National Character Area profile:

54. Manchester 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.

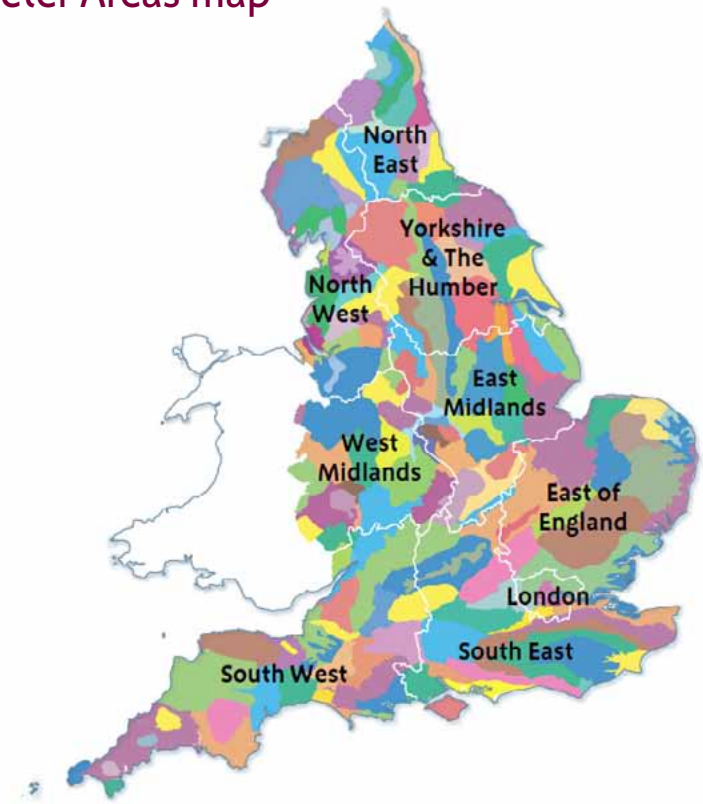
NCA profiles are guidance documents which can help communities to inform theirdecision-making about the places that they live in and care for. The informationthey contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage 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 Manchester Pennine Fringe occupies the transitional zone between the open moorlands of the Dark Peak and Southern Pennines, and the densely populated urban conurbation of Manchester. The area wraps around Manchester from Bolton in the north-west to the edge of Hazel Grove in the east, and includes the industrial towns of Bury, Bolton, Rochdale, Oldham, Dukinfield and Glossop.

This transitional area runs along the edge of the Millstone Grit of the Pennine uplands, and is underlain by Carboniferous Millstone Grit and the Pennine Coal Measures, which broadly dip to the south-west. The area owes much of its character to its proximity to the adjacent Pennine moors, and the deeply incised, steep valleys that characterise the transition from moorland to urban area. The elevation of the area is generally between 100 m and 300 m, between the lower plains and higher Pennine moors.

Much of the countryside is influenced by recreational use from adjacent urban areas and also by the diversification of farmland. The river valleys, upland hinterland and proximity of urban development all contribute to the area's distinct Pennine fringe character.

The natural distribution of habitats throughout the area has been heavily modified by human activity over centuries, especially since the Industrial Revolution. Woodland is concentrated in narrow, steep-sided valleys that cut into smooth shoulders of pastoral land, but it also extends along whole river valleys. In recent years, community woodland has been created in the urban areas. Rivers and canals are also an important feature of this area, providing transport routes and links to industrial heritage, as well as important sites for biodiversity. The Rochdale Canal is internationally important as it supports floating water-plantain. Large tracts of the South Pennine Moors and Peak District Moors internationally important sites and supporting habitat are adjacent to this fringe area. Part of the Peak District National Park lies within the Manchester Pennine Fringe NCA, as does the Pennine Bridleway National Trail, offering increased opportunities to encourage visitors to engage with and enjoy the local environment.

Challenges from development, transport links and recreation are significant in this fringe area. However, there are opportunities to improve habitat quality, distribution and connectivity, provide better water quality and storage, minimise erosion, and increase carbon storage and recreational provisions. This can strengthen landscape resilience and adaptation to climate change, and manage increased tourism and recreational demand, while promoting the positive benefits that contact with nature affords.

Click map to enlarge; click again to reduce.

Statements of Environmental Opportunities:

SEO 1: Manage, enhance and expand the network of green infrastructure (such as rivers, woodlands, restored industrial sites, parklands and canal routes) within the urban areas, to increase biodiversity, strengthen access and recreational use, and increase understanding of the area's rich industrial heritage, natural heritage and geodiversity.

SEO 2: Sustainably manage and enhance the distinctive features of the Pennine fringe landscape, including the predominantly pastoral agricultural land use, the mosaic of farmland and upland fringe habitats, the clough woodland, the drystone walling and the gritstone buildings, to strengthen the landscape character, and improve habitat condition and connectivity, bringing benefits for water quality and reduced soil erosion.

SEO 3: Manage and continue to enhance Manchester Pennine Fringe's characteristic watercourses, such as the fast-flowing rivers and restored canals; conserve and extend the associated riparian habitats, to strengthen their role, extend and link habitats, manage flood risk, improve water quality and reduce soil run-off, and provide opportunities for recreation.

SEO 4: Manage existing woodlands and community forests, and extend broadleaved woodland cover in appropriate locations, to help mitigate the effects of climate change, improve biodiversity, reduce the impact of new development, and provide access to nature and green infrastructure links into urban areas.

Canals are an important feature of this area, providing transport routes and links to industrial heritage, as well as important sites for biodiversity.

Description

Physical and functional links to other National Character Areas

The Manchester Pennine Fringe NCA occupies the transitional zone between the open moorlands of the Dark Peak and South Pennines, which lie to the east and north respectively, and the densely populated areas of the Manchester Conurbation NCA and the Lancashire Coal Measures NCA, which lie to the south and south-west.

There are prominent views from urban settlements looking up the Pennine slopes towards the adjacent South Pennine Moors and the Dark Peak. Equally, looking down from the foothills of the moors provides extensive views across to the adjacent Manchester Conurbation NCA and Lancashire Coal Measures NCA. The high rise of Manchester city centre is a visual landmark.

Numerous rivers flow through the area, including the Irwell, Roch, Goyt, Tame and Etherow, which drain down through this area from the adjacent uplands of the Dark Peak and Southern Pennines towards the lowland Manchester Conurbation and Mersey Valley NCAs, ultimately flowing into the Mersey Estuary and the Irish Sea. These rivers are important links between the uplands and lowlands, in terms of ecological connectivity as well as water management.

The demand for recreation – both within the Manchester Pennine Fringe NCA and from neighbouring NCAs – is high, due to the closeness of the Manchester Conurbation. The Pennine Bridleway National Trail provides an opportunity for multi-user access to the eastern extent of the area, providing links to other

Extensive views over the Manchester Pennine Fringe NCA towards the Manchester conurbation.

NCAs along the edge of the Pennines. There is evidence of the diversification of farming into a range of urban-related uses.

Historic trans-Pennine communication routes, especially railways and canals, connect with surrounding NCAs. A large number of A-roads and motorways (including the M60, M62 and M67) cut through this NCA, connecting the towns of Bolton, Bury, Glossop, Rochdale, Oldham and Dukinfield, and bypassing the city of Manchester. The closeness of the adjacent Manchester Conurbation NCA is reflected in the fact that many of the settlements act as 'satellite towns'. The modern tram and busy public transport networks link the Manchester Pennine Fringe NCA with Manchester city centre.

Key characteristics

- Transitional zone between elevated, open moorlands and densely populated urban areas on lower ground.
- Landform is a transition from upland to lowland, with smooth shoulders of land divided by steep-sided valleys with fast-flowing rivers.
- Elevated vantage points provide extensive views across the adjacent Manchester Conurbation NCA.
- Fringe area underlain by the Carboniferous Coal Measures rising to the north and east, into the Carboniferous Millstone Grit uplands.
- Several rivers flow through the area from the Pennine uplands, linking with adjacent lowland areas.
- Woodland cover is characterised by a range of woodland types concentrated along river valleys, as well as some newer community woodlands in the urban areas.
- Field boundaries include dry 'gritstone' walls at higher elevations and hedgerows at lower elevations.
- Limited semi-natural habitats include broadleaved mixed and yew woodland, lowland dry acid grassland, lowland meadows, lowland heathland, and purple moor-grass and rush pasture, which are often fragmented.
- Extensive evidence of 18th- and 19th-century stone and brick-built industrial buildings, including mill lodges and reservoirs originating from the woollen and cotton industries.
- Historic trans-Pennine communication routes, especially railways and canals.
- Much of the countryside is influenced by recreational use from adjacent urban areas and the diversification of farmland, giving the area a distinct urban fringe character.
- High population densities across a belt of industrial towns, with busy transport networks and motorways. Almost half of this NCA is classed as urban.

Visitors enjoying Burrs Country Park.

The Manchester Pennine Fringe today

The Manchester Pennine Fringe runs along the edge of the Millstone Grit uplands of the Southern Pennines and the Dark Peak. This fringe area has been carved partly from the Millstone Grit and partly from the overlying Coal Measures, all of which dip south and west off the high ground and beneath the Manchester plain. Glacial drift cover is extensive only on the lower ground.

The Manchester Pennine Fringe owes much of its character to its pronounced landform (deeply incised, steep valleys, and localised woodlands) and to its proximity and visual links to the adjacent Pennine moors. The elevation of the area is generally between 100 m and 300 m, between the lower plains and higher Pennine moors. The character of the area is shaped by a combination of historical mineral extraction, industrial heritage, some agricultural land and large areas of urban land use; 46 per cent of the Manchester Pennine Fringe is defined as urban, all against a backdrop of the Pennine uplands.

The higher slopes to the north and east of the Manchester Pennine Fringe form the transition to the open moorland of the South and West Pennine Moors and the Peak District Moors, ecologically linking this fringe area with the uplands. Extensive tracts of the South Pennine Moors and Peak District Moors internationally important sites are adjacent to this NCA. This moorland vegetation, characteristic of the southern Pennines, is of particular importance for supporting breeding bird populations, including breeding merlin, golden plover, curlew and twite.

The rivers Irwell, Roch, Goyt, Tame and Etherow flow through the area in narrow, steep-sided valleys. Canals, such as the Rochdale Canal and Huddersfield Narrow Canal, cross the area, with steep flights of locks climbing from the Manchester plain up to the Pennines. For much of its length, the Peak Forest Canal runs alongside the River Goyt, joining the Macclesfield Canal at Marple Locks.

Nob End Site of Special Scientific Interest (SSSI), a species-rich grassland which has colonised a former waste tip.

Pockets of clough woodland remain in the narrow, steep-sided valleys. The Red Rose Community Forest covers the western part of the area. The Pennine Edge Forest is a woodland and environmental initiative for the eastern fringe. The forests provide a network of green spaces and woodlands to enhance biodiversity and environmental quality, increase recreational opportunities and improve access to the countryside.

The natural distribution of habitats throughout the area has been heavily modified by human activity over centuries, including commercial or residential development, and agriculture. All of the most important habitats have been affected and some, such as ancient woodland and heathland, have been much reduced from their original extent. Limited semi-natural habitats include broadleaved mixed and yew woodland, lowland dry acid grassland, lowland meadows, lowland heathland, and purple moor-grass and rush pasture, which are often fragmented.

Past industrial activities in the Manchester Pennine Fringe have left a variety of sites, such as quarries, mill lodges, reservoirs, canals and spoil heaps, which are now valued for their biodiversity and geodiversity. This has left sites such as Nob End Site of Special Scientific Interest (SSSI), a species-rich calcareous grassland of national importance, which has colonised a former alkali waste tip. The NCA contains much of the Rochdale Canal Special Area of Conservation (SAC), which is of international importance for its significant population of floating water-plantain Luronium natans. The Huddersfield Narrow Canal SSSI is one of the best examples of a flowing eutrophic water system in Greater Manchester.

The marginal farmland, which is usually in close proximity to urban development, contributes to the area's distinct urban fringe character. Stone walls, narrow winding lanes and the area's traditional stone architecture give a consistently upland feel to these areas. The lower, steeply undulating foothills to the fringes are of variable quality grassland, with some small hedges and walls to irregular fields enclosed by the 19th-century wooded valleys, and scrub on steeper slopes. Stock rearing and rough grazing is practised in a regular pattern of fields enclosed in the late 18th and then the 19th centuries, varying in size with topography. Farming with sheep flocks is the most prominent enterprise on both the improved grassland on the lower slopes, and the unimproved grassland higher up, towards the moorlands. At the southern end of the profile area, cattle grazing and dairy farming start to become evident. Farm diversification and recreational demands have led to a change in the physical appearance of the countryside, as it has moved from a traditionally farmed environment to one capable of supporting a range of recreation activities.

