk of erosion The heavier wetter soils (covering 43 per cent of the area) in the east of the NCA are at lower risk of soil erosion. There are no Defra priority catchments in this NCA.	Local	The freely draining slightly acid loamy soils, covering half of the NCA have enhanced risk of soil erosion on moderately or steeply sloping land where cultivated or bare soil is exposed, exacerbated where organic matter levels are low after continuous arable cultivation or where soils are compacted or bare. The peaty soils of the NCA (together covering 6 per cent of the NCA) are also very prone to soil erosion. The slowly permeable upland soils with a peaty surface are at risk of gullying / hagging (and loss of particulate organic matter) where surface vegetation is damaged or lost. Drainage of these soils (for example through gripping) may also result in increased oxidation of carbon and soil wastage. Measures will be beneficial, therefore, that retain water in situ; ensure good vegetative cover; and avoid over grazing/ trampling or damage by mechanised activities. Equally the very acid loamy upland soils with a wet peaty surface are frequently found on steep slopes where they suffer from a combination of easily damaged peat layers and rapid run-off. The heavier wetter soils (covering some 43 per cent of the NCA) are at low risk of erosion – the slowly permeable seasonally wet acid loamy and clayey soil and the loamy and clayey flood plain soils with naturally high groundwater.	Seek opportunities to create and manage areas of semi-natural habitats, especially on upland areas and steep slopes. This will help to improve infiltration and thus reduce the impact of heavy flows on top soils. Encourage hedgerow and tree management and the creation of semi-natural habitats within the farmed environment to improve soil structure and reduce erosion. Promote permanent grass cover where activities are managed to avoid poaching and bank erosion when near to watercourses such as keeping livestock away from watercourse banks. Encourage appropriate stocking levels of livestock grazing and mixed farming practices to decrease intensity of soil use.	**Regulating soil erosion** **Biodiversity** **Food production** **Regulating soil quality** **Regulating water quality** **Regulating water flow**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Semi-natural habitats Pollinator species	Almost 400 ha of heathland and grassland (less than 1 per cent of the NCA area) provide limited nectar sources for pollinating insects. Urban areas also support pollination, as gardens provide rich sources of nectar, as does the mixture of native and exotic plants which have escaped from gardens. Green infrastructure development to link urban areas with rural areas has provided some increases in species richness for pollinators.	Local	Provision of this service is limited within this NCA but urban gardens and allotments will all play an important role. The infrastructure networks, such as roads, railways and canals, provide opportunities to create corridors for pollinator species connecting areas within and outside the NCA boundary. Arable farming is most common in the eastern parts of the NCA as it transitions into the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA and where the need for increases in this service will be greatest.	Encourage the creation of nectar-rich grassland areas and strips next to arable fields to increase food provision for pollinator species. Protect and expand existing species-rich grasslands through appropriate management practices. Promote crop rotation and management and biological crop management to reduce need for pesticides that may harmfully affect pollinator species and populations. Encourage the creation of semi-natural habitats in arable areas along with field margins and conservation headlands to increase pollinator and predator species.	**Pollination** **Biodiversity** **Food production** **Regulating soil erosion** **Regulating soil quality** **Regulating water flow** **Regulating water quality**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	Semi-natural habitats Predator species	There is little information regarding delivery of this service for this NCA. However, there are some good habitats such as hedgerows, woodlands and riparian habitats, which are likely to support beneficial predator species.	Local	Habitat features such as hedgerows, grassland strips, woodland and other semi-natural habitats support a number of predator species that can help control pest species on agricultural products. In the east of the NCA the need and provision of this service is greatest where arable cropping is more predominant.	Seek opportunities to increase landscape features such as hedgerows, grassland strips, woodland and semi-natural habitats. Encourage incorporation of beetle banks and buffer strips around arable fields to support populations of predator species.	**Pest regulation** **Pollination** **Biodiversity** **Food production** **Regulating soil quality** **Regulating soil erosion**
Regulating coastal erosion and flooding	N/A	N/A	N/A	N/A	N/A	N/A

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	Geology Topography Semi-natural habitats Rivers and reservoirs Historic assets	Sense of place is provided by the strong landform of hills, ridges and broad valleys dominated by the distinct backdrop of the Pennines to the west, with extensive urban and industrial development contained within the steep-sided valleys', creating a dramatic interplay of views between settlements and the surrounding hillsides. The river valleys are often well wooded and create a striking backdrop to views from within settlements The wooded river valleys that stretch into the west of Sheffield reach right into the city centre, creating a series of linear parks which connect town and country into the Peak District National Park. Senses of inspiration and escapism are associated with the elevated hill tops where the open and exposed landscape allows far reaching views across the landscape into the Pennines to the west. Strong contrasts between exposed isolated and uninhabited plateaux, steep wooded valleys, dense urban areas and a strong sense of time depth provides further inspiration. The parklands and country villas of the south of the NCA also provide strong sense of place and inspiration in this area.	