Agricultural land is predominantly Grade 3 and Grade 4, with silt and gravel deposits or sand and gravel, sandstone or mixed deposits. Soils are primarily slowly permeable, seasonally wet, acid, loamy and clayey soils, with some freely-draining, slightly acid, sandy soils and freely-draining, slightly acid, loamy soils.

The urban areas lie at a transition between the upland fringe and lowland landscapes. At the transition into upland there is a strong delineation between the edge of settlement and the countryside, however its lowland extents merge into a wider urban massing. Extensive long-distance views are possible from elevated vantage points across urban development in the valleys. There is a close intermingling of industry and settlement, including at Bolton, Bury, Glossop, Rochdale, Oldham and Dukinfield, along with remaining fragments of farmland.

The urban area owes its size and importance largely to the development of the cotton trade, but also to coal mining and engineering, and to the communications network that radiates from it. Much of the area has seen evidence of industrial activity resulting from naturally occurring minerals, including coal and ironstone mining, glass making and stone quarrying. Settlements typically have agricultural origins, later developing into mill towns and ultimately becoming more general in character, with modern mixed residential and industrial uses.

Stone and brick industrial buildings, mills and reservoirs from the 18th and 19th centuries, located along the valley bottoms, are important heritage sites. Some old

cotton mills have found alternative uses, but many are derelict and some have been pulled down. While the demolition of industrial heritage has taken place to facilitate urban regeneration, the remaining 18th- and 19th-century urban assets remain a notable feature of the urban character. The Millstone Grit building stone of the Pennine fringe suburbs makes a gradual transition into the characteristic red brick terraces of Manchester. The mix of red brick and sandstone building materials used for the area's industrial and institutional architecture (for example, mill stacks, mill buildings and railway viaducts) contributes to the overall sense of place.

The high population densities across the belt of industrial towns and the busy transport networks result in urban areas having low tranquillity. The open spaces and canals offer areas of relative tranquillity, allowing people to reconnect with nature at a local level.

Much of the countryside is influenced by recreational use from adjacent urban areas, and by the diversification of farmland into uses such as haulage and riding schools. In recent years there has been an increase in the demand for recreational activities such as walking, cycling and horse riding, with many disused railway lines now being used as walking and cycling routes. Busy trans-Pennine transport routes (especially railways, canals, A-roads and motorways) cut through this area, reflecting the nearness of the adjacent Manchester conurbation. Well-used routes act as important travel trajectories across the Pennines and between urban conurbations. A large number of busy A-roads and motorways cut through this NCA, connecting the towns of Bolton, Bury, Glossop, Rochdale, Oldham and Dukinfield, and bypassing the city of Manchester. Five canals run through the area, forming part of the rich industrial heritage of the Manchester Pennine Fringe.

The Pennine Bridleway National Trail passes through this NCA, while the Peak District National Park, designated for its spectacular landscapes, cultural heritage and wildlife, lies to the east of the area. The area is adjacent to the extensive open access areas of the Southern Pennines. There are also a number of local nature reserves, country parks and registered parks and gardens. These all provide increased opportunities for local communities and visitors to engage with and enjoy the natural environment.

Farmland has diversified, often into uses such as horse grazing.

The Landscape through time

The Manchester Pennine Fringe is a predominantly low-lying area underlain by the Carboniferous Coal Measures of the Lancashire Coalfield, and rising (to the north and east) into the Carboniferous Millstone Grit uplands of the Southern Pennines and Dark Peak. Much of the underlying geology is covered in more recent glacial and post-glacial gravels, sands, silts and clays.

The Millstone Grit (316–327 million years ago) was deposited as part of a river system that gave way to the more marginal coastal environment of deltas, estuaries and swamps, with occasional marine inundation. The Pennine Lower and Middle Coal Measures (308–316 million years ago) deposited the sandstone, silts, clays and coal seams that underlie much of the area. Mountain building towards the end of the Carboniferous created the Rossendale anticline to the north, and the Pennine anticline to the east, and tilted the sequence of Carboniferous rocks, which get progressively younger towards the south-west.

During the Quaternary, the area was periodically covered by thick ice sheets and glaciers. The last ice advance and retreat during the Devensian (26,000 years ago) left behind a thick sequence of glacial till, gravel and sand, which today conceals much of the underlying solid geology. The presence in the glacial till of rocks originating from the Lake District indicates that the main ice sheet originated in the Irish Sea, although there is also evidence of more local glaciers flowing off the Pennines. Significant volumes of meltwater flowing from the retreating ice sheets left extensive fluvial sands and gravels, and deepened many of the river valleys. This contributed to the present steep-sided valley – and, in places, gorge – topography.

Traces of early colonisation of the area survive, chiefly in the form of barrows on high ground. A number of Roman roads crossed the area, linking Manchester with Ribchester in the Lancashire Valleys as well as with Castleshaw and Ilkley in the Southern Pennines. A diverse medieval landscape developed, with substantial surviving woodland in the south, thinning out to the north. Much of the economy of the area was pastoral, with arable cultivation close to the settlements. Fields were mostly enclosed, by private agreement by the 19th century.

The Manchester Pennine Fringe's heritage is largely related to textile manufacture and the infrastructure that grew up to support this sector. Occasional and indirect references to textile manufacture in this area have been found in manuscripts dating from as early as the late 13th century.

Wool from the sheep reared here, as well as flax from the Amounderness Plain, supported the early development of the textile industries in the ring of Pennine fringe towns. In turn, this led to the further, more regular, enclosure of moorland grazing in the late 18th and early 19th centuries.

By 1700, each district within the area was specialising in the production of one type of cloth. The Marple, Hazel Grove and Ashton-under-Lyne areas produced almost all the linen cloth. Bolton was the centre for fustians (a cotton, wool and flax mix), and most woollens and worsteds were manufactured in Bury and Rochdale. The earliest mills were driven by water, so needed to be situated on fast-flowing streams.

The 18th century witnessed not only big increases in the production of these traditional textiles, but also the development of cotton cloth manufacture. By the early 19th century, cotton had almost entirely replaced wool and linen. The

construction of the canal network, including the Rochdale Canal, Huddersfield Narrow Canal and Macclesfield Canal, in the late 18th and early 19th centuries, opened up the area's industries, to bring in raw cotton and take away the finished yarn or cloth. This also enabled coal to be cheaply transported to Manchester and the Mersey for shipment. The area became economically linked with the southern states of America and the port of Liverpool. It is associated with some of the significant early developments of the Industrial Revolution, for example the expansion of canals and railways, and the industrialisation of the workforce.

The development of the steam engine made it possible for mill owners to move from upper valleys and build their new mills where communications and house building were much easier. Archaeological evidence related to these periods of expansion remains visible in the ruins of isolated farms and cottages on the hillsides, and in abandoned sites of water-driven mills in small Pennine valleys.

The landscape of well spaced, nucleated villages, and medium densities of smaller hamlets and farmsteads, was transformed as towns expanded. The growth of the textile industry and a big increase in population produced a concentration of people in the industrial centres in the lower, wider valleys. Mills were extremely water-intensive, and so were clustered around watercourses, sometimes constructing and maintaining their own reservoirs.

Places such as Bolton, Bury, Rochdale, Oldham and Glossop expanded, and by the end of the 19th century had become important and productive mill towns. These towns developed industrial structures, especially the larger mill complexes, as well as associated areas of planned workers' housing, and the villas of mill owners and managers. In the hinterland, agricultural production intensified. The change to cotton production and urban centralisation caused

At Lowside Brickworks exposures of the coals, mudstones and sandstones can be seen.

a shift away from less profitable wool, to provide meat, dairy, arable and horticultural products to sustain the increasing populations.

The Pennine Coal Measures form part of the Lancashire Coalfield, mined throughout the 19th and 20th centuries. They are visible today in disused quarries and where rivers, such as the Irwell and Roch, cut through the overlying glacial deposits. The Millstone Grit upland dominates the edge of the Manchester Pennine Fringe NCA and, during the 19th century, was the main source of building

stone for much of north-east Manchester. Coal Measures brick clays have also been widely exploited as the main source of bricks for many of Manchester's buildings; the disused Lowside Brickworks SSSI reflects this former industry and is important today for both its geodiversity and biodiversity.

The presence of large, sprawling industrial conurbations has a pronounced effect on many of the landscapes surrounding them, with dense settlement patterns and well-used roads in place. Changes associated with agriculture, together with the pressures of development in and around major urban centres, all continue to affect the landscape, giving it a strong urban influence. Today, most of the land between the towns is farmland and is used as permanent pasture.

Recent developments include the expansion of residential settlements and industrial estates, and the expansion of the road and motorway network, all of which are contributing to increasing the urban character of the area. Many mills have been converted into other uses, such as retail and housing. In many areas, farming is now giving way to livery stabling (or horsiculture), particularly around the fringes of settlements. Some of the canal network has been restored and re-opened for recreational purposes. The rivers that helped to facilitate the Industrial Revolution (and became polluted with industrial waste and devoid of fish as a result) have been subject to a number of improvement initiatives: many are now host to recreational activities, such as angling and canoeing. The Red Rose Community Forest and Pennine Edge Forest initiatives have been established to take forward community forestry as an opportunity to improve the area's environmental image and to improve the overall quality of life. Because of its proximity to urban areas, the countryside continues to be well used by local people. It provides sensory environments that allow public participation, understanding and enjoyment of the natural environment, and that provide benefits for health and wellbeing.

The Rochdale Canal restored and re-opened for recreational purposes as well as an important site for nature conservation.

Ecosystem Services

The Manchester 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 Manchester Pennine Fringe NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision:** The Manchester Pennine Fringe provides medium- to low-grade agricultural land (14 per cent is Grade 3 and 39 per cent is Grade 4), which predominantly supports livestock rearing. There is also some dairy farming. Some 46 per cent of the NCA is urban.

- **Timber provision:** There are some opportunities for small-scale timber and wood fuel production for local use.

- **Water availability:** Principal surface water resources within the Manchester Pennine Fringe NCA are the rivers Irwell, Roch, Tame, Goyt and Etherow. The majority of the water abstraction in the area is used for industrial purposes, such as chemical, construction, metals and mineral, mining, leather and textiles. Abstraction for public water supply and supplying the canals is also significant.

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

- **Climate regulation:** The pockets of carbon-rich soils in this NCA are very important to conserve, providing a carbon storage function. The area of woodland cover (3,699 ha) has a role in sequestering and storing carbon. There are opportunities for habitat management, restoration and creation to enhance climate regulation.

Regulating water quality: The many steep, fast-flowing streams and rivers result in high levels of run-off, especially after heavy rainfall, with consequent erosion and increased sediment load impacting on areas downstream. Appropriate management, as well as extending some habitats, can capture sediment run-off and improve infiltration, benefiting water quality both within this NCA and downstream.

Development adjacent to the River Irwell.

- **Regulating water flow:** There is a risk of fluvial flooding along the narrow river valleys where settlements have typically developed, and within adjacent downstream NCAs. Upstream land management practices that increase vegetation cover and sward roughness can increase the infiltration, interception and evapotranspiration of water and slow surface flows locally. There is some scope to improve flood mitigation by intercepting and retaining water for longer within key locations in river catchments. There are also opportunities for managing surface water, such as integrating sustainable urban drainage systems into development.

Cultural services (inspiration, education and wellbeing)

- **Recreation:** The NCA has significant recreational and potential health benefits. Recreation is supported by the area's extensive rights of way network, as well as open access land. The access network, including the Pennine Bridleway National Trail and the Irwell Sculpture Trail, is particularly important in allowing links from urban areas to the wider countryside. Any improvements to the access network would allow greater public participation, understanding and enjoyment of the natural environment. Given the NCA's proximity to Manchester, the countryside is heavily used for recreation, including angling, horse riding, golfing and walking. In addition, the Red Rose Community Forest and Pennine Edge Forest are in this NCA. The proximity to a large urban population gives opportunities for recreational use and tourism.

- **Sense of place/inspiration:** The backdrops of the Pennine uplands on one side of this NCA, with the Manchester Conurbation NCA on the other, create a strong sense of place, as does the area's industrial past. The sense of inspiration and escapism is constrained by urban development and industrialisation, however in some places there are extensive long-distance views from elevated vantage points across urban development in the valleys to the Pennine Moors and Manchester conurbation. This, combined with the area's industrial background (largely based on the textiles industry), gives a distinct mill-town feel. A sense of inspiration may also be derived from the strong industrial archaeology of the area. Millstone Grit building stone and red bricks give a strong sense of identity to the villages and urban areas, and are intimately associated with the landscape. Similarly, communities value their local green spaces as places of local distinctiveness that provide opportunities to engage with nature close to where they live and work, and that help to encourage a sense of community.

Recreation is supported by the area's extensive rights of way network.

- **Sense of history:** There is a wealth of industrial heritage within the NCA, reflecting the area's strong links to the textile industry during the Industrial Revolution. Aspects of the historic environment most evident to the general public are the canal network, and the many industrial buildings and large mill complexes. The connection between geology and the industrial heritage include the historical link to coal mining and the underlying Pennine Coal Measures; clay and brick making; the link with sand and gravel extraction; and the Quaternary extensive glacio-fluvial sand and gravel deposits. There are a number of registered parks and gardens, including Heaton Park (Manchester), Smithills Hall (Bolton), Alexandra Park (Oldham), Stamford Park (Stalybridge), Queen's Park (Bolton), and Queen's Park (Rochdale). These all provide opportunities for the historical interpretation of land use changes within the NCA.

- **Biodiversity:** Biodiversity Action Plan (BAP) priority habitats within the NCA are limited in extent, with isolated areas of wet woodland, lowland heathland and lowland meadows. The NCA contains the Rochdale Canal Special Area of Conservation (SAC), while less than 100 ha are nationally designated as SSSI. There are 192 local wildlife sites in the Manchester Pennine Fringe NCA, while 15 Local Nature Reserves fall fully or partly within the NCA, covering 396 ha.

- **Geodiversity:** There are four geological SSSI in this NCA. The area's geology provides a sense of place and history, as well as providing important resources for education and recreation. The history and geology can be explored in locations such as the Glodwick Lows Local Nature Reserve, where a trail passes the Lowside Brickworks SSSI, an exposure of the Upper Carboniferous Pennine Coal Measures.

Clough woodland lines the slopes of the Cheesden Valley, with views over Rochdale and the Pennines in the distance.

Statements of Environmental Opportunity

SEO 1: Manage, enhance and expand the network of green infrastructure (such as rivers, woodlands, restored industrial sites, parklands and canal routes) within the urban areas, to increase biodiversity, strengthen access and recreational use, and increase understanding of the area's rich industrial heritage, natural heritage and geodiversity.

For example by:

- Retaining and enhancing the existing open spaces, including Local Nature Reserves, parklands, woodlands, waterbodies, mill lodges, wetlands and reclaimed sites within urban areas of the Manchester Pennine Fringe, to protect the landscape character, maintain the mosaic of biodiversity habitats and provide accessible local green space.
- Promoting the creation of areas of community woodland, particularly around the edges of urban fringe areas, and especially within the Red Rose Community Forest and Pennine Edge Forest. Trees in urban areas provide multiple benefits, such as improved air and water quality, and noise reduction.
- Expanding and improving the habitat connectivity of the green infrastructure network, as well as access routes throughout and between the settlements of the Manchester Pennine Fringe.
- Enhancing recreational opportunities by maintaining and improving the rights of way network and the Pennine Bridleway long-distance routes, as well as the wider network of canal towpaths and cycle routes. Building links with the country parks, small areas of open access land, Local Nature Reserves and locally accessible green space.
- Planning for significant new green infrastructure provision in association with areas of new urban development, to expand the existing ecological networks. Strategically planning green infrastructure provides an opportunity to link potentially fragmented elements of land use into a more cohesive whole, and to provide a framework for development.
- Integrating sustainable urban drainage systems into new development, to improve infiltration and manage surface water, as well as providing habitats for wildlife.
- Conserving the industrial architecture and archaeology – particularly buildings and sites associated with the textile manufacturing industry and cotton trade, for which the area was globally renowned. This area is known for its visible industrial history, resulting in a range of structures and features such as mill buildings and lodges.
- Interpreting archaeological evidence and historic features for the wider public, to increase their understanding and enjoyment of the area.
- Ensuring that the restoration of vernacular buildings is carried out using local styles and appropriate materials.
- Encouraging innovative new uses for old and/or abandoned buildings and industrial sites, while preserving their characteristic features.
- Protecting and managing registered parks and gardens, including Heaton Park (Manchester), Smithills Hall (Bolton), Alexandra Park (Oldham), Stamford Park (Stalybridge), Queen's Park (Bolton), Queen's Park (Rochdale) and other parks, to conserve significant historic landscapes and habitats. Conserving and managing country parks as significant contributors to accessible natural green space, providing opportunities for recreation, health, education and an improved quality of life.

SEO 1: Continued

- Identifying key characteristic geological features – both within and outside designated sites – and keeping important geological exposures such as quarry faces, cuttings, outcrops and stream sections visible and, where appropriate, accessible.
- Using local stone for buildings, so that they reveal the relationship to the underlying geology.
- Conserving and managing the outstanding geodiversity interest as a valuable educational and scientific research resource. Linking geology to the use of characteristic building materials, the industrial history of the area and the influence that geodiversity has on biodiversity. Providing interpretations of geological features at appropriate locations, and identifying opportunities to enhance educational access, to increase visitors' understanding and enjoyment of the natural environment.

SEO 2: Sustainably manage and enhance the distinctive features of the Pennine fringe landscape, including the predominantly pastoral agricultural land use, the mosaic of farmland and upland fringe habitats, the clough woodland, the drystone walling and the gritstone buildings, to strengthen the landscape character, and improve habitat condition and connectivity, bringing benefits for water quality and reduced soil erosion.

For example by:

- Conserving and managing habitats and local wildlife sites, including lowland dry acid grassland, lowland meadows, lowland heathland, purple moor-grass and rush pasture, to improve the condition of the vegetation. Ensuring that land management practices in adjacent land are supporting and enhancing the biodiversity value.
- Managing the landscape to provide a mixed patchwork of habitats, including hedgerows, woodland, grassland, open fields, field margins, pasture and uncut grass, to benefit species such as brown hare.
- Encouraging the creation, restoration and expansion of a more ecologically connected mosaic of habitats (such as lowland meadows, purple moor-grass and rush pasture), in particular on the moorland fringes, to improve ecological links between habitats, and achieve a strong and resilient ecological network.
- Protecting, restoring and expanding the areas of clough woodland. Protecting and restoring ancient, semi-natural woodland and ancient, re-planted woodland (Plantations on Ancient Woodland Sites, or PAWS).
- Managing the network of farmland, including the provision of a mosaic of pasture types, to offer a range of feeding, roosting and nesting opportunities for birds, as well as variety in species richness.
- Working with the local farming community, land owners and managers to sustainably manage pastures and meadows, to improve water infiltration and slow down water run-off, as well as to ensure that water quality is protected.
- Encouraging appropriate grazing of the pastures on the moorland fringes and between urban areas to improve soil quality, reduce soil compaction by livestock and decrease the risk of soil erosion, while enhancing other services.
- Creating, managing and restoring field boundaries to enhance the landscape and ecological networks. Restoring patterns of drystone walls using local stone, showing the relationship to the underlying geology. Improving the condition of hedgerows, restoring structure and species diversity, so that they make more of a contribution to connecting habitats.
- Providing educational access, with interpretation that promotes the connections between farming, food and the landscape, and that advocate the benefits these bring for the wider public.
- Maintaining the vernacular architecture of farmsteads and field barns, while ensuring that development respects local settlement patterns. Using appropriate local building materials and styles when restoring traditional buildings and structures.
- Managing and creating linear routes and networks, such as canals, tracks and roads, to strengthen the area's biodiversity. These will enable the movement of species, and provide improved opportunities for visitors to access, engage with and enjoy contact with the natural environment.

SEO 3: Manage and continue to enhance the Manchester Pennine Fringe's characteristic watercourses, such as the fast-flowing rivers and restored canals; conserve and extend the associated riparian habitats, to strengthen their role, extend and link habitats, manage flood risk, improve water quality and reduce soil run-off, and provide opportunities for recreation.

For example by:

- Managing the area's river valleys by improving water quality, and managing and enhancing riparian vegetation, waterbodies and wetland habitats. These river corridors form an important component of the landscape, are of recreational value, and also form important links between the uplands and lowlands in terms of ecological connectivity and water management.
- Conserving and maintaining water-dependent habitats, including the designated Rochdale Canal SAC/SSSI, the Huddersfield Narrow Canal SSSI and Local Wildlife Sites, in favourable condition.
- Promoting the sustainable management of water, reducing flood flows and soil erosion (for example, by preventing sediment run-off as a result of introducing permanent grassland or woodland on steep slopes), managing pastures to improve infiltration and managing moorlands.
- Seeking opportunities to restore and expand areas of biodiversity habitat, for example introducing permanent grassland, reedbeds, wet woodlands and wet pastures along valley bottoms, to improve flood mitigation by intercepting and retaining water for longer within key locations in river catchments.
- Managing the canal network to conserve and enhance its associated habitats. The canals form part of the character of the Manchester Pennine Fringe and are of high wildlife, recreational and historic value.
- Creating and managing linear routes and networks that connect many different waterbodies and wetland habitats, especially river valleys and canals, to improve ecological connectivity. Promoting sustainable recreation and education opportunities that encourage appropriate access to – and understanding of – the importance of water to the fabric of the area, and the need for its sustainable management.

SEO 4: Manage existing woodlands and community forests, and extend broadleaved woodland cover in appropriate locations, to help mitigate the effects of climate change, improve biodiversity, reduce the impact of new development, and provide access to nature and green infrastructure links into urban areas.

For example by:

- Protecting and managing the network of woodland habitats (including the concentrated pockets of clough woodland) and associated species, to maintain and enhance biodiversity value and to improve carbon sequestration.
- Undertaking appropriate management for each woodland type to restore the diversity of the woodland structure and species.
- Identifying suitable areas into which to expand woodland habitats, linking existing fragmented areas of broadleaved woodland and clough woodland, especially on valley sides.
- Planning for new opportunities to plant woods and new areas of wood pasture, to expand existing sites. Creating short rotation coppice to enhance timber and biomass provision, increase carbon storage, manage water flow and quality, and reduce habitat fragmentation.
- Ensuring that new woodlands are designed and created in suitable locations, and include native species that are suitable for the physical location. Avoiding damage to historic features.
- Ensuring that woodlands are managed to enhance biodiversity, provide new access opportunities where appropriate, and offer interpretation and educational experiences to increase visitors' understanding and enjoyment of this environment.
- Seeking to ensure that new woodland (particularly areas of community woodland within the Red Rose Community Forest and Pennine Edge Forest) contributes to the area's recreational value, providing improved quality of life while also assimilating urban development, thus enhancing character and tranquillity. Creating an enhanced network of green spaces, trees and green routes, providing wildlife habitats and corridors.
- Seeking opportunities for small-scale biomass production through planting (on sites including small parcels of land isolated by development that are not suitable for agriculture, spoil heaps and closed landfill sites) and through small-scale wood fuel production from appropriately managed woodlands.

Supporting document 1: Key facts and data

1. Landscape and nature conservation designations

55 hectares, less than 1 per cent of the Manchester Pennines Fringe NCA lies within the Peak District National Park.

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)	Peak District Moors SPA (South Pennine Moors Phase 1)	0.5	<1
	Special Area of Conservation (SAC)	Rochdale Canal (SAC), South Pennine Moors (SAC)	22	<1
National	National Nature Reserve (NNR)	n/a	0	0
National	Site of Special Scientific Interest (SSSI)	A total of 10 sites wholly or partly within the NCA	66	<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.

In total 88 ha of the NCA are nationally designated.

There are 192 local wildlife sites in the Manchester Pennine Fringe NCA covering 2,033 ha or 5 per cent of the 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: 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

A breakdown of SSSI condition as of March 2011 is as follows:

SSSI condition category	Area (ha)	% of SSSI land in category condition
Unfavourable declining	3	5
Favourable	4	7
Unfavourable no change	14	23
Unfavourable recovering	40	65

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

Elevation ranges from 35 m above sea level to a maximum of 357 m above sea level. The average elevation of the landscape is 141 m above sea level.