Regional	Sense of place has changed over recent decades with a move away from heavy industry and an increase in the urban fringe character as urban settlements expand. It will be important that future developments help retain sense of place by using locally relevant materials. The interplay between rural and urban is important, especially retaining the views between the higher land to the west and the valleys and lower land to the east. In the south around Sheffield here are a number of country villas and parklands built from industrial wealth, these provide a strong sense of place and link to the cultural heritage of the area.	Ensure that any settlement extensions are sympathetically placed to retain separation of urban and rural areas and maintain views. Retain and sympathetically manage historic features within the landscape. Manage parklands and improve access to parkland and estates to retain the sense of place and inspiration they provide and seek recreation opportunities. Maintain field boundaries in line with historic character of stone walls in the west and upland areas and hedgerows in the eastern lower-lying areas. Encourage use of appropriate building materials in new developments to ensure the character of the local vernacular and building materials is retained.	**Sense of place/ inspiration** **Sense of history** **Tranquillity** **Recreation** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Industrial and civic buildings Geology and rivers Canal and road network	The most evident aspect of history is the strong sense of industrial heritage found in the valleys throughout the NCA, which are rich in industrial archaeology - making reference to the various industries that grew along the valleys and became so important to the growth and identities of towns and cities (steel and cutlery around Sheffield and wool in the north around Halifax and Huddersfield). The buildings associated with these industries are prominent throughout the landscape, and include the large mills that are evident in all the main valleys and often tend to dominate the towns, as well as the civic buildings built by wealthy industrialists, such as the centre of Dewsbury and Saltaire. Saltaire was built as an entire town complete with mills, schools, library, canteen and church, and is now a World Heritage Site. The canal and rail network underline the area's coal mining and quarrying past. **Continued on next page...**	National	There are strong links to the industrial heritage of the area which is closely linked to the landscape and unique collection of geological features. Innovative uses are being found for some of the old mills and industrial buildings allowing them to be retained within the landscape. Development in the NCA has been strongly linked to the landscape and gives a picture of the historical industries. Linear patterns of development within the valleys to the north are common with 18th/19th-century mills concentrated along the watercourses with locally distinctive housing with long first floor windows to light hand looms. Woollen towns of Halifax, Huddersfield, Wakefield and Bradford grew from marketing to production centres during the 18th century. There is a wide range of historic domestic architecture as well as the more formal industrial buildings, including aisled 15th–16th-century houses of	Seek opportunities to retain industrial buildings, finding new uses that support their role within local communities and provide opportunities for interpretation and recreation. Protect the distinctive building styles seen across the NCA and encourage the use of local building materials to retain historic character to settlements. Seek opportunities to share the link between different building styles and settlements to the historic activities and geological features. Protect and maintain existing archaeological sites. Promote land management that is sympathetic to the existence of cropmarks and earthworks, particularly on higher land to the west. Encourage maintenance and restoration of drystone walls in the west and hedgerows on lower-lying land to the east.	**Sense of history** **Sense of place / inspiration** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history cont		**... continued from previous page** The history of the landscape is also evident in bronze-age and Roman remains on the undeveloped higher land to the west, as well as the old pack-horse trading routes across the Pennine hills which once linked settlements lying to the east and west and has now evolved into today's modern road routes.		yeoman clothiers, minor gentry houses of 16th and 17th centuries, 16th–18th-century styles marked by mullioned windows, terraced housing for workers and villas of wealthy industrialists (a major feature west of Sheffield). The strong infrastructure network across the area provides opportunities to increase recreation and engagement of people from urban areas with the more rural parts of the NCA. Old railways and canals also provide opportunities for paths and green corridors for people and wildlife through the landscape. With the decline in local industries that local communities were once well linked to, there is a strong need for interpretation to retain links to historical importance of the NCA in providing goods for the country.	Restore key historic features of parklands and estates and manage to retain their historic value, providing access and interpretation where possible.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Geology Semi-natural habitats, especially woodlands Rivers and reservoirs	This is a heavily urbanised area, with under 1 per cent of the NCA classified as 'undisturbed' (a decline from 15 per cent since the 1960s). Tranquillity may nevertheless still be associated with the undeveloped wooded valleys that adjoin the towns and cities and some of the larger urban woodlands and green spaces.	Local	The natural features of the NCA provide areas of relative tranquillity for people living in the urban areas. The relatively high number of urban parks and green spaces and the linear green corridors along rivers, canals and disused railways provide accessible places for urban populations to find greater levels of tranquillity.	