Source: Natural England (2010)

2.2 Landform and process

This transitional area has a different character from the adjacent plain which it surrounds and its backcloth of the Pennine Moors. This fringe area has been carved partly from the Millstone Grit and partly from the overlying Coal Measures, all of which dip south and east off the high ground and beneath the Manchester plain. The Manchester Pennine Fringe owes much of its character to the pronounced landform with deeply incised steep valley sides and localised woodlands, and to its proximity and visual links to the adjacent Pennine moors. The broadly similar elevation range of 100m to 300 m also helps to unify the character of this fringe area. Its character is a combination of these topographic features with historic mineral extraction, industrial heritage and existing land use.

Source: Manchester Pennine Fringe Countryside Character Area description

2.3 Bedrock geology

The Manchester Pennine Fringe runs along the edge of the Millstone Grit uplands of the Southern Pennines and the Dark Peak. The area is underlain by Carboniferous Millstone Grit Group and the Pennine Coal Measures Group which broadly dip to the south-west. The Mill Stone Grit Group is dominated by thick coarse grained sandstone ('Millstone Grit') exposed to the east and north of the area, mudstones and siltstones and the Pennine Coal Measures Group by mudstones and siltstones with common thick sandstones with coal seams.

Source: Manchester Pennine Fringe Countryside Character Area description, Natural England (2010)

2.4 Superficial deposits

Extensive glacial deposits cover much of the lower ground. Glacial till, sands and gravels left by the last Devensian glaciation dominate. Fluvioglacial gravels sands and silts are also extensive resulting from meltwater flow over the area and post glacial rejuvenation of the river systems. Ice dammed lakes also occur in several places, lake deposits today underlying much of the area between Rochdale, Oldham, Manchester and Bury. Today, landslides are also present across much of the area where post glacially steepened valleys have continued to be undercut by meandering rivers and streams.

Source: Natural England (2010)

2.5 Designated geological sites

Designation	Number of Sites
Geological Site of Special Scientific Interest (SSSI)	4
Mixed Interest SSSIs	1

There is 1 Local Geological Site within the 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

2.6 Soils and Agricultural Land Classification

Most of the Grade 3 soils can be found to the south-east of Bury where there are silt and gravel deposits. The Grade 4 and 5 agricultural lands can mainly be found on sand and gravel, sandstone or mixed deposits.

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):

Agricultural Land Classification	Area (ha)	% of NCA
Grade 1	0	0
Grade 2	0	0
Grade 3	5,479	14
Grade 4	15,328	39
Grade 5	254	1
Non-agricultural	73	<1
Urban	18,161	46

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 Name	Length (km)
River Irwell	23
River Roch	20
Peak Forest Canal	15
Rochdale Canal	15
River Etherow	12
River Tame	10
Macclesfield Canal	10
River Goyt	8
River Mersey	5
Huddersfield Narrow Canal	5
Manchester Ship Canal	1

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.

The principal rivers in the northern part of the NCA are the River Irwell and its tributary the River Roch, which have their sources in the uplands of the Southern Pennines NCA. Within this NCA they drain a highly urbanised area to the north of Manchester that includes Bolton, Bury and Rochdale. The River Irwell then flows on to the Manchester Conurbation NCA where it joins the rivers Irk and Medlock at the Manchester Ship Canal.

In the south of the NCA the rivers Etherow and Goyt join to form the River Mersey. The River Tame which also flows through this part of the NCA has its confluence with the River Mersey in Manchester Conurbation NCA. The upper part of the Mersey catchment lies to the east in the Dark Peak and Southern Pennines NCAs.

The canal system, created to serve industry, has gained a reputation as a significant nature conservation resource. Several canals have developed rich and varied communities of aquatic plants and animals.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 15,904 ha, or 40 per cent of 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 http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total Woodland Cover

The NCA contains 3,699 ha of woodlands over 2 ha, 9 per cent of the total area, of which 475 ha, or 1 per cent of the total area, is ancient woodland. The Red Rose Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 14,192 ha of this NCA, or 36 per cent.

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

4.2 Distribution and size of woodland and trees in the landscape

Woodland cover is sparse overall, though there are concentrated pockets of woodland within the narrow, steep sided stream valleys. Areas of scrub are also found on steeper slopes. Evidence of a substantial wildwood covering large parts of the area can be traced back to the period following the last ice age and there are references to well-wooded river valleys from medieval times.

Source: Manchester Pennine 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	3,480	9
Coniferous	61	<1
Mixed	56	<1
Other	102	<1

Source: Forestry Commission (2011)

Area and proportion of Ancient Woodland and Planted Ancient Woodland within the NCA.

Woodland type	Area (ha)	% of NCA
Ancient semi-natural woodland	455	1
Ancient re-planted woodland (PAWS)	20	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

The lower, steeply undulating foothills are characterised by a regular pattern of fields, varying in size according to the topography. Hedgerows in lower areas give way to stone walls on higher ground. As of March 2011, the Manchester Pennine Fringe NCA had a total of 82 km of boundaries entered into Environmental Stewardship boundary options.

Source: Manchester Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

5.2 Field patterns

Fields of varying sizes are enclosed by drystone walls at higher levels and by hedgerows, predominantly of hawthorn, in the valley bottoms.

Source: Manchester Pennine 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

The farming character of this landscape is shown in the breakdown of main farm types with 116 grazing livestock holdings in Less Favoured Areas (29 per cent), 37 lowland grazing livestock holdings (9 per cent), 40 dairy holdings (10 per cent), 11 specialist poultry holdings (3 per cent), 10 mixed holdings (3 per cent) and 9 horticulture holdings (2 per cent). Farms classified as other, likely to be small holdings, are also numerous and account for 176 holdings (44 per cent). From 2000, there was a 100 per cent decrease in the number of specialist pig farms and a 50 per cent decrease in the number of specialist poultry holdings. There was also a decrease of 25 dairy farms (39 per cent fall) and a decrease of 65 lowland grazing livestock holdings (64 per cent fall). However, there was an increase of 42 grazing livestock holdings in Less Favoured Areas (57 per cent rise).

Source: Agricultural Census, DEFRA (2010)

6.2 Farm size

Farms of between 5 and 20 ha in size are the most numerous, accounting for 176 holdings (44 per cent), followed by 131 farms of between 20 and 50 ha in size which account for 32 per cent of the total number of holdings. Only 10 holdings are over 100 ha in size. Between 2000 and 2009 the main trends were a decrease in the number of holdings of between 5 and 20 ha (from 217 to 176) and a decrease in the number of holdings of less than 5 ha (from 63 to 51).

Source: Agricultural Census, DEFRA (2010)

6.3 Farm ownership

Sixty-one per cent of the total farmed area is owner occupied, accounting for 541 holders. There has been a 10 per cent decrease in the area of owned land over the 2000 to 2009 period and an 18 per cent decrease in the number of holders.

2009: Total farm area = 10,139 ha; owned land = 6,156 ha
2000: Total farm area = 10,685 ha; owned land = 6,836 ha

Source: Agricultural Census, DEFRA (2010)

6.4 Land use

The dominant land use is grass and un-cropped land accounting for 9,744 ha (96 per cent). This is followed by cereals accounting for just 77 ha (<1 per cent). Between 2000 and 2009 there was a decrease in the area of grass and un-cropped land by 426 ha, or 4 per cent. There was also a decrease in the area of cereals by 111 ha, or 59 per cent.

Source: Agricultural Census, DEFRA (2010)

6.5 Livestock numbers

Sheep are the most numerous livestock type within this landscape with a total of 16,100 animals, followed by 10,700 cattle and 1,500 pigs. Between 2000 and 2009, the number of cattle decreased by 25 per cent; sheep decreased by 11 per cent and pigs decreased by 65 per cent; there are now no specialist pig farms.

Source: Agricultural Census, DEFRA (2010)

6.6 Farm labour

The figures show that the majority of holdings are run by holders (541). Trends from 2000 to 2009 show a decrease in the number of holders from 662 to 541, an increase in the number of salaried managers from 7 to 14, a decrease in full time worker, part time workers and a slight increase in the number of casual/gang workers.

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

Ridges and steep sided valleys with fast flowing rivers are a prominent feature of the area. Grassland of varying quality, with some small hedgerows and walls, occurs on the steep foothills. Locally restricted hay meadow species include great burnet (*Sanguisorba officinalis*) and ragged robin (*Lychnis flos-cuculi*). Although woodland cover is generally quite sparse, there are concentrated pockets confined to narrow steep-sided stream valleys which cut into the smoothly undulating, upland, pastoral landscape. The drier soils sometimes support oak and birch woods while the wetter, lower parts have woodland dominated by ash and alder. The rivers provide habitat for birds such as dipper and other wildlife.

Source: Urban Mersey Basin Natural Area Profile

7.2 Biodiversity Action Plan (BAP) 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; 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.

UK BAP Priority Habitat	Area 9ha)	% of NCA
Broadleaved mixed and yew wood-land (Broad habitat)	1,768	5
Upland heathland	3	<1
Lowland dry acid grassland	133	<1
Lowland meadows	125	<1
Lowland heathland	110	<1
Coastal and flood plain grazing marsh	69	<1
Purple moor-grass and rush pasture	59	<1

Source: Natural England (2011)

7.3 Key species and assemblages of species

- Maps showing locations of UK BAP Priority Habitats are available at: http://magic.defra.gov.uk/website/magic/ – select 'Habitat Inventories'
- Maps showing locations of S41 species are available at: http://data.nbn.org.uk/

8. Settlement and development patterns

8.1 Settlement pattern

Urban areas tend to be located in the valley bottoms and around the foot of the escarpments, generally linked with 19th and 20th century industrialisation.

The recent development and expansion of large conurbations, particularly the development of housing estates with conspicuous high rise blocks, has tended to obscure the evidence that they were originally a series of upland settlements. The presence of large, sprawling industrial conurbations has a pronounced effect on many of the landscapes surrounding them with dense settlement patterns and well-used transport routes mainly roads, railways and canals.

Source: Manchester Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

The main settlements within the Manchester Pennine Fringe NCA are: Bolton, Oldham, Rochdale, Bury, Dukinfield and Glossop. The total estimated population for this NCA, derived from ONS 2001 census data, is: 882,616.

Source: Manchester Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular & building materials

Millstone Grit sandstone is often used for farmsteads, barns and walling in the Pennine areas. Local use of gritstone for the architecture of towns and villages is also common. More recent 20th and 21st century development has used a variety of building materials which has consequently reduced the clear visible link between buildings and underlying geology.

Source: Manchester Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

Traditional buildings such as farmsteads and the cores of older settlements are constructed in characteristic Pennine stone. Stone walls and winding lanes combine with these buildings to give many parts of the area a consistent, upland feel.

While there are prehistoric and medieval landscape elements – barrows and field systems – it is 18th and 19th century industrialisation that has had the most significant influence on this landscape.

A number of Roman roads crossed the area linking Manchester with Ribchester in the Lancashire Valleys as well as Castleshaw and Ilkley in the Southern Pennines.

Fields were enclosed, by private treaty, in the early post-medieval period.

References to textile manufacture in this area have been found in manuscripts as early as the late 13th century. By the early 19th century cotton had almost entirely replaced wool and linen in Lancashire mills.

The growth in the textile industry and a big increase in population resulted in a concentration of people in the industrial centres in the lower, wider valleys.

Ruins of isolated farms and cottages on the hillsides and abandoned sites of water driven mills in small Pennine valleys provide evidence of the earlier small scale agricultural and industrial activity in the area.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 15 Registered Parks and Gardens covering 238 ha
- 0 Registered Battlefield/s covering 0 ha
- 12 Scheduled Monuments
- 1,314 Listed Buildings

Source: Natural England (2010)

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, 1,647 ha, is classified as being publically accessible. There are also several parks and gardens in the area including Heaton Park, Smithills Hall and gardens, Alexandra Park, Queen's Park and Stamford Park.
- There are 1,030 km of public rights of way at a density of 2.6 km per km2.
- There is 1 National Trail (the Pennine Bridleway) that falls within the NCA covering 14 km.

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)	0	0
Common Land	2	<1
Country Parks	437	1
CROW Access Land (Section 4 and 16)	214	<1
CROW Section 15	6	<1
Village Greens	22	<1
Doorstep Greens	2	<1
Forestry Commission Walkers Welcome Grants	559	1
Local Nature Reserves (LNR)	396	1
Millennium Greens	3	<1
Accessible National Nature Reserves (NNR)	0	0
Agri-environment Scheme Access	0	0
Woods for People	957	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) the NCA is least tranquil around Barnstaple Bay particularly in the neighbourhood of Bideford and alongside the A roads to Bude, Launceston and Okehampton. The greatest areas of tranquillity can be found along the heritage coast at Hartland Point, the adjacent inland region and to the east of Launceston.

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

Tranquillity	Tranquillity Score
Highest Value within NCA	2
Lowest Value within NCA	-117
Mean Value within NCA	-52

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 results are similar to the tranquillity scores with the undisturbed areas in the parklands and woodlands. A breakdown of intrusion values for this NCA are detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	66	65	51	-15
Undisturbed	1	2	0	-1
Urban	33	33	49	16

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are a 16 per cent increase in urban intrusion.

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 Inventory of Woodland & Trees, Forestry Commission (2003)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- BAP 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)Detailed River Network, Environment Agency (2008)

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 and trends

Trees and woodlands

- The NCA contains 3,699 ha of woodlands, which is 9 per cent of the total area, though woodland tends to be concentrated in pockets within the narrow, steep-sided stream and river valleys. In recent years new community woodland has been created in the urban areas.

- Between 1999 and 2003 an area equivalent to 2 per cent of the 1999 total stock was approved for new planting under a Woodland Grant Scheme agreement (36 ha). Much of the new planting is in the Community Forest area.

- The proportion of established, eligible National Inventory of Woodland and Trees woodland stock covered by a Woodland Grant Scheme management agreement went up from 4 per cent to 14 per cent between 1999 and 2003.

- About 25 per cent of the woodland cover is ancient woodland. The proportion of these sites covered by a Woodland Grant Scheme agreement changed between 1999 and 2003 from 6 per cent to 25 per cent.

Boundary features

- The estimated length of boundaries within this NCA is about 1,466 km. The total length of Countryside Stewardship agreements for linear features between 1999 and 2003 was equivalent to only around 1 per cent of this total.

Stone wall boundaries in the Manchester Pennine Fringe.

- Between 1999 and 2003 Countryside Stewardship capital agreements for linear features included fencing (7 km), hedge management (3 km), hedge planting and restoration (4 km), restored boundary protection (2 km) and stone wall restoration (2 km).

- The Manchester Pennine Fringe NCA has a total of 82 km (March 2011) of boundaries entered into Environmental Stewardship boundary options.

- There has been boundary loss and fragmentation around urban fringes, and loss of more traditional land management to horsiculture.

- Walls are generally poorly maintained, with boundaries becoming fenced where fences are a cheaper and safer alternative for stock management.

Agriculture

- Agriculture is dominated by grass and uncropped land, but there was a 4 per cent decline in this land use between 2000 and 2009.
- There was a substantial reduction in the number of specialist pig and poultry holdings, as well as a large reduction in the number of dairy holdings between 2000 and 2009.
- There was a reduction in the livestock numbers of sheep, cattle and pigs on commercial holdings between 2000 and 2009. Numbers of cattle reduced by 25 per cent, numbers of sheep reduced by 11 per cent and numbers of pigs reduced by 64 per cent.
- From 2000 to 2009 there was a decline in all farm types apart from a marked expansion in numbers of 'other' and 'small' farm holdings. The latter groups account for the majority of holdings covered by the census.

Settlement and development

- The rate of change to urban is high, although 43 per cent of area is within a greenbelt (as shown in the Countryside Quality Counts data).
- Much of the area has high recreational use from adjacent urban areas and there is evidence of the diversification of farming into a range of urban related uses.
- Almost all of the NCA is within the peri-urban fringe of Manchester and therefore heavily influenced by this city and other neighbouring large settlements.

Heaton Park is a popular location for recreation. Much of the area has high recreational use from adjacent urban areas.

Semi-natural habitat

- There has been drainage of rushy meadows and a reduction in the number of herb-rich hay meadows. The most extensive annual Countryside Stewardship agreements in 2003 were for upland hay meadows (47 ha) and lowland pastures on neutral/acid soils (31 ha).
- Up to 2003, Countryside Stewardship uptake for annual area features was consistently below the national average.
- 44 ha of SSSI is in favourable or unfavourable recovering condition. 14 ha of SSSI is in unfavourable no-change, whilst 3 ha is in unfavourable declining condition.

Historic features

- In 1918 about 1 per cent of the NCA was historic parkland. In terms of its share of the resource the NCA was ranked 127. By 1995 it is estimated that 52 per cent of the 1918 area had been lost. About 48 per cent of the remaining parkland is covered by a Historic Parkland Grants.

- About 67 per cent of historic farm buildings remain unconverted. About 73 per cent are intact structurally.

Rivers

- From 2011 pilot projects were established aimed at exploring ways to achieve more for the environment under the Water Framework Directive. The Irwell was selected as one of these pilots, aiming to improve the quality of water environments, and includes the river catchments of the Irwell and Roch. Diffuse urban pollution (dirty water coming from roads, badly connected sewers and old landfills) and physical modifications to rivers (such as weirs, culverts and artificial river banks) are preventing water environments in the Irwell pilot area achieving legally required standards. The pilot is working collaboratively to find solutions that can deliver environmental, social and economic benefits.

Minerals

- There are strong associations with mineral extraction in this area, including coal and ironstone mining and sandstone quarrying.

- Crushed rock is obtained from older sandstone and gritstone deposits laid down during the Carboniferous Period and which are found in the north and east of Greater Manchester. Deposits of Carboniferous Millstone Grit (sandstone) are located to the north and east of the area. These are currently being worked at Harwood Quarry.

- Deposits of sand and gravel occupy areas associated with modern day river systems such as the River Irwell. Glaciofluvial sand and gravel is currently worked at Pilsworth, Bury. There is limited potential for future extraction due to the extent of urban areas.

- Within the Pennine Coal Measures Formation, one active brickclay quarry remains at Harwood in Bolton.

Drivers of change

Climate change

- The North West Landscape Framework Climate Change Assessment 2010/11 briefly covers the urban fringe landscapes of Greater Manchester. Urban areas are identified as having a higher vulnerability for the natural environment to climate change due to their lack of habitats and for generally being located on the flattest areas of land. The fragmented nature of the habitats in this area restricts species movement and ecosystem functionality. Urban suburbs with extensive gardens can act as a substitute in some areas for shade and pollination sources.

- This area on the periphery of the Manchester Conurbation NCA has been rated as having a medium to low climate change vulnerability, but with localised hot spots at key locations for example close to rivers.

- Climate trends suggesting increased rainfall, periods of summer drought and more frequent storm events.

- Changes in gleyed soils will have the largest impacts across the widest area, with high level of uncertainty on how this will affect sites within the area. Climate change could lead to greater slope instability and landslides. Changes to waterbodies and habitats will be localised and probably variable particularly on the previously mined areas.

- Wetter winters and dryer summers would change soil moisture and soil water-logging at different times of year. Gleyed soils created by water-logging could alter vegetation types. Water bodies would also be affected by seasonal alterations.

- Change in climate could increase risk to native species, such as trees, from pests and diseases.

- As the urban heat island affect becomes more pronounced, with higher summer temperatures, pressure to live and work in the cooler urban fringe location may increase.

- Due to the warming climate, species movement from south to north and from low to high altitudes is likely. Key routes will be along rivers, canals, and other green corridors.

Other key drivers

- There is development pressure usually associated with the redevelopment of old industrial sites, which is not always in keeping with character. This is affecting all parts of the NCA, if only through views in and out. However, restoration of sites affected by the industrial past may provide opportunities to enhance biodiversity and the landscape, whilst ensuring that the legacy of the industrial heritage remains legible within the landscape.

- The recreational demands for walking, cycling and horse riding in the urban fringe needs to be sensitively managed to avoid erosion and potential damage to archaeological sites, loss of habitats, and diminished visitor experience, whilst balancing the positive benefits of increasing opportunities for visitors to reconnect with nature. The close proximity to large populations provides opportunities for sustainable recreation and tourism.

- There are continuing pressures associated with the expansion of urban areas, such as housing and road development, with the need to balance the conservation of environmental resources with encouraging wider access, engagement and enjoyment, which may also help promote a local green economy.

- There are continuing pressures associated with providing renewable energy.

- Green infrastructure approaches to the integration of built and undeveloped land uses provide an opportunity to link potentially fragmented elements of land use into a more cohesive whole and to provide a framework for development. These approaches provide multiple benefits including reconnecting fragmented habitats, increasing resilience and improving water quality, managing flood risk, improving air quality and quality of life.

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis shows the projected impact of Statement of Environmental Opportunity on service provision:

Statement of Environmental Opportunity	Ecosystem Service: Food Provision	Timber Provision	Biomass	Water Availability	Genetic Diversity	Regulating Climate Change	Regultating soil erosion	Regulating soil quality	Regulating Water Quality	Regulating water flow	Pollination	Pest Regulation	Regulating Coastal Erosion	Sense of place / inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: Manage, enhance and expand the network of green infrastructure (such as rivers, woodlands, restored industrial sites, parklands and canal routes) within the urban areas, to increase biodiversity, strengthen access and recreational use, and increase understanding of the area's rich industrial heritage, natural heritage and geodiversity.	↔ **	↗ *	↗ *	↔ **	n/a	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	n/a	↗ ***	↗ **	↗ ***	↑ ***	↑ ***	↗ ***
SEO 2: Sustainably manage and enhance the distinctive features of the Pennine fringe landscape, including the predominantly pastoral agricultural land use, the mosaic of farmland and upland fringe habitats, the clough woodland, the drystone walling and the gritstone buildings, to strengthen the landscape character, and improve habitat condition and connectivity, bringing benefits for water quality and reduced soil erosion.	↔ *	↔ *	↔ *	↗ **	n/a	↗ **	↗ ***	↗ ***	↗ ***	↗ ***	↗ ***	↗ **	n/a	↗ **	↗ **	↗ **	↗ **	↑ ***	↗ **
SEO 3: Manage and continue to enhance Manchester Pennine Fringe's characteristic watercourses, such as the fast-flowing rivers and restored canals; conserve and extend the associated riparian habitats, to strengthen their role, extend and link habitats, manage flood risk, improve water quality and reduce soil run-off, and provide opportunities for recreation.	↔ **	↔ ***	↔ ***	↗ **	n/a	↔ **	↗ **	↗ **	↗ ***	↗ ***	↔ *	↔ *	n/a	↗ **	↔ **	↗ **	↗ ***	↑ ***	↔ **
SEO 4. Manage existing woodlands and community forests, and extend broadleaved woodland cover in appropriate locations, to to help mitigate the effects of climate change ,, improve biodiversity, reduce the impact of new development, and provide access to nature and green infrastructure links into urban areas.	↔ **	↗ **	↗ **	↔ *	n/a	↗ **	↗ **	↗ **	↗ *	↔ *	↔ *	↔ *	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 attributes

Landscape attribute	Justification for selection
Transitional zone between wild open moorlands and densely populated urban areas.	■ Much of the countryside is influenced by heavy recreational use from adjacent urban areas and the diversification of farmland into uses such as haulage and riding schools. ■ The marginal farmland, neglect of some of the landscape features and proximity of urban development all contribute to the areas distinct urban fringe character. ■ 46 per cent of the NCA is urban.
Landform is a transition from upland to lowland, with smooth shoulders of land divided by steep-sided valleys with fast flowing rivers.	■ The Manchester Pennine Fringe has pronounced smooth shoulders of land deeply incised by valley with steep sides. ■ The elevation of the area generally lies between 100 m and 300 m, between the lower plains and higher Pennine moors. ■ The higher moorland provides extensive views across to the adjacent Manchester Conurbation NCA and Lancashire Coal Measures NCA in the south and west. ■ The wooded valleys are an important habitat and there are notable networks of woodlands along river corridors.
Elevated vantage points providing extensive views across adjacent Manchester Conurbation NCA.	■ Senses of inspiration and escapism are constrained by urban development and industrialisation, however, in places there are extensive long distance views from elevated vantage points across urban development in the valleys to the Pennine Moors.
Several rivers flow through the area from the Pennine uplands linking with adjacent lowland areas.	■ The rivers of the Manchester Pennine Fringe form part of the rich, industrial heritage, providing early water power and water to process the textiles. ■ Six major rivers run through the NCA, as well as a number of adjoining tributaries, providing water for both domestic and industrial use in Manchester and the many other large settlements.