Seek opportunities to link urban areas to more rural areas. Encourage the inclusion of green infrastructure within new developments to provide more tranquil places for residents locally. Encourage the creation of links to neighbouring NCAs with areas of higher tranquillity.	**Tranquillity** **Biodiversity** **Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Trans Pennine Trail Pennine Cycle Trail Disused railways Restored industrial sites and buildings Rivers 20 Registered Parks and Gardens	Recreation is supported by 1,315 km of public rights of way (equivalent to a relatively high density of 2.25 km per km^2), including the Trans Pennine Trail and the Calderdale Way long-distance routes, as well as small areas of open access land covering 1.3 per cent of the NCA.	Regional	There are many linear networks that traverse this NCA including rivers, canals, discussed railways and historical routes. These, along with the formalised trails, provide opportunities for recreation and to link industrial settlements to the more rural areas. In Sheffield much work has been done to link the city centre and suburbs with upland areas outside of the city. This has been done mainly through restoration and improvements to the river corridors and woodland planting. Many of the towns and cities have large parks, woodlands and cemeteries that provide green refuge for people and wildlife.	Seek opportunities to improve access along river, canal and disused rail corridors to link people within urban areas to more rural areas. Encourage promotion and interpretation of access routes. Encourage engagement with large urban green spaces to promote a greater understanding of the natural environment. Identify opportunities to improve access by ensuring that paths are well maintained and signposted and that some surfaced paths are provided to ensure easy access walks.	**Recreation** **Biodiversity** **Geodiversity** **Sense of history** **Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Semi-natural habitats Rivers Urban greenspace	There is almost 4,000 ha of priority habitat within the NCA (5 per cent of the NCA area), which comprises in particular lowland mixed deciduous woodland and wet woodland. There are 2,547 ha of ancient woodland, much of which has been replanted. Other priority habitats include lowland beech and yew woodland, meadows, grassland and heathland. There are 12 SSSI within the NCA, totalling just 0.1 per cent of the NCA area. 288 Local Wildlife Sites cover 3,923 ha (7 per cent of the NCA).	Local	The low number of designated sites within the NCA places greater significance on areas of semi-natural habitat where they occur. Many features have been created as a result of the industrial past of the NCA such as leats, small reservoirs, canals and disused railways and provide opportunities to regenerate the landscape, providing access, recreation and green space for local people. These areas also have a great importance in terms of bringing biodiversity into closer proximity with people in the urban fringe and increasing understanding and engagement of people with the natural environment. Areas of semi-natural habitat are generally fragmented and small and therefore more vulnerable to outside detrimental pressures. The network of rivers throughout the NCA, and hedgerows in eastern areas, provide corridors for wildlife through a generally impermeable landscape. The river and canal networks play an important role in connecting the upland and lowland landscapes across the NCA, often acting as green fingers spreading through urban and rural areas. The linear features of other infrastructure such as canals, railways and roads also create connective features if managed appropriately and linked to habitat creation and existing green spaces.	Seek opportunities to expand, buffer and link existing areas of semi-natural habitats. Encourage incorporation of semi-natural habitats in new developments along with green infrastructure that links areas within the settlements to the wider countryside. Investigate and take advantage of opportunities to restore industrial sites through the creation of semi-natural habitats. Make the most of old industrial features and infrastructure such as disused railways and canals as areas for improved access, recreation and creating connectivity for wildlife and people. Promote improved management of ancient semi-natural woodlands to improve species composition within replanted sites. Seek to buffer and link ancient woodland sites.	**Biodiversity** **Geodiversity** **Recreation** **Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Regulating water flow**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Geology	The NCA is underlain by Upper Carboniferous strata. With 51 per cent sandstone and 49 per cent mudstone and siltstone. There are six geological SSSI within the NCA and 82 local geologically designated sites.	Local	The underlying stone has been extensively exploited for building stone, and historically for iron and coal. Commercial extraction continues for fire clay, high quality building stone and roadstone. Industrial features and past and active quarries provide opportunities to raise awareness of geological features and engage people in geology of the area. The prevalence of these raw materials has significantly affected the history and development of the NCA and it would have been of high importance during industrial times.	Maintain and protect geological sites, and seek opportunities for increased interpretation where appropriate. Promote use of local stone in developments and increase awareness and interpretation of this link to the local landscape. Seek opportunities to engage people through interpretation and awareness raising on quarry sites, closed and active, railway cuttings and disused railway tracks. Seek opportunities to increase understanding and engagement of communities with geological features in the landscape and their importance in the history of the area. Work with volunteers to develop trails and interpretation at a number of sites to improve understanding and enjoyment of these for all ages.	**Geodiversity** **Biodiversity** **Recreation** **Sense of place / inspiration** **Sense of history**

Photo credits

Front cover: View across Mirfield with striking stone church spire dominant in a landscape of settlements along river corridors. © Nancy Steadman

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