Landscape attribute	Justification for selection
Woodland cover is characterised by a range of woodland types concentrated along river valleys, as well as some newer community woodlands in urban areas.	■ There is 9 per cent woodland cover, largely confined to the steep sides of the valleys, making this a distinctive feature of this NCA. The wooded cloughs are important habitats in this area. In recent years new community woodland has been created in the urban areas. ■ About 455 ha of the woodland cover in this NCA is ancient woodland. ■ Gale Clough and Shooterslee Wood SSSI is the best example of an ancient semi-natural clough woodland on acid soils in Greater Manchester. ■ Compstall Nature Reserve SSSI also has one of the best examples of clough woodland in Greater Manchester and an important site for breeding birds. ■ The Red Rose Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 14,192 ha of this NCA (36 per cent). ■ The Pennine Edge Forest is a woodland and environmental initiative for the east of Greater Manchester conurbation.
Field boundaries include dry 'gritstone' walls at higher elevations and hedgerows at lower elevations.	■ The strong field pattern and boundary types contribute to the cultural history formed as a result of historic land uses. ■ The local gritstone used in this area is a distinctive feature of the Pennine fringe and creates a clear link with the underlying geology. ■ Field boundaries comprise hedges at lower elevations towards the urban conurbations.
Limited semi-natural habitats include broadleaved mixed and yew woodland, lowland dry acid grassland, lowland meadows, lowland heathland, and purple moor-grass and rush pasture, often fragmented.	■ In the river corridors pockets of clough woodland remain in the narrow steep sided valley, whilst the higher and more exposed slopes to the north and west of the area form the transition to the open Pennine Moorland. ■ In the upland fringes where improvement has been less worthwhile, a few meadows are still managed traditionally. ■ Past industrial activities in the Manchester Pennine Fringe have left a variety of sites that are now valued for their biodiversity such as quarries, mill lodges, reservoirs, canals and spoil heaps. ■ There are 192 local sites covering 2,033 ha, which is approximately 5 per cent of the NCA.

Landscape attribute	Justification for selection
Extensive evidence of 18th and 19th century stone and brick-built industrial buildings, including mill lodges and reservoirs originating from the woollen and cotton industry.	■ Manchester and the surrounding towns owe their size and importance largely to the development of the cotton trade in the Pennine Fringe, but also to coal mining and engineering and to the communications which radiate from it. ■ There is strong visual unity with the use of local sandstones and gritstone for building material in the town centres, villages and farmsteads.
Historic trans-Pennine communication routes, especially railways and canals.	■ Well-used routes act as important travel trajectories across the Pennines and between urban conurbations. ■ A large number of busy A-roads and motorways cut through this NCA, connecting the towns of Bolton, Bury, Rochdale, Oldham and Dukinfield and bypassing the city of Manchester. ■ Canals form part of the rich, industrial heritage of the Manchester Pennine Fringe. 5 canals run through the area, covering 47 km. ■ The canals and railways are historically important, enabling the passage of goods to and from the port of Liverpool, and thus facilitating the rapid period of industrialisation, especially the textile industry.
Much of the countryside is influenced by recreational use from adjacent urban areas and the diversification of farmland, giving the area a distinct urban fringe character.	■ The demand for recreation within the Manchester Pennine Fringe is high, relating to the closeness of the Manchester Conurbation. ■ Much of the area has high recreational use and there is evidence of the diversification of farming into a range of urban related uses. ■ There are many Local Nature Reserves and country parks.
Rich industrial heritage and historic parks.	■ There are 15 registered parks and gardens in the area including Heaton Park (Manchester), Smithills Hall (Bolton), Alexandra Park (Oldham), Stamford Park (Stalybridge), Queen's Park (Bolton) and Queen's Park (Rochdale). ■ There are 12 scheduled monuments and 1,314 listed buildings. ■ These provide access to the history, architecture and habitats for the nearby urban populations, as well as recreation.

Landscape opportunities

- Protect and manage the network of woodland habitats and associated species to maintain and enhance biodiversity value. The concentrated pockets of clough woodlands are important habitats which should be conserved and enhanced.
- Plan to extend woodland planting in appropriate locations particularly where opportunities exist to expand or link existing woodland areas.
- Ensure that new woodlands are located to enhance the local landscape character in terms of scale, type and location. There is scope for woodland creation on some slopes, but this needs to avoid impacting on other sites of biodiversity value or features of historic interest.
- Protect, manage and connect the existing network of local wildlife sites, farmland, woods, open space and water bodies within the Manchester Pennine Fringe to protect the underlying landscape character, maintain the mosaic of biodiversity habitats, and provide accessible local green space.
- Manage and restore areas of lowland dry acid grassland, lowland meadows and purple moor-grass and rush pasture. Provide a mosaic of pasture types to provide a range of feeding, roosting and nesting opportunities for birds, as well as variety in species richness.
- Manage the river valleys and the canal network to conserve and enhance their riparian habitats. These habitats form an important component of the landscape character which is of high wildlife and recreational value. The rivers are important links between the uplands and lowlands in terms of ecological connectivity and water management.
- Manage the field boundary patterns across the NCA. There are opportunities to restore patterns of dry stone walls and strengthen the network of hedgerows to enhance the landscape and ecological networks. Manage and restore the urban fringe farmland structure including stone walls, hedges and hedgerow trees.
- Maintain the vernacular architecture of farmsteads and field barns whilst ensuring that development respects local settlement patterns. Use appropriate local building materials and styles in restoring traditional buildings and structures.
- Manage development within the built environment and encourage the sensitive restoration of existing buildings to maintain historic features.
- Conserve and promote the area's industrial heritage and cultural history, and provide opportunities to interpret this legacy for the understanding and enjoyment for all, whilst also restoring the landscape associated with it.
- Plan for significant new green infrastructure provision within, and in association with, areas of new urban development to expand and connect the existing ecological networks.
- Manage the geological heritage of the area, including geological exposures and sites. Enhance their value for interpretation, education and visual amenity.
- Protect and manage historic parks and urban parks, including Heaton Park (Manchester), Smithills Hall (Bolton), Alexandra Park (Oldham), Stamford Park (Stalybridge), Queen's Park (Bolton) and Queen's Park (Rochdale), so as to maintain significant historic landscapes and to conserve important archaeological features and habitats.

- The close proximity to urban areas creates opportunities for recreation, environmental education and access.

- Manage the access network of rights of ways, cycle routes, towpaths and plan new links, particularly within urban areas and between the urban areas and the wider countryside. There are many opportunities to use the network of paths to gain access to, reveal and interpret the area's history, especially historic features such as boundary stones, tracks, farms, canals, mills and reservoirs.

- Improve access by ensuring that paths are maintained and well signposted, and that some surfaced paths are provided for use by all levels of ability and interest at key locations, including the Pennine Bridleway. This will encourage greater public access, an enhanced visitor experience, an understanding of the local environment and improvements to visitors' health and wellbeing.

New community woodland planting in the Red Rose Forest.

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 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 rearing	There are approximately 21, 000 ha of agricultural land in the Manchester Pennine Fringe NCA. 39% is classed as Grade 4 agricultural land and 14% is Grade 3. Most of the Grade 3 soils can be found to the south-east of Bury where there are silt and gravel deposits. Stock rearing is the predominant agricultural activity, with sheep the most numerous, followed by cattle. There is little opportunity for arable crops due topography and slopes, and the majority of the land is Agricultural Grade 4 (poor quality). Soils tend to be limited by wetness due to slowly permeable layers and sometimes dense or clay subsoils.	Local	Food production is an important service to the area, however, much of the area has high recreational use from adjacent urban areas and there is evidence of the diversification of farming into a range of urban related uses. From 2000 to 2009 there was a decline in all farm types apart from a marked expansion in numbers of 'other' and 'small' farm holdings. The latter groups account for the majority of holdings covered by the Agricultural Census, Defra (2010). Appropriate grazing levels and a robust cover of vegetation can reduce soil erosion and run-off, enhancing a range of other services.	There is an opportunity to improve long term viability of agriculture by ensuring agriculture is managed sustainability. Work with the local farming community to consider how livestock rearing can be managed sustainably to produce food whilst enhancing other services. The extensive urban populations nearby could provide a market for quality local produce.	**Biodiversity** **Regulating water quality** **Water availability** **Regulation water flow** **Regulating soil quality** **Regulating soil erosion** **Sense of place** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Existing woodland	There is 9% woodland cover in this NCA and much of this is broadleaved and situated on steep valley sides or community woodland, so there is limited timber production, other than for local use. Only approximately 61 ha covered by coniferous or felled/prepared for planting land use.	Local	Woodland on steep valley sides or in cloughs is not likely to be viable to manage for timber provision. With much of the land used for livestock rearing and recreational interests, as well as much urban land and development pressure, there are limited places for woodland creation. There is only a limited forestry industry in the area. There are some opportunities for small scale timber and woodfuel production for local use.	There is scope for woodland creation in some areas, but this needs to avoid impacting on sites of biodiversity value. Also the need to ensure that new woodlands are located and designed to enhance the local landscape character in terms of scale, type and location and avoid impacting on features of historic interest. Seek to ensure new woodland contributes to recreational value and screen urban fringes to enhance rural character and tranquillity where appropriate.	**Regulating soil erosion** **Regulating water quality** **Climate regulation** **Sense of place**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Existing woodland cover	Woodlands cover 9% of the area (3,699 ha), and tend to be located within steep-sided valleys or community woodlands.	Local	In this heavily urbanised NCA the existing woodland cover offers limited potential for the provision of biomass, either through bringing unmanaged woodland under management or as a by-product of commercial timber production. Any biomass should be sited in locations which do not negatively impact food provision. Increased provision of SRC and miscanthus as a source of renewable energy could contribute to climate regulation, but could also decrease provision of food if grown on farmland. Significant expansion could also affect the sense of place if short rotation coppice and miscanthus become a major component of the landscape. There may be degraded parcels of land that are not suitable for agriculture such as spoil heaps and closed landfill sites, which would be suitable for planting. www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/default.aspx	There is an opportunity for small-scale biomass production through planting on sites including small parcels of land isolated by development that are not suitable for agriculture, spoil heaps and closed landfill sites. There may be opportunities for small-scale woodfuel production from appropriately managed community woodlands.	**Biomass energy** **Climate regulation** **Sense of place** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Surface water resources (rivers Irwell, Roch, Tame, Etherow and Goyt) High levels of precipitation in this NCA and on the upland adjacent NCAs which drain through this area	The majority of the water abstraction in the Northern Manchester CAMS (catchment management abstraction strategies) area (covering the rivers Irwell and Roch within this NCA) is used for industrial purposes, such as chemical, construction, metals and mineral, mining, leather and textiles, with abstraction for public water supply also significant. Both the Irwell and Roch within this NCA have 'water available'.[4] The Tame, Goyt and Etherow CAMS area has a large number of reservoirs in the upper catchment (in the adjacent Dark Peak and Southern Pennines NCAs), such as the Longdendale Reservoir Complex at the head of the River Etherow, providing public water supply, which is the dominant use of abstracted water in this area, with industrial use also significant. All of the catchment that falls within the NCA has 'water available' with the exception of a tributary of the River Etherow at Glossop which has 'no water available'.[5]	Regional	Abstracted water is used for industrial purposes and for public water supply. Water is also needed to supply the canals; the Huddersfield Narrow Canal, the Macclesfield Canal, the Rochdale Canal and the Macclesfield Canal all pass through the NCA. Land management practices are key to improving infiltration and storing surface water in the agricultural landscapes is important to minimise compaction and/or capping risk on wet soils, which can arise from over-grazing, trafficking or other mechanised activities. These will tend to exacerbate run-off problems as well as damaging soil structure. The slowly permeable seasonally wet acid loamy and clayey soils may suffer compaction and/or capping as they are easily damaged when wet. In turn this may lead to increasingly poor water infiltration and diffuse pollution as a result of surface water run-off. Management measures can help reduce these problems. **Continued over...**	There are opportunities to ensure that riparian habitats and other semi natural habitats are under positive management to reduce soil erosion run-off into the rivers, increase holding capacity and aid water infiltration. There are opportunities to develop sustainable urban drainage systems (SUDS) in new development to improve infiltration and manage surface water. There are opportunities to work with land owners and managers to sustainably manage pastures to improve water infiltration and slow down water run-off, as well as ensure water quality is protected. There are opportunities to ensure peat habitats in the adjacent Pennine uplands (in the adjacent NCAs), and those habitats buffering the peat, are managed in favourable condition to improve infiltration and increase ability to store water.	**Regulating water quality** **Regulating water flow** **Sense of place** **Biodiversity** **Regulating soil erosion**

[4] The Northern Manchester Catchment Abstraction Management Strategy, Environment Agency (2007) (accessed January 2013; URL: www.environment-agency.gov.uk/business/topics/water/119927.aspx)

[5] The Tame, Goyt and Etherow Catchment Abstraction Management Strategy, Environment Agency (2004) (accessed January 2013; URL: www.environment-agency.gov.uk/business/topics/water/119927.aspx)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability continued				The freely draining soils allow water infiltration. They may be valuable for groundwater recharge requiring the maintenance of good structural conditions to aid water infiltration and to prevent pollution of the underlying groundwater. The use of sustainable urban drainage is important to increase infiltration in urban areas. There are pockets of upland soils with a peaty surface in this NCA, although these are limited in extent. Adjacent upland NCAs have high levels of precipitation accompanied by extensive peat soils. Land management practices in adjacent (upland) NCAs can influence water availability in this NCA. Appropriate management upstream can benefit water quality within this NCA and downstream.		
Genetic diversity		Not applicable in this NCA				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Existing woodlands Soils Permanent pasture	Soil carbon levels are generally low to moderate (0-10%), reflecting the 90% coverage of the NCA by mineral soils that can be low in organic matter. A few pockets of higher soil carbon content (20-50%) also occur, notably in the south-east adjacent to the Dark Peak NCA. These are associated with the wet, very acid sandy and loamy soils (2%), very acid loamy upland soils with a wet peaty surface (1%), slowly permeable wet very acid upland soils with a peaty surface (3%), and loamy and clayey floodplain soils with naturally high groundwater (2%), all of which can provide a store of carbon. Existing woodland performs a role in the sequestration and storage of carbon, with woodland cover of 9% of the area. Permanent pasture, found throughout much of the area, provides improved soil carbon storage capacity.	Regional	The pockets of carbon-rich soils are very important to conserve. To maximise the benefits for climate regulation, bare and eroded areas need to be re-vegetated and any activities which may damage these areas should be restricted (planting trees, creation of tracks, soil compaction). The humus-rich soils under woodlands are likely to provide a store of carbon, while carbon sequestration can be increased in the area's mineral soils by increasing organic matter inputs. Carbon storage is also provided by the woodlands themselves (9% of NCA), especially where brought under management. It is important to ensure that the existing woodlands are in good management so that their role in sequestering and storing carbon is enhanced. The area of woodland cover could be expanded where appropriate. Agricultural management options can maintain soil and vegetation carbon stocks or reduce their losses. Options which do not involve disturbing the soil have been shown to be best in terms of conserving carbon stocks, particularly organic soils.	There are opportunities to encourage extensive grazing and low fertiliser input management of permanent grassland. On soils low in organic matter, measures could be taken to improve carbon sequestration by increasing organic matter inputs and by reducing the frequency / extent of cultivation. There may be opportunities to create new woodland in suitable locations, using native broadleaved species, where there no adverse impacts on other environmental aspects. Encourage the maintenance of permanent pasture to increase soil carbon storage and subsequent improvement in soil quality.	**Regulating soil quality** **Regulating soil erosion** **Biodiversity** **Regulating water quality** **Water availability**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Semi-natural vegetation cover Woodland Hedgerows Permanent pasture	The soils that cover 61% of this NCA, such as the slowly permeable, seasonally wet acid loamy and clayey soils, are not susceptible to erosion. Of the remaining soils, the freely draining slightly acid loamy soils (14%) and the freely draining slightly acid sandy soils (17%) are prone to erosion, especially where vegetation is removed or where organic matter levels are low after continuous cultivation. The naturally wet very acid sandy and loamy soils (2%) can also be prone to erosion if heavily trafficked or after heavy rain. All of these soil types are light and at risk of wind erosion, especially where coarse textured (freely draining slightly acid loamy soils), cultivated or left bare. The slowly permeable wet very acid upland soils with a peaty surface (3%) often found on the plateau tops are at risk of gullying/hagging (and loss of particulate organic matter) where surface vegetation is damaged or lost.	Regional	Risks arise with loamy and sandy soils, often on steep slopes, which are vulnerable to erosion if heavily trafficked or after heavy rain. Improving organic matter content and vegetative cover on these soils is important. The many steep watercourses result in high levels of run-off, especially after heavy rainfall, with consequent impacts of soil erosion and increased sediment load impacting on areas downstream. There are also risks of poaching and compaction on soils with impeded drainage. There are pockets of upland soils with a peaty surface, although these are limited in extent. Issues include ensuring that these peaty soils retain water in situ, have good vegetative cover and are not overgrazed, subject to trampling/ poaching or damage by mechanised activities. Drainage of these soils (for example through gripping) may also result in increased oxidation of carbon and soil wastage.	There are opportunities to manage pastures in ways that build up organic matter and avoid compaction, for instance by reducing grazing pressures, thus slowing down run-off. There are opportunities to manage permanent grassland and woodland along cloughs, steep valley sides and near watercourses to prevent or capture sediment run-off and improve infiltration. Manage and increase riparian habitats to reduce soil erosion rates and capture migrating soils before entering into the streams. Restoration of 'gappy' hedgerows and dry stone walls in poor condition to act as wind breaks and bind the soil. There are some opportunities to protect peaty soils and to restore bare and eroded peat, and to manage the moorlands to ensure good vegetative cover, including slowing down run-off by blocking grips.	**Regulating water quality** **Regulating soil quality** **Biodiversity** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soils Woodlands and hedgerows Permanent pasture	There are 8 main soil scape types in this NCA: Slowly permeable seasonally wet acid loamy and clayey soils, covering 56% of the NCA; freely draining slightly acid sandy soils (17%); Freely draining slightly acid loamy soils (14%); Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (3%); Slowly permeable wet very acid upland soils with a peaty surface (3%); Loamy and clayey floodplain soils with naturally high groundwater (2%); Naturally wet very acid sandy and loamy soils (2%); and very acid loamy upland soils with a wet peaty surface (1%). The slowly permeable seasonally wet acid loamy and clayey soils are easily damaged when wet or after heavy rain and may suffer compaction leading to reduced infiltration which will tend to cause/exacerbate run-off problems. There is a risk of diffuse pollution and flooding due to poor water infiltration. The freely draining slightly acid sandy soils and freely draining slightly acid loamy soils may have potential for increasing organic matter levels by management interventions. This will also help to minimise erosion risk.	Regional	It is important to minimise compaction and/or capping risk on wet soils, which can arise from over-grazing, trafficking or other mechanised activities. These will tend to exacerbate run-off problems as well as damaging soil structure. These soils may have limited potential for increasing organic matter levels by management interventions. The freely draining soils allow water infiltration and also have potential for increased organic matter levels through management interventions. They may be valuable for groundwater recharge requiring the maintenance of good structural conditions to aid water infiltration and requiring the matching of nutrients to needs to prevent pollution of the underlying groundwater. Take measures to keep soil in situ eg improve soil structural condition and water infiltration (for example by addition of soil organic matter where low, ensure good vegetative cover – avoid over grazing/ trampling or damage by mechanised activities).	Although half the NCA is urban, there are opportunities to ensure that the management of the pastures and meadows on the moorland fringes and between urban areas will encourage the build up of organic matter, through for instance extensive grazing regimes, which will also reduce the level of poaching/ compaction by livestock. Opportunities to continue sustainable land management, manage stocking rates and machinery operations on more vulnerable soils, and gradually increase organic matter content. The permanent pasture, woodland in the cloughs and soil binding hedgerows contribute positively to protecting soil quality so continued sustainable management of these features is an opportunity.	**Regulating soil erosion** **Regulating water quality** **Biodiversity** **Food provision**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Many fast flowing streams and rivers Areas of semi-natural habitats including moorland, rough grazing and woodland Permanent pasture High rainfall	The ecological quality of rivers and canals is moderate across most of the NCA. The chemical status of surface waters is generally good or not assessed whilst that of groundwater is poor.[6] The rich industrial past has left a legacy of poor water quality. There has been progress in cleaning up many of the problems of the water environment. However, a range of challenges remain including diffuse pollution from agricultural activities, point source pollution from water industry sewage works, diffuse pollution from urban sources, physical modification of water bodies, and point source pollution from industrial discharges.	Regional	The Irwell catchment is one of 15 Environment Agency led Water Framework Directive pilot areas, which may provide opportunities for improving water quality and other associated services. The many steep watercourses result in high levels of run-off, especially after heavy rainfall, with consequent impacts of erosion and increased sediment load impacting on areas downstream. With much of the NCA classified as urban, water quality is also affected by run-off from urban areas and the urban drainage systems.	Woodland planting, increasing riparian vegetation, strengthening hedgerow networks, particularly cross-slope hedgerows, will aid in the capture of chemicals and nutrients before they enter the ground water. They will also filter or slow movement of sediments and organic matter preventing it from travelling into water courses. There are opportunities to manage and extend permanent grassland, woodland and riparian habitats along cloughs, steep valley sides and near watercourses, to capture sediment run-off and improve infiltration. There are also opportunities for managing and increasing organic matter in order to help reduce compaction and/or capping of soils which can lead to poor water infiltration and diffuse pollution as a result of surface water run-off. Improvements in water quality allow the rivers' fish populations to recover and provide opportunities for enhancement, recreation and regeneration. There are opportunities to develop sustainable urban drainage systems (SUDS) in new development to improve infiltration and water quality.	**Regulating soil erosion** **Biodiversity** **Regulating soil quality** **Regulating soil erosion**

[6] River Basin Management Plan, North West River Basin District, Environment Agency (2009) (accessed January 2013; URL: www.environment-agency.gov.uk/research/planning/33106.aspx)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Rivers Surface waters Woodland and hedgerows Wetlands Canals Permanent pasture	The principal rivers in the northern part of the NCA are the River Irwell and its tributary the River Roch, which have their sources in the uplands of the Southern Pennines NCA. Within this NCA they drain a highly urbanised area to the north of Manchester that includes Bolton, Bury and Rochdale. The River Irwell then flows on to the Manchester Conurbation NCA where it joins the rivers Irk and Medlock at the Manchester Ship Canal. The Irwell Catchment has a history of flooding, with Salford and Manchester City Centre (in Manchester Conurbation NCA) in the lower catchment, worst affected after widespread and/or prolonged heavy rain. Settlements subject to river flooding within this NCA include Rochdale in the 'flashy' upper catchment, whilst more prolonged heavy rain leads to river flooding in middle catchment settlements such as Bury, Radcliffe and Middleton. In the south of the NCA the rivers Etherow and Goyt join to form the River Mersey. The River Tame which also flows through this part of the NCA has its confluence with the River Mersey in Manchester Conurbation NCA. **Continued over...**	Regional	The management and control of flood waters in this NCA influences many urban areas and settlements and improved management could bring benefits downstream. Upstream land management practices are important in addressing rates of run-off and storage of floodwater. In this NCA the Environment Agency's preferred approach to managing flood risk includes identifying potential flood storage areas, sustainable gravel/sediment management strategies, and exploring ways of achieving land management change to reduce run-off from the rural upper catchment, for example through blocking of moorland grips, creation of storage ponds, and targeted woodland creation.[7] The scope for increasing floodplains or creating wetlands adjacent to watercourses within the valleys is very limited, as they are generally narrow and built up. The valleys are often wooded and sustainable management of the woodland and riparian habitats will continue to benefit water flow regulation. **Continued over...**	Upstream land management practices that increase vegetation cover and sward roughness can increase infiltration, interception and evapotranspiration of water and slow surface flows locally. This could be done in both this area and in adjoining upstream NCAs. There are also opportunities to expand areas of wetland habitats such as reedbeds and wet pastures along valley bottoms, to improve flood mitigation by intercepting and retaining water for longer within key locations in river catchments. There are opportunities to develop sustainable urban drainage systems (SUDS) in new development to improve infiltration and manage surface water. Woodland planting, strengthening hedgerow networks, particularly cross-slope hedgerows, and managing pastures will aid infiltration.	**Biodiversity** **Regulating soil erosion** **Regulating soil quality** **Regulating water availability** **Climate regulation** **Sense of place**

[7] Irwell Catchment Flood Management Plan Summary Report, December 2009 (Environment Agency), accessed from www.environment-agency.gov.uk/research/planning/33586.aspx

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow continued		**...continued from previous.** The upper part of the Mersey catchment lies to the east in the Dark Peak and Southern Pennines NCAs. Within this NCA, flood risk in the steep and heavily urbanised upper catchment of the River Tame is concentrated at Uppermill, Mossley and Stalybridge. The Goyt and Etherow are more rural and have fast response times; flood risk occurs in Glossop, Hollingworth and Woolley Bridge on the Etherow and New Mills on the Goyt. The upper catchment, for example in the Peak District National Park, provides opportunities to store water and/ or manage run-off to reduce flood risk downstream as well as improving natural habitat locally.[8]		**..continued from previous.** Many of the watercourses in the Irwell Catchment are heavily modified, and there are features such as mill walls and industrial structures close to rivers that were not constructed to act as flood defences. Riverside development has resulted in properties at risk from main river flooding. The Upper Mersey catchment has historically been subject to sudden periods of flooding. Surface water flooding is known to occur in urban areas of this catchment. It is as a result of short intense storms, when the capacity of the urban drainage system is exceeded and water is forced to flow across the ground.		

[8] Upper Mersey Catchment Flood Management Plan Summary Report, Environment Agency (2009) (accessed January 2013; URL: www.environment-agency.gov.uk/research/planning/33586.aspx)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Semi-natural habitats Hedgerows	Isolated areas of lowland heathland and lowland meadows provide only a limited source of nectar to attract pollinating insects. A network of hedgerows is found in the area and where these are species rich, they benefit pollinating insects.	Local	With little arable production, pollination is not a strongly required service in this NCA, however, generally there is an increasing need to ensure that habitats are in good condition, and to find ways to extend them, to support pollinating insects for longer. Road verges could be managed to provide improved nectar sources.	There are opportunities to expand areas of species-rich grasslands on the moorland fringes and within valleys. There are opportunities to improve road verge management so that they provide nectar sources. There are opportunities to improve management of small greens and parks within villages and towns. There are opportunities to include green infrastructure and biodiversity habitat within new development. There are opportunities to achieve mosaics of farmland vegetation in the landscape.	**Biodiversity** **Sense of place** **Food provision**
Pest regulation		Not applicable in this NCA.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiring places	Strong patterns of upland pastures Enclosed narrow valleys with wooded sides Mills, farmsteads, villages and drystone walls built of local gritstone Strong industrial archaeology From elevated vantage points there are strong visual links to the Pennine Moors and across the Manchester conurbation	Sense of place is dominated by a unified, undulating landform incised by narrow steep-sided valleys with fast flowing rivers, forming a transitional landscape between Manchester and the open moorlands of the Dark Peak and Southern Pennines. Large urban settlements dominate the area, alongside the remains of heavy industries of quarrying, sand and gravel working, landfilling, brick making and textiles. Amidst the recent development are traditional buildings such as farmsteads and the cores of older settlements constructed in characteristic Pennine stone with Welsh slate roofs, linked by stone walls and narrow winding lanes. This helps to generate a consistent, upland feel in places. Senses of inspiration and escapism are constrained by urban development and industrialisation, however in places there are extensive long distance views from elevated vantage points across urban development in the valleys to the Pennine Moors. A sense of inspiration may also be derived from the strong industrial archaeology of the area.	Regional	The Manchester Pennine Fringe has a transitional landscape character, one that links the urban areas with the open moorlands of the Dark Peak and Southern Pennines. The close proximity of the Pennine hills, which shape the extent of the urban areas and provide a backdrop to these towns, contributes strongly to the sense of place. Millstone Grit building stone and red bricks give a strong sense of identity to the villages and urban areas and are intimately associated with the landscape. The area is very popular with the many residents of nearby conurbations for recreation and relaxation. Communities also value their local green spaces as places of local distinctiveness that provide opportunities to engage with nature close to where they live and work, and that help encourage a sense of community.	There is scope to protect the contrasts between open expansive moorlands, walled pastures of the moorland fringes, and enclosed wooded valleys. There are opportunities to retain and restore patterns of dry stone walls and the vernacular architecture of farmsteads and field barns. Restore and enhance the hedgerow patterns to strengthen the landscape pattern. There are opportunities to connect communities with their local green spaces. There are opportunities to enhance field boundaries, dry stone walls and hedges, and improve recreation and educational access through agri-environment schemes. There are opportunities to ensure that development respects local settlement patterns and building materials, and to avoid the loss of historic evidence through insensitive development.	**A sense of history** **Recreation** **Regulating soil erosion** **Regulating water flow**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of history	Prehistoric features on high ground Medieval settlements, farmsteads Early weavers' cottages, small-scale industrial artefacts and strong patterns of dry stone walls Industrial heritage revealed through mills, canals, factories Unity to all structures through widespread use of local gritstone 15 registered parks and gardens, 12 scheduled monuments and 1,314 listed buildings	The history of the landscape is evident in the area's strong links to the textile industry. Stone and brick buildings including mill lodges sit alongside abandoned isolated farms, cottages and water drive mills and reservoirs. The historic trans-Pennine routes of the Rochdale Canal and the Liverpool and Manchester railway connect areas. The industrial towns of Bury, Oldham, Rochdale and Glossop include a range of industrial structures, especially large mill complexes and associated areas of planned workers' housing and the villas of mill owners and managers. The registered parks and gardens include Heaton Park (Manchester), Smithills Hall (Bolton) and gardens, Alexandra Park (Oldham), Queen's Park and Stamford Park (Stalybridge), Queen's Park (Bolton) and Queen's Park (Rochdale).	Regional	Aspects of history likely to be particularly evident to the public include the old cotton mills which are imposing features in some of the industrial towns. This area is well known for its visible industrial history resulting in a range of structures and features. The main emphasis will be on protecting features, but also on interpreting them to the wider public. Some old cotton mills have found alternative uses but many are derelict. Some demolition of industrial heritage has taken place to facilitate urban regeneration. The connection between geology and the industrial heritage include the historical link to coal mining and the underlying Pennines Coal Measures; clay and brick making; the link with sand and gravel extraction and the extensive Quaternary glaciofluvial sand and gravel deposits. There are 15 registered parks and gardens and 12 scheduled monuments within this NCA, as well as the Irwell Sculpture Trail, allowing access to green infrastructure for the nearby urban populations as well as benefits for biodiversity.	There are opportunities to protect, manage and interpret the many layers of historic evidence. There are also opportunities to ensure that the restoration of vernacular buildings is carried out using local styles and appropriate materials, and that land management practices and developments such as tracks do not damage archaeological evidence or historic features. Encourage the sensitive restoration of existing buildings to maintain historic features. There are many opportunities to use the Pennine Bridleway and the public rights of way network to gain access to, reveal and interpret the area's rich history. There are opportunities to retain and restore patterns of dry stone walls and the vernacular architecture of farmsteads and field barns.	**Sense of place / Inspiring places** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of tranquillity	Parklands and urban green spaces Pockets of remote agricultural land along the moorland fringes	Tranquillity is not a feature typically associated with this area given the extent of development, with none of the NCA classified as 'undisturbed' (little changed since the 1960s)[9]. A sense of tranquillity may nevertheless be associated with the area's parklands, canals, rivers and urban green spaces.	Local	There are very few areas of relative tranquillity within this NCA. The expansion of residential settlements, industrial estates and development of the road and motorway network are all contributing to further the urban character of the area. The higher tranquillity scores occur around the edges of the urban areas and towards the northern and eastern edges of this NCA.	There are opportunities to retain the sense of tranquillity in the parklands and urban green spaces by protecting them from inappropriate development and through wider connectivity between urban green spaces and the rural Pennine fringes. There are also opportunities to improve and maintain semi-natural habitats such as clough woodlands which may increase the sense of tranquillity in the urban fringes. Seek to ensure new woodland contributes to the recreational value and assimilates urban fringes to enhance rural character and tranquillity where appropriate. Opportunities exist to promote the calming and restorative effect that contact with tranquil and sensory environments have on visitors' health and wellbeing.	**Biodiversity** **A sense of place/inspiring places** **Recreation**

[9] CPRE Intrusion Map, 2007

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Network of footpaths Open access land The Pennine Bridleway The Red Rose Community Forest Local trails and locally accessible greenspace including country parks and Local Nature Reserves	Recreation is supported by the area's 1,031 km rights of way network (with a density of 2.6 km per km^2), including the Pennine Bridleway of which 14.2 km cuts through the area, as well as 214 ha of open access land (0.5% of the NCA). In addition, the Red Rose Community Forest covers 36% of the NCA. Given the NCA's proximity to Manchester and many other large towns, the countryside is well used for recreation including angling, horse riding, golfing and walking. There are 437 ha of country parks, 396 ha of Local Nature Reserves, 957 ha 'Woods for people', and 15 Registered Parks and Gardens.	Local	There are many access opportunities here reflecting the needs and interests of the large urban populations in the area, and with easy access by road, rail and bus. There is still scope to improve the provision of a range of recreational opportunities to allow greater public participation, understanding and enjoyment of the natural environment and to provide interpretation of the many elements of the landscape. The Irwell Sculpture Trail provides a local example of interpretation of the local landscape and culture, connecting local landscape, heritage and communities.	There are opportunities to improve access by ensuring that paths are maintained, well signposted and that some surfaced paths are provided for use by all levels of ability and interest at key locations. There are opportunities to provide interpretation of the landscape and its many features, especially historic features such as boundary stones, tracks, farms, canals, mills and reservoirs, enabling visitors to understand and enjoy its character. Local greenspace provides opportunities for recreation and outdoor education close to where people live, allowing local communities to enjoy the natural environment, take action to improve it and to benefit from the health and social rewards it affords them.	**A sense of history** **A sense of place/inspiring places**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Semi-natural habitats Post-industrial habitats Species	Biodiversity Action Plan (BAP) priority habitats within the NCA are limited in extent, with isolated areas of broadleaved mixed and yew woodland, lowland dry acid grassland, lowland meadows, lowland heathland, and purple moor-grass and rush pasture. The NCA contains the Rochdale Canal SAC while less than 100 ha are nationally designated as SSSI. There are 192 Local Sites covering 5.2% of the area. 15 Local Nature Reserves fall fully or partly within the NCA.	National	Habitats and species have been identified that are of local conservation importance and require action in order to conserve them. Conserving and enhancing this network of local wildlife sites will bring benefits of biodiversity. Consideration should also be given to surrounding areas to promote linking of habitats and populations to provide a more integrated approach. Lowland meadows were once characteristic of this NCA, but meadows are now rarely managed in a traditional way and are confined to the upland fringes where the degree of slope and small field size have made improvement less worthwhile. Permanent pastures for livestock grazing also provide conditions for upland waders. Post-industrial sites such as quarries, mill lodges and reservoirs, canals and spoil heaps provide habitats for biodiversity. The urban fringe location enables people to experience biodiversity, for example at Local Nature Reserves. Pockets of habitats are often fragmented by urban land use. Species including brown hare and mountain hare are found within this NCA. Generally a mixed landscape of open fields, hedgerows, uncut grass and small woodland will benefit brown hares.	Bring habitats, particularly the nationally and locally designated habitats, into favourable condition and maintain in favourable condition. There is an opportunity to conserve and enhance semi-natural habitats and post-industrial habitats and to expand and extend them where possible. There are opportunities to manage the land adjacent to the isolated habitats to ensure that they are protected. Manage important linear routes that connect many different habitats, especially river valleys, canals and road verges. There are opportunities to promote sustainable recreation and education opportunities linked to biodiversity. Also to enhance the value of habitats for interpretation, education and visual amenity. Manage farmland to provide a mixed landscape of open fields, hedgerows, uncut grass and small woodland to benefit species such as brown hare.	**Regulating water quality** **A sense of place** **Pollination** **Recreation** **Regulating soil quality**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Exposures in old quarries Local stone used for building	There are 4 geological SSSIs in this NCA, covering an area of around 11 ha. Geologically, the Manchester Pennine Fringe lies on the western flank of the Pennine Gritstones and is underlain by Coal Measures along with grits and shales. Glacial drift cover is extensive only on the lower ground. Geological interest is revealed in many locations through human activity such as quarrying and road and rail cuttings.	Regional	Lowside Brickworks, Ashclough and Tonge River Section SSSIs are important sites for Carboniferous stratigraphy and fossils. The Manchester Pennine Fringe NCA is a heavily urbanised area and there are pressures on geological sites for landfill and development. The close proximity of large populations also offers opportunities for education and recreation at these sites. Old and existing quarries providing opportunities for people to see and understand the underlying geology.	There is an opportunity to maintain the diversity and integrity of geological and geomorphological features within the NCA and enhance their value for interpretation, education and visual amenity. There is the potential to identify sites of local geological interest, and where appropriate to improve enjoyment and understanding of the area's geology.	**A sense of place/inspiring places** **A sense of history** **Recreation